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# A FRAMEWORK TO DEVELOP COMPETENCY PROFILES USING ONLINE COLLABORATION

BY

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**Approval of Dissertation**

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## Dedication

This project is dedicated to recruit firefighters everywhere, and all workers in the trades, construction, and heavy industry. Their lives and well-being, and the comfort and security of their families, depend on effective safety training.

**Acknowledgement**

The road to a doctoral degree is rarely smooth for anyone travelling it. Mine has had a few more bumps and ruts than many. I'd like to thank some of the people who helped smooth the way.

She may not realize it, but Dr. Susan Bainbridge provided inspiration in a particularly muddy section. The final stretch of the road would have been impossible without the patience, reassurance, and support of my supervisory committee: Dr. Mohamed Ally (my supervisor who got the whole journey back on track after a somewhat chaotic and uncertain start), and Drs. Susan Moisey and Aga Palalas. They all guided me through the most difficult parts of the road, and I am deeply indebted to them.

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This journey would have never started without the person who was beside me for every single meter, my husband, Robert Penner. "Thank you" will never be enough to recognize his endless and selfless devotion to my cause, constant support, and unwavering faith in my effort. The rookie firefighters started it, the construction workers moved it along, but Rob is the one who made it all possible, all through these long years.

## Abstract

North American businesses and corporations invest heavily in the ongoing training of employees. Unfortunately, that investment rarely yields expected returns. One reason for this shortfall is that organizations frequently develop and implement training with only a superficial grasp of the skills employees need to perform their jobs. The absence of rigorous competency analysis in corporate training environments typically results in reduced training effectiveness and minimal return on effort and investment.

This research was based on an overarching research question: *How can a competency analysis profile be conducted online, in a way that is cost-effective in both human and financial resources, and provides results of comparable rigour and quality as a competency profile developed face-to-face?* The tool created as part of this research is called an OCAN, an acronym for **O**nline **C**ompetency **AN**alysis.

Two OCANs were completed over the course of the project. While they took longer than initially planned, each OCAN chart fell within the parameters expected of face-to-face DACUMs, and was achieved at a quarter of the cost. The lessons learned from this research indicate that that the efficiency of the OCAN process can be substantially increased, leading to a form of workplace competency analysis that is effective, relatively inexpensive, and fast. It is hoped that the availability of such a tool will increase its use in workplace training, and lead to better training outcomes.


*Keywords:* competency analysis, competency profile, DACUM, Delphi method, online collaboration, workplace training

## Table of Contents

## List of Tables

## List of Figures

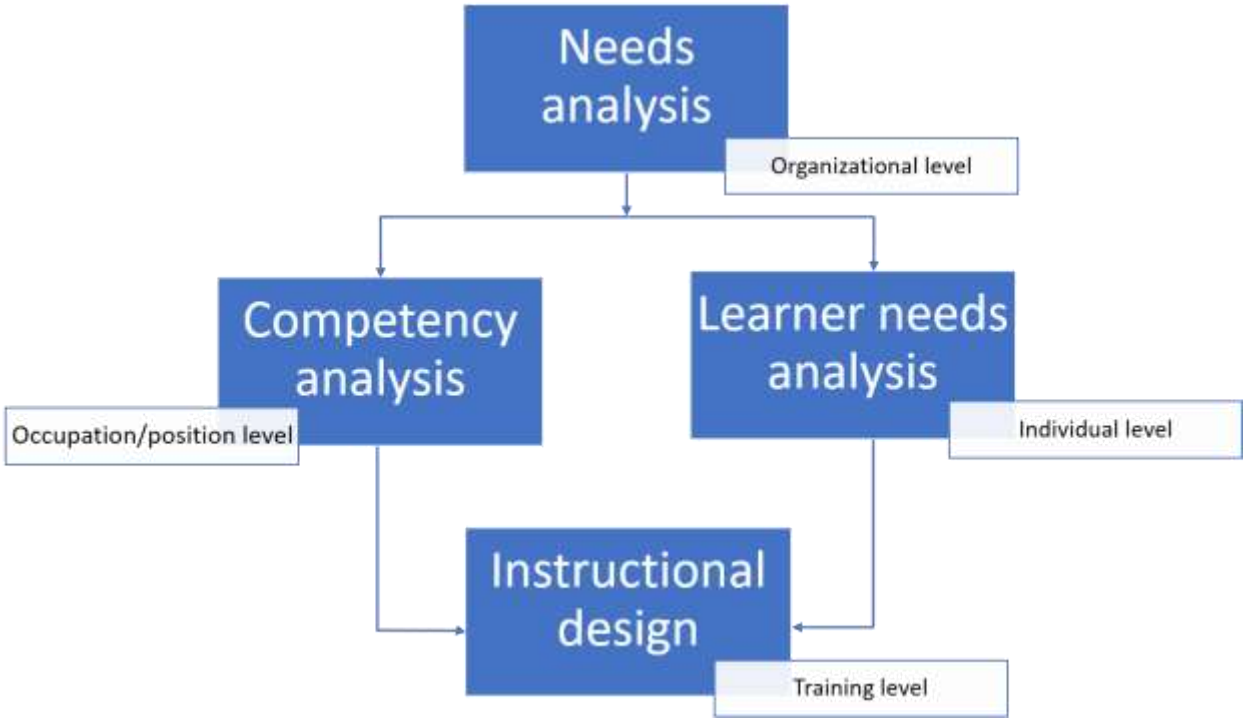
## Chapter 1: Introduction

North American businesses and corporations invest heavily in the ongoing training of employees, in the order of billions of dollars per year. In Canada in 2017, employers spent about $1.3 billion on workplace training (Cotsman & Hall, 2018). Unfortunately, that investment rarely yields expected returns (Al-Sakafi, Al-Hamami, & Ali, 2019; Burke & Hutchins, 2007). One reason for this shortfall is insufficient attention to the initial stage of training development, namely the analysis of the prospective learners and their work. Organizations frequently develop and implement training with only a superficial grasp of the skills employees need to perform their jobs. The absence of rigorous competency analysis—a clear articulation of the exact skills needed, and the level of proficiency required in performance—in corporate training environments typically results in reduced training effectiveness and minimal return on effort and investment.

The terms “competency analysis,” “needs analysis,” and “learner needs analysis” overlap in meaning. Competency analysis sets out the skills required by a job or occupation and the proficiency required by someone performing them. Needs analysis, sometimes called training or learning needs analysis, refers to investigating “where training is required, who needs to be trained and finally what needs to be taught” (Kodwani & Prashar, 2019, p. 287). A needs analysis may include a competency analysis, which establishes what needs to be taught. A learner needs analysis investigates the characteristics of the learners’ abilities, knowledge, and values.

**Figure 1**

*Levels of Analysis for Instructional Design*




Generally, face-to-face methods of workplace competency analysis process are time-consuming and therefore expensive, especially as organizations are increasingly distributed, regionally and globally (Gayeski, Golden, Andrade, & Mason, 2007). Online alternatives may help to decrease the expense but are currently not used. The goal of the research was to develop and test a framework for asynchronous online competency analysis using design-based implementation research (DBIR), a methodology that lends itself both to furthering theoretical understanding and developing interventions to real-world (educational) problems, through an in-situ research process.

DBIR has its antecedents in evaluation research, participatory research, design-based research, and implementation research. It focuses on problems that persist from the perspective of multiple stakeholders, and seeks to further both theory and implementation, especially

scalable implementation. Like design-based research, DBIR is iterative and collaborative and seeks to improve learning (training) outcomes. However, while the focus of design-based research is on student learning, DBIR contributes to theories of organizational change, systems coordination, and building capacity (Fishman, Penuel, Allen, Cheng, & Sabelli, 2013). It was particularly suitable for this study in order to provide evidence that competency analysis can be widely and inexpensively implemented across business and industry.

This dissertation research study involved the eLearning development department of a privately-held, corporate testing and training company (hereafter referred to as the Company). Since its inception in 2005, the Company has trained and/or tested the competencies of more than 20 million adult workers. The Company has its head office in Edmonton, Alberta, but at the time of this research was distributed throughout Canada from Nova Scotia to Alberta. The eLearning development team included eLearning instructional designers, eLearning developers and artists, project managers, industry liaisons, and team leaders.

Two online competency analyses were conducted, one for the position of eLearning Developer, and the second for the position of eLearning Instructional Designer. The analyses included a list of competency areas, tasks that supported each area, and measures of the frequency, importance, and performance levels required for each task for both developers ("developers") and instructional designers ("IDs").

The competency analyses were developed based on a modified DACUM process that used online technology. DACUM is an acronym for **D**eveloping **A C**urricul**UM** and was developed at Holland College, Prince Edward Island, in the 1960s, but has since been implemented worldwide (Norton & Moser, 2013)**.** With the guidance of a trained facilitator, a typical DACUM process is usually conducted in real-time and face-to-face with a panel of five

to 12 expert workers, who develop a chart of areas of competence, usually called duties, and the specific tasks required in each competency area (Norton & Moser, 2013). For this study, the DACUM process was adapted for asynchronous, online implementation using the Delphi method of inquiry.

The Delphi method was developed in the 1950s at the Rand Corporation in the United States as a way of achieving a consensus from experts (Hsu & Sandford, 2007). The earliest uses of the Delphi method were enquiries that included five to 15 experts in a specific industry, who were asked to identify and rank order potential vulnerabilities in their industry (Linstone & Turoff, 2011). The Delphi method is like the DACUM process in that it gathers experts, asks them for opinions about a specific subject, and extracts a consensus from the results. However, the Delphi process has a broader range of objectives and applications, including program planning, needs assessment, policy determination, and resource utilization (Hsu & Sandford, 2007). While DACUM is used for instructional or training purposes, it shares two goals with the Delphi process: “to determine or develop a range of possible program alternatives” and “to seek out information which may generate a consensus on the part of the respondent group” (Hsu & Sandford, 2007, p. 1).

The two methods are further aligned. Both DACUM and Delphi are used to gather information from experts and both use facilitated brainstorming to produce results. Both types of inquiry are iterative. The Delphi method is explicitly iterative by design: ideas are gathered during several cycles. DACUM is implicitly iterative in that the facilitator probes repeatedly for ideas that fit the DACUM parameters of competency/duty and task, and participants review, order, and refine their ideas once the ideas have been sufficiently articulated.

While the Delphi method and DACUM process have similar objectives and methodologies, a literature review did not discover any published research linking the two. However, the research comes at a point when investigating the utility of such a link may be beneficial to both methods. A face-to-face DACUM, while a valid and reliable method to perform a competency analysis, is frequently resisted by corporations as too expensive in terms of time and human resource requirements. The Delphi method, asynchronous and including widely distributed participants, has been criticized for being inefficient because of the time required between cycles and the tendency for panel members to drop out because of the time requirements (Gnatzy, Warth, von der Gracht, & Darkow, 2011). An asynchronous, distributed method of conducting a DACUM would likely be more palatable to senior managers and executives, less disruptive to the workforce, and more convenient in geographically distributed organizations. Providing an online model of the Delphi method could further extend the utility of this method of inquiry as well. However, the primary goal of the study was to determine if an asynchronous online competency analysis results in a competency profile as robust as a DACUM done in real time, face-to-face.

**Rationale**

The enormous financial investment in workplace training is evidence of its importance to business and industry, and in the United States about 33% of that training is delivered online, either synchronously or asynchronously (Ho, 2019). The latest Canadian data are similar: about 37% of workplace training is delivered online (synchronously or asynchronously), and 77% of organizations use asynchronous online instruction to deliver workplace training (Cotsman & Hall, 2018, pp. 42-44). However, the implementation of learning needs analysis, specifically determining what competencies employees require to meet organizational goals, is overlooked

and ignored (Garavan, et al., 2020). Unfortunately, this lack of competency analysis means that employees receive training that may be engaging, and may even result in the acquisition of new information, but does not change their on-the-job behaviour. Since the training does not result in better job performance, it is ineffective in the context of a corporate environment. This lack of initial analysis pervades organizational training (Garavan et al., 2020, p. 63; Lacrenza, Reyes, Marlow, Joseph, & Salas, 2017, p. 1689).

While needs analysis, and therefore competency analysis, is mostly avoided in corporations, there are occasions where it is used. But often these analyses are problematic. Sometimes they are based on previously published information such as job descriptions or evaluation protocols that may be out-of-date, too vague, or based on an idea of what the job should be, rather than what the job actually entails. Other times, the analysis may rely on input from staff in a human resources function, rather than on the people who perform the job and can speak best about the tasks involved and the expertise required (Russ-Eft, 1995). While the DACUM process can surmount these problems by relying on master performers of the job, it also requires specially trained professionals. A DACUM is most effective and efficient when conducted by a trained DACUM facilitator (Norton & Moser, 2013, p. 9). Certification as a DACUM facilitator requires specific and expensive training. A DACUM also requires a scribe familiar with the method. The cost of employing a DACUM facilitator and scribe is prohibitive for many corporations. DACUM consultants command large fees that a corporation may be reluctant to allocate to an activity only indirectly related to front-line operations.

As a result, the initial analysis phase required for training development is either not done, or not done rigorously. When the essential competencies or tasks of the job being trained are not accurately identified in the analysis phase, effective training cannot result. Unfortunately,

success is not often measured by improved job performance. Too often the value of corporate training value is assessed by counting attendance figures (generally the most important information collected from learning participants), so the root causes of training ineffectiveness are obscured. When such limited measures are used, making a business case for competency analysis funding is even more difficult.

**Research Question**

Since the main impediments to performing a competency analysis in a workplace environment are time and money, would the availability of an economical, timely, and high quality version of competency analysis lead to wider application in corporations? However, before this question could be answered, the tool that met these criteria had to be developed and demonstrated as a proof-of-concept. The need to develop such a tool and provide a credible demonstration of it underlies this research.

This research study is based on an overarching research question: *How can a competency analysis profile be conducted online, in a way that is cost-effective in both human and financial resources, and provides results of comparable rigour and quality as a competency profile developed face-to-face?* The tool created as part of this research is called an OCAN, an acronym for **O**nline **C**ompetency **AN**alysis.

Several other questions follow from the main research question:

1. What is the framework of an OCAN that meets those standards?
2. How fit for purpose are the online collaboration tools widely available in a corporate environment (e.g., Microsoft OneNote) in conducting an OCAN?
3. What will an OCAN cost an organization in terms of the resources required?

## Limitations and Delimitations

This study was limited to a single organization and functional business unit, and used online tools that were already installed at the organization. As the study examined the feasibility of replacing a face-to-face DACUM with an OCAN, its scope was limited to evaluating the OCAN process; it did not include testing whether OCAN can bring about significant improvements in training effectiveness. While the literature review that follows presents evidence that an initial competency analysis improves training outcomes, testing whether an OCAN specifically will do so was outside the scope of this project. However, this study compares the OCAN results with the generally accepted standards for an effective DACUM (Norton & Moser, 2013, pp. E3-E5).

### *Limitations*

Limitations are conditions outside the researcher's control that affect the scope and outcome of the research (Simon & Goes, 2018). Chief among the limitations of this study was needing to confine research to a sample of convenience within the Company. Recruiting participants in different companies was attempted. Three other organizations committed and subsequently withdrew their support as their organizational goals changed. Initial recruitment of staff within the psychometrics unit of the Company was unsuccessful, even with support from the unit's leadership and a small monetary incentive. Finally, I asked members of my own business unit (eLearning content development) if they would participate in the study; almost all of them agreed, there was enthusiastic support from the business unit leaders, and the research proceeded.

### *Delimitations*

Delimitations are constraints that arise from a researcher's conscious decisions and choices that narrow the scope of the study (Simon & Goes, 2018). There were several in this research project. The first was the decision to use a DACUM-like process as opposed to other competency analysis methods. I am a trained DACUM facilitator, and not formally trained in other methods. It would not have made sense to attempt a competency analysis using a method of which I had little or no experience.

Secondly, participants estimated and self-reported the amount of time they spent creating the competency lists or otherwise participating in the project. A more precise measure of time spent, using a computer-based timer, would have been helpful, but it was believed that the additional effort to stop and start a timer would have inhibited participation, and may not have added any accuracy to the results. One of the key elements of this research was the decision to use only software commonly available and pre-installed in business organizations. Dedicated software used to capture participants' input, including automatic timers, was outside the scope and design of this research.

Third, this research does not address the utility of the competency analyses that were created by the participants. It was limited only to the feasibility of conducting a competency analysis asynchronously and online, with pre-existing software at the research site. Evidence about how well the analyses performed as hiring, training, and development tools was beyond the scope of this research. Ideally, the analyses would be used for those tasks, evaluated as to their effectiveness, and modified as a result. That research is a long-term project in a business unit of fewer than 20 people.

Finally, a complete DACUM is a two-step process. The first step is the brainstorming and consensus building about the duties and tasks required in a particular occupation, and their relative frequency, importance, and performance characteristics. The second step is to have these results reviewed by as many as 50-100 people who are not part of the first step. Often this review goes beyond the sponsoring organization. This second step is always done asynchronously, at a distance, usually by email or regular mail. This research is specifically concerned with the first step and does not include the second step.

In spite of these limitations and delimitations, the study extends the literature on online facilitation and its uses in developing consensus. Near the completion of this study, much of the developed world was quarantined in order to reduce the spread of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), commonly known as COVID-19. Organizations that had not had a distributed workforce prior to the quarantine were forced to develop tools and procedures to allow their employees to work away from their normal, convened workplaces. If there were ever a time to introduce new tools for online discussion, consensus-building, and decision-making, it is now.

Such information may be used in the development of online corporate training protocols. The project also extends the use of DBIR beyond education and community groups. It is hoped that as DBIR and similar methodologies are used in workplace research, more formal workplace studies will be done.

**Organization of the Dissertation**

Following this introduction is a review of the scholarly literature on corporate training effectiveness, the concepts of competence and competency analysis, as well as a brief description of the two main processes that form the foundation of the DACUM, Delphi, and new OCAN

method of enquiry. The rationale for conducting the study using a design-based implementation research methodology is discussed, as well as the research methodology and procedures. The Results chapter is followed by the Discussion chapter, which includes answers to the research questions and recommendations that could have improved this research. The Conclusion chapter summarizes the findings and makes suggestions for future research.

## Chapter 2: Literature Review

This chapter reviews the literature in workplace training effectiveness, competence, DACUM and Delphi methods, online collaboration, and DBIR. Google Scholar was used to search for all these terms, both alone and in combination with each other. In general, the search was started with the broadest term, for example, "corporate training." The search results were then combined with a Boolean "and" for the term "effectiveness." A further search was then done on the combination term "corporate training effectiveness." Other forms of keywords were also searched so "workplace" and "corporate" were both used. "Teams" and "teamwork" were all combined with both "collaboration" and "facilitation." Similar search strategies were used for the other terms, alone and in combination.

The literature was also searched using the Athabasca University Library "Discovery" system which searched both the Library's collection, and the ProQuest database. Index and abstract databases were also searched, using truncation characters as appropriate. The literature search included Academic Search Complete, EBSCO, ProQuest Business Databases, and Sage Journals Online. Results were limited to those from 2010 and beyond. However, where the literature referred to foundational, earlier work, those sources were also reviewed.

### Corporate Training Effectiveness

Since the publication of *The Fifth Discipline* (Senge, 1990/2006) employee training is widely regarded as necessary, if not sufficient, to build what the book terms a "learning organization." A learning organization is one in which "people continually expand their capacity to create the results they truly desire…where people are continually learning how to learn together" (p. 13). The need for learning organizations is driven by the accelerating rate of change in business and society, and the necessity to build "enterprises capable of continually adapting to

changing realities clearly demands new ways of thinking and operating" (p. 9) Organizations require "new capacity for continual learning, innovation, and adaptation" (p. 9), predicated on effective training and development systems. Senge notes that "the organizations that will truly excel in the future will be the organizations that discover how to tap people's commitment and capacity to learn" (Senge, 2006, p. 15). Salas, Tannenbaum, Kraiger, and Smith-Jentsch (2012) argue that "training and development activities allow organizations to adapt, compete, excel, innovate, produce, be safe, improve service, and reach goals" (p. 74). More recently, Bisbey, Traylor, and Salas (2020) note that, "Skilled employees provide organizations with competitive advantage, so workers must continuously learn and develop their KSAs to remain relevant," where KSAs refer to knowledge, skills, and attitudes (p. 488). In short, since corporations are organizations, corporate training enables the continuing successful operation of the business as conditions change.

But while organizational leaders will readily agree that training is essential, the fact is that corporate training departments are cost centres, not profit centres. As economic fortunes change, especially in volatile sectors such as the energy industry, corporate training departments increasingly find it difficult to protect their budgets, programs, and staff.

### *Training Transfer*

This situation is not helped by the unwelcome truth that corporate training is often ineffective (Baldwin & Ford, 1988; Burke & Hutchins, 2007). Employees are unable to apply their training in knowledge, skills, and attitudes to on-the-job performance. For training to be effective, there must be a positive transfer from the training event to the employee's tasks. This transfer is defined as the "degree to which trainees effectively apply the knowledge, skills, and attitudes gained in a training context to the job" (Baldwin & Ford, 1988, p. 63). Estimates of how

much training leads to positive transfer were small, ranging from less than 10% (p. 63) to about 50% (Burke & Hutchins, 2007, p. 263). Not surprisingly, with such low rates of positive transfer, training must be repeated to be effective (Blume, Ford, Baldwin, & Huang, 2010). Given the above-noted deficiencies in training, millions—if not billions—of dollars spent on both direct and indirect training investment have been wasted. It is for this reason that Ford, Baldwin, and Prasad (2018), in revisiting the literature since Baldwin and Ford's initial review in 1988, note that, "training investment at the organizational level of analysis is viewed so positively, whereas individual training initiatives are viewed so skeptically" (p. 202).

Baldwin and Ford's model of the transfer of training (1988) states that the transfer process includes training inputs, training outcomes, and the conditions of transfer (p. 64). Training inputs include training design, trainee characteristics, and work-environment characteristics (p. 64). Instructional designers can only influence learning transfer at the initial training design stage, and have no input on the trainee/learner or environment characteristics. Sitzmann and Weinhardt's (2018) training engagement model states that training effectiveness requires goal establishment, goal prioritization, and goal persistence. In this model, instructional designers' influence is limited to goal establishment, "the causal mechanism that triggers where mastery or completion goals" (p. 734).

Training design, in Baldwin and Ford's model, and goal establishment, in Sitzmann and Weinhardt's model, are therefore opportunities for instructional designers to influence training effectiveness and learning transfer. A clear and explicit understanding of the duties and tasks required of a specific job function is a key driver in workplace instructional design (Franklin, 2005). However, an analysis that determines the duties and tasks required on the job requires an investment of time and resources, which in turn requires a commitment from corporate senior

executives and managers to allocate them. Over 10 years' experience in corporate training has led me to believe that this commitment is largely lacking.

### *Balancing the Iron Triangle*

One reason for the lack of commitment is that the field of competence and competency analysis is not well-defined by researchers (Succar, Sher, & Williams, 2013), much less the staff in corporate training departments. Competency analysis is usually presented as a table of skills, tasks, and/or attributes. It is not innately engaging except to specialists in the field. (In this regard, it is like financial analysis, but less animated.) On the other hand, an actual training program can use an impressive array of multimedia and interactive strategies, which can distract decision-makers from whether the training program will meet business objectives.

The demand for fast implementation of training programs (because time equals money), a poor understanding of how expert competency analysis should inform instructional design, and a corporate unwillingness to fund activities that do not seem to have a tangible, measurable product, have led to corporate training environments that produce training programs that may be stylish but do not meet actual corporate needs. In addition, many corporations, particularly large ones with significant training needs, are distributed across the globe. There is significant cost to bringing together subject matter expertise, and since corporate training is so frequently ineffective, it becomes very difficult to justify additional resources when so much is wasted.

Workplace processes are strictly constrained by the Iron Triangle, a concept that describes the three-way balance among quality, time, and cost. While the Iron Triangle is generally used as the measure of a project's success (Atkinson, 1999), a project that favours one side over the others must be justified by a significant return on investment. Because workplace training is widely—and correctly—viewed as providing poor return on investment, the Iron

Triangle is particularly rigid when considering training innovations. Corporate training will not improve until a comprehensive, high quality competency analysis can be completed with a minimal input of time and resources. Current competency analysis methods fail to balance the iron triangle, favouring one or more dimensions over the others.

In her editorial in *Human Resource Development Quarterly*, Russ-Eft (1995) reviewed different approaches to competency analysis, including task analysis and task inventory, functional job analysis, expert panels, critical incident method, and behavioural event interviewing. She noted that task analysis and inventories are beyond the capacity of all but the largest organizations, such as the U.S. armed services, disadvantaging the cost side of the Triangle, and by extension, the time side (since time is usually proportional to cost in business organizations). She criticized other approaches, including DACUM, for their reliance on subject matter experts, who "may not be the most appropriate group to identify critical competencies" (p. 332), thereby disadvantaging the quality side of the Iron Triangle.

(It should be noted that this criticism of DACUM is somewhat misplaced. The DACUM method specifies using technically proficient workers who are employed full time in the occupation under review [Norton & Moser, 2013, p. C-6]. In fact Russ-Eft does not make clear distinctions between subject matter experts, expert panels, and the preferred participants, "individuals nearest to the observation of that competency" [Russ-Eft, 1995, p. 334]).

Russ-Eft (1995, p. 334) recommends that a competency analysis should gather information from expert workers who perform the job directly. The analysis should include participants from as many levels and perspectives as possible. In addition, as the workplace continues to change at an increasing pace, a competency analysis should be repeated frequently (Russ-Eft suggests annual reviews). This increase of the burden on the quality side of the Iron

Triangle, with well-informed and frequent analysis, also results in heavier loads on the time and cost sides. In organizations which are already skeptical of the benefits of training, and reluctant to invest more resources in cost centres, a competency analysis is either absent or ineffective. What is needed is an analysis method that provides a comprehensive result (meeting quality requirements), at little expense (meeting cost restrictions), in a timely fashion (meeting time constraints). An online method that avoids significant time and resource investment can create stability in the Iron Triangle, and provide a feasible alternative to poor or nonexistent competency analyses.

These subjects are reviewed in more detail in the rest of this chapter.

### *Using Instructional Design in Workplace Training*

When training is designed systematically, it usually adheres to an instructional systems design model which divides the process into phases. Among the most widely-used sequences is that of analysis, design, development, implementation, and evaluation—referred to as ADDIE (Allen & Sites, 2012). While there is no definitive, authoritative source for ADDIE (Molenda, 2003), the five phases—analysis, design, development, implementation, and evaluation—are widely accepted as an effective model of instructional systems design.

The first phase (analysis) comprises a comprehensive inquiry into the specific nature of the task and its supporting functions, the level of performance required, pre-existing training and/or instructional resources, the instructional setting, and the characteristics of prospective learners such as prior education/training level. This phase, including competency analysis, is considered the crucial foundation of developing an effective training program (Marrelli, 1998; Taylor, O'Driscoll, & Binning, 1998). If the competency analysis is not done well, then the training curriculum may be unreliable, and lead to reduced training effectiveness. Salas et al.

(2012) noted that maximizing effective training begins with a comprehensive training needs analysis, including a rigorous exploration of job functions and specific tasks and competencies. They emphasized that a "systematic job-task analysis….is the blueprint for training" (pp. 80-81).

Even though the initial competency analysis is crucial, this task is often omitted or done poorly (Salas et al., 2012). In their meta-analysis of 636 training effectiveness research studies covering the period from 1960–2000, Arthur, Bennett, Edens, and Bell (2003) found that only 6% of organizations reported using a needs analysis at an organizational, individual, or task level (p. 242). Despite the importance of a needs analysis to support effective training, the vast majority of organizations neglected this step when developing workplace training.

For-profit organizations engage in activities that create a positive return on investment (ROI) and avoid activities that do not. However, measuring the ROI of training is difficult because the specific tools, expertise, and long-term perspective to measure the impact of training on business outcomes are unavailable in most organizations (Berge, 2008). Since there is no effective way to measure the ROI of training, training is categorized as a cost (Berge, 2008, p. 392), and organizations strive to reduce costs.

Effective instructional design requires comprehensive, high-quality competency analysis, and such an analysis currently requires significant investment. Only very large organizations, such as U.S. armed services have the resources to carry out task-based analyses and inventories (Russ-Eft, 1995, p. 330). Competency analyses that rely on technically proficient workers pull these workers from direct production activities in order to participate in the analysis. Consulting with skilled personnel across distributed organizations with offices and staff across countries and around the world, is even more costly. In the effort to reduce costs, it is difficult to have any but

the most rudimentary training needs analysis expenses approved, and a haphazard analysis can be detrimental to the organization (Giffort, 1998; Sarkar, 2013; Teodorescu & Binder, 2004).

Yet accurate, comprehensive competency analysis remains essential to effective ongoing training in organizations (Marrelli, 1998; Salas et al., 2012). The ideal analysis would fall within the constraints of the Iron Triangle: comprehensive and rigorous, timely, and relatively inexpensive. The fact that so few organizations conduct a competency analysis prior to developing training suggests that this combination is currently unavailable.

## The Concept of Competence

There is wide variation in the scholarly literature on the definition and application of terms such as competency, job, and task. The first academic definition of competency is generally considered to be from McClelland in the 1970s (Gayeski, Golden, Andrade, & Mason, 2007; Lambert, Plank, Reid, & Fleming, 2014; Markus, Cooper-Thomas, & Allpress, 2005; Marrelli, 1998), a Harvard psychologist best known for his work on Achievement Motivation Theory. McClelland (1973) felt that paper-and-pencil test scores were not valid predictors of success in academia or the workplace. He suggested that an analysis of performance of job components would provide a better indicator of proficiency, saying "If you want to test who will be a good policeman, go find out what a policeman does. Follow him around, make a list of his activities, and sample from that list in screening applicants" (McClelland, 1973, p. 7). While McClelland did not explicitly define competence using that term, he was discussing observable behaviours that were closely aligned to job requirements.

The discussion of competence in pedagogy moved to the field of human resources with the 1982 publication of *The Competent Manager* by Boyatzis (as cited in Woodruffe, 1993b). In discussing the effect of Boyatzis's work, Woodruffe (1993b) distinguished between competence

and competency, suggesting that competence was an "aspect of the person which enables him to be competent," and that competency was a "behaviour people need to display in order to do the job effectively" (p. 30). In this definition, competence is a personal trait, either learned or inherent, that it resides in observable (and therefore measurable) behaviour.

In 1990, Prahalad and Hamel moved the definition of competence from pedagogy to business and industry. They coined the phrase *core competence*, and used competence and competency interchangeably. Rather than a characteristic of individuals, Prahalad and Hamel (1990) considered competencies as organizational assets. They defined competencies as "core products that contribute to the competitiveness of a wide range of end products" (pp. 82-83). In their view, a corporation's competence was defined by what it produces. Their concept of corporate competence can be considered analogous to individual competence, given that an individual's observable behaviour must be a product of the individual's activity.

Marrelli's (1998) definition of competence was direct and clear, contending that competencies are "measurable human capabilities that are required for effective work performance demands" (p. 8). She noted that the field was continuously evolving and that her definition was but one of many. In a similar vein, Athey and Orth (1999) defined competency as "a set of observable performance dimensions, including individual knowledge, skills, attitudes, and behaviours, as well as collective team, process, and organizational capabilities, that are linked to high performance, and provide the organization with sustainable competitive advantage" (p. 216). By including both individual and organizational characteristics, Athey and Orth (1999) incorporated Marrelli's (1998) concept of observable individual behaviour as well as Prahalad and Hamel's (1990) ideas of production and competition.

The multiplicity of definitions of competence has not abated. Shippmann et al. (2000) attributed the lack of consensus to the number of fields in which the term competence and competency were used, including psychology, education, and law (p. 707), and that each field used the term in a slightly different way. More recently, Succar, Sher, and Williams (2013) reported that there was still "no consensus among researchers on the meaning of the term *competency*" (p. 175). They noted a "non-exhaustive list" of definitions: behavioural goals, capability to perform, performance standards, standardized performance requirements, resources used to reach an objective, and a contextual expression of ability (p. 177).

For the purposes of this study, Marrelli's (1998) definition— "measurable human capabilities that are required for effective work performance demands" (p. 8)—will be used because it features several characteristics that are particularly relevant to a corporate research environment:

- It applies to individuals and their work, as opposed to Prahalad and Hamel's (1990) concept of organizational competence.
- The definition requires that the competencies, being measurable, must also be observable allowing an analysis to be performed.
- The definition also calls for the work performed to be "effective" (p. 8). Efficacy is critical in a corporate environment if the corporation is to become and remain successful.

### *Core Competencies*

A subset of competencies is known as core competencies. The elements of core competencies are not consistently agreed upon. In their comparison of the Nippon Electric Company (NEC) and General Telephone & Electronics Corporation (GTE) Prahalad and Hamel

(1990) argued that core competencies are those behaviours which support the organization's primary products and further provide opportunities for growth. They defined core competencies as "the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies" (p. 82). Core competencies are connected to the few categories—no more than five or six—in which the organization has a competitive advantage (p. 84). Prahalad and Hamel's definition of core competencies is located at the level of the organization, rather than at the level of occupation, job, or individual proficiency.

Ljunquist (2007) suggests that core competencies differ from non-core competencies not so much in kind, so much as in scope. Ljunquist also locates competence at an organizational level, stating core competencies must meet three criteria:

- The competence "contributes significantly to customer benefit from a product";
- The competence "is competitively unique," that is, serves to distinguish an organization from its competitors; and
- The competence "provides potential access to a wide range of markets" (p. 399).

Eden and Ackermann (2010) suggested that core competencies are those that enable the realization of the goals of the organization, stating that "Setting the distinctive competences within the context of the business goals of the organization is, conceptually and analytically, a way of addressing this issue and so determining core distinctive competences" (p. 18). The advantage of Eden and Ackermann's definition for this study is that it allows the differentiation between the competencies required for an organization to function, and the competencies required for the organization to meet its goals. The emphasis on meeting organizational goals, as opposed to production or competition, allows for applicability across a wider set of organizations, including non-profit and public agencies.

**Competency Analysis**

There are few details in the literature about the process of competency analysis although the use of qualitative and quantitative data is often recommended. Marrelli (1998) set out the following general steps:

- Establish the objectives for the project;
- Obtain the support of senior staff;
- Plan the project and method;
- Develop communication plans so that communication begins before the implementation on the project;
- Identify the competencies using the method chosen;
- Create a model based on the identified competencies;
- Integrate the model; and
- Evaluate the effectiveness of the model and process (pp. 12-13).

However, she left the actual method to the researcher's choice saying only "select the tools to be used to collect and analyze data. These include interviews, focus groups, surveys, observations, and more" (p. 12). Franklin (2005, p. 2) listed the same general methods and noted that interviews and surveys could provide a high-level analysis while observations and focus groups could provide a more detailed analysis.

Robinson, Sparrow, Clegg, and Birdi (2007) divided competency analysis methods into two categories, top-down and bottom-up. Top-down analysis begins with existing competency information and attempts to validate the information using primarily quantitative approaches. This approach is efficient and accurate if it draws upon a large group of people, which is possible given that quantitative data can be gathered through surveys. However, because the method

begins with existing data, it is limited by the scope of that data. The bottom-up approach is more qualitative and exploratory in nature. In this approach, data are explored without pre-existing competency labels or preconceptions about the role being analyzed, and is more time-consuming (pp. 67-68). Robinson et al. recommended that both approaches be used "in tandem" (p. 68) in order to take advantage of the benefits of each.

Campion et al. (2011) differentiated between the two approaches, referring to top-down analysis as competency modeling, and bottom-up methods as job analysis. They indicated a preference for top-down competency modeling, noting the following:

> Traditional job analysis often starts with collecting information from employees. This certainly has many advantages, such as getting information from the people who actually do the work. However, it is better to begin competency modeling information collection with top executives….to get their support for the project. (p. 233)

Campion et al. (2011) claimed that executive support is "one of the most important advantages" for top-down approaches, as senior executives can ensure that sufficient budget resources are available for implementation, and that the "proper organizational language" is used (p. 233). They further noted that "all levels of employees will likely be involved with the development of the model" (p. 233). In spite of their stated preference for a top-down approach because of the understanding senior executives have of organizational goals, Campion et al. (2011) acknowledged that all levels of employees should be consulted, and concurred with Robinson et al. (2007) that the combination of the two approaches results in greater rigor.

**DACUM Method of Competency Analysis**

One of the approaches for identifying the components of training is DACUM, an acronym for **D**eveloping **A** **C**urricul**UM** . The process was developed at Holland College in

Charlottetown, Prince Edward Island, in the 1960s, but has since been implemented worldwide (Norton & Moser, 2013, Appendix E, p. 9)**.** It is one of the most frequently used methods of work analysis and has been called the most popular of any job or occupational analysis technique (Jacobs, 2019, p. 4). DACUM combines both top-down and bottom-up methods. The DACUM process can be considered top-down because, in order to bring expert workers together, the process and funding must be approved by senior management and/or executives, thus enabling the support required by top-down approaches. However, it can also be considered bottom-up because, while the actual competency information is initially gathered from incumbent workers, which provides the advantages of a bottom-up approach, the final aggregation of data is validated by a wide sample of other workers and managers.

The most useful input in a DACUM is considered to come from the most experienced, best performing employees (Norton & Moser, 2013, C5-C7; Russ-Eft, 1995, p. 334). Unfortunately, in many organizations, these participants are often the people most valuable to the corporation. Thus, they are the least likely to be excused from daily responsibilities in order to consult with a competency analyst. In addition, it is difficult to adapt DACUM to large, rapidly changing organizations, in part because these organizations are likely to be distributed over a wide area (Kim & Hwang, 2008), and gathering a representative sample of participants in one place can be prohibitive in terms of time and expense. While the difficulty in assembling an appropriate group of experts has been noted as a limitation of the process, the DACUM method itself is considered very effective in determining a comprehensive list of competencies (Willett & Hermann, 1989).

While there have been attempts to use online surveys and other web-based tools in the DACUM process, respondents tended to be few and slow to respond (Gayeski, Golden, Andrade,

& Mason, 2007, p. 10). Further, these online methods did not combine top-down and bottom-up approaches, and resulted in data that was too general to be useful for training development, or data that was not supported by senior executives and management.

There are a number of online collaboration tools to facilitate discussion and consensus-building such as Basecamp and Asana. As the number of remote employees and distributed staff is increasing, more software is likely to be developed, and collaboration features not currently available in existing software are likely to be added. This type of software can support a modified DACUM online process, through video conferencing, virtual whiteboards, and threaded messaging. But the additional expense is unlikely to be accepted in training department budgets, and the software often requires additional support from information technology departments. It was critical to this project that the modified online DACUM be available through a widely-installed corporate user base, such as Microsoft SharePoint.

**DACUM Method and Online Group Decision Support Systems**

Nevertheless, the nature of DACUM as a brainstorming and consensus-building method suggests that incorporating online group decision support systems may provide the benefits of DACUM while minimizing the costs. Online group decision support systems are based on an older research technique, the Delphi method (Linstone & Turoff, 2011, p. 1713) and can "increase collaboration, speed of decision making, quality of decisions, and satisfaction among group members" (Gayeski, Golden, Andrade, & Mason, 2007, p. 12).

The Delphi method lends itself both to gathering information and generating consensus (Fletcher & Marchildon, 2014; Hsu & Sandford, 2007), tasks that are required as part of the DACUM process. Delphi was developed in the 1950s by the RAND Corporation for use in American national defense as way of gathering expert opinion asynchronously and in different

locations (Linstone & Turoff, 2002). The technique was meant to replace "direct debate by a carefully designed program of sequential individual interrogations…conducted by questionnaires" (Gordon & Helmer, 1964, p. 5). In the first use of the Delphi technique outside the American defense community, Gordon and Helmer selected six groups comprising 150 people. Each person completed four questionnaires, spaced about two months apart. The data in each questionnaire was collated, and presented to the participant group in a subsequent questionnaire (Gordon & Helmer, 1964, pp. 5-7).

The Delphi method has since evolved and now includes methods that use computer-mediated communication to collect the opinions and ideas of the participants (Hasson & Keeney, 2011, pp. 1696-97). Hasson and Keeney report 10 different categories of Delphi, that vary in design, aim, number of rounds, types of participants, initial rounds, and levels of anonymity. This wide adaptability has a significant advantage over proprietary group decision support systems in that the Delphi technique itself "is guided by the research problem rather than the requirements of the method" (p. 1697).

Hsu and Sandford (2007) state that in theory, the iterations of the Delphi method can be repeated until it is determined that a consensus has been reached. However, in most cases, an introduction, which is sometimes considered as the first iteration, followed by three or four rounds of data review and revision, is sufficient to achieve consensus. Hsu and Sanford explain the general Delphi framework. An introductory round, which Hsu and Sanford refer to as Round 1, consists of an open-ended or structured questionnaire about the topic under consideration. The results of the Round 1 questionnaire serve as the survey instrument for Round 2 of the Delphi. In Round 2 participants add more information and may revise the results of the first round. Participants are often asked to rank-order the results in Round 2. The largest degree of consensus

building usually occurs in Round 2. Round 3 requires that participants review the results of Round 2, clarify their positions, and defend any of their judgments that fall outside the consensus. The consensus arrived at in Round 3 is a refinement of the consensus built in Round 2, rather than a major shift. Round 4 is an opportunity for participants to perform a final review.

The adaptability of the Delphi method, its focus on meeting the needs of the research question rather than methodology make it an ideal tool for an online, asynchronous DACUM-like competency analysis. A DACUM-like process, but using a computer-mediated Delphi method, can be adapted to meet the needs of various organizations. A competency analysis that uses a methodology which can be aligned with organizational needs, rather than software or procedural limitations, is more likely to be received and approved by senior executives and management of a corporation.

**Virtual Collaboration**

As organizations have become more distributed globally, the need for teams to work and communicate through virtual channels has increased. The reported success of virtual teams has been mixed, and although "some organizations have experienced dramatic success in improving communication and collaboration…most others have experienced little or no change" (Cardon, 2016, p. 141). These "lackluster results…indicate that successful use of these platforms is most often linked to positive organizational culture and communication" (p. 141).

Online collaboration is considered to be more widely accepted and used by younger employees, and in those organizations that use an enterprise-specific social networking platform such as Slack, Asana, or Basecamp, as opposed to a public platform such as Facebook or Instagram (Cardon & Marshall, 2015). Adoption of enterprise-specific social networking

platforms is expected to increase so that 75% of organizations will have had them in place before 2020, and almost all organizations will use them by 2028 (Cardon & Marshall, p. 288).

The COVID-19 pandemic may speed the adoption of online collaboration through social networking. De Lucas Ancillo, del Val Núñez and Gavrila believe that "nothing [about the workplace] will remain the same" as it was before the pandemic and the restrictions on people gathering for any purpose (2020, p. 2299). Their analysis of research and expert opinion published from March to July 2020 states that workplaces will be more digital and flexible (p. 2305). The movement from congregated to remote workplaces will continue for the foreseeable future, making the availability of online, asynchronous competency analysis even more important.

Conducting a successful OCAN (that is, one that provides results comparable to a successful DACUM) requires collaborating virtually, rather than face-to-face, but the literature on the success of virtual teams has been mixed. Purvanova (2014) compared the effectiveness of face-to-face and virtual teams, examining two types of studies, experimental and field research. She notes that despite the popularity of virtual teams (they are cost-effective), eight meta-analyses of the experimental literature found that virtual teams are less effective than face-to-face teams. However, Purvanova also observes that field investigations lead to the opposite conclusion, that virtual teams are successful. She summarized her findings stating, "Depending on the source, one may conclude that virtual teams are either unlikely (experimental literature) or quite likely (field investigations and case studies) to live up to the standards and expectations set by face-to-face teams" (p. 3).

She then compared the methodological details of experimental and field research. The comparison indicated that experimental research was carried out in laboratory settings using

student participants, while field studies were conducted in organizations, using organizational staff. The experimental studies were of short duration, involved unrealistic or inconsequential tasks, and relied on groups of three or four students. On the other hand, the field studies were lengthy, involved complex engineering or business problems, and included groups of about a dozen trained professionals (see Table 1)

**Table 1**

*Purvanova's Comparison of Experimental Versus Field Methodologies*

| Factor | Experimental Studies | Field Studies |
|---|---|---|
| Participants | Mostly small teams, 3 to 4 members | Mostly larger teams, 12 to 13 members |
| | Mostly undergraduate or graduate students | Mostly trained professionals |
| Tasks | About half simulated a business context, half were "unrealistic" (p. 21) | All were complex activities within an organizational context |
| Project length | Shorter, between 1 hour and 100 days | Longer, between 3 months and 9 years |
| Media | Synchronous | Asynchronous |

Purvanova's research suggests that since the OCAN will occur in a field setting, around a task recognized by the company as important to its organizational goals, the online collaboration will not be overly affected by the lack of richness and/or presence in the online communication.

***Social Presence***

The literature on presence— the ability to project oneself socially and emotionally through a communication medium (Garrison, 2017, p. 37)—suggests that face-to-face

collaboration is more successful than virtual collaboration because face-to-face communication automatically provides presence. Research about social presence, and the Community of Inquiry theory of which it is a part, has largely been in the context of primary, secondary, and higher education. There has been very little research done in workplaces (Bickle, Hirudayaray, & Doyle, 2019) for the purposes of human resource development, that is, hiring, training, and professional development.

As a collaborative process, a face-to-face DACUM, requires group cohesion sustained over two to three days, during which the group is actively brainstorming, considering ideas, and coming to consensus for about eight hours each day. One of the critical functions of a DACUM facilitator is to support the group energy required to maintain the cohesion. "Reading" the group, encouraging participation, boosting flagging energy, and fostering the group's commitment to the goal are key parts of this.

This is all required in an OCAN as well, but an OCAN is text-based, asynchronous, and lacks almost any non-verbal communication to add richness to the group process. OCAN also requires that social presence and a sense of community must be maintained over a period of weeks. "The degree of team success depends on the level of social presence necessary to complete the task" (Bickle, Hirudayaray, & Doyle, 2019, p. 386). Because the OCAN task takes a few weeks, its success depends on a high level of social presence.

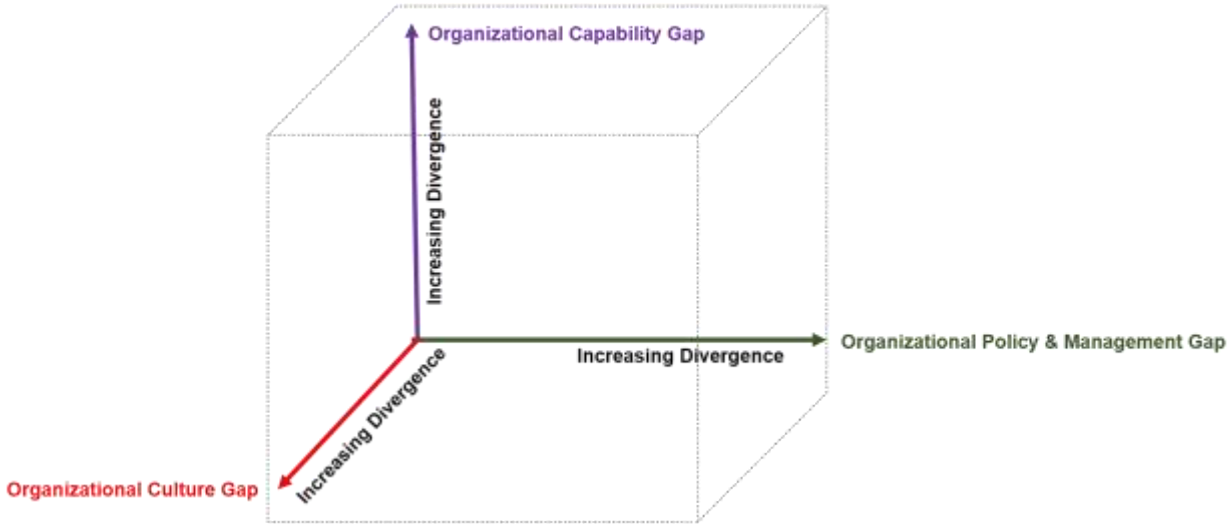
**A Framework for Fit**

The complexity of the instructional/training environment means that an innovation that works in one organization at one time may not work in another organization or at a different time. The perspective of DBIR is that it is just as important to understand why an innovation works in one place and not another, as it is to develop the innovation itself. Blumenfeld,

Fishman, Krajcik, Marx, and Soloway (2000) developed a framework that assists researchers in examining the "fit" (p. 149) between the innovation and the organizational environment in which it is implemented. They suggested that all innovations can be located in the three-dimensional space bounded by axes of organizational culture, capability, and policy. Innovations are more or less successful depending on how far they diverge from the origin point of those axes, that is, the size of the gap between existing organizational conditions, and the conditions required to implement an innovation.

**Figure 2**

*Framework to Identify Challenges to Organizational Change*




*Note:* Adapted from Blumenfeld, Fishman, Krajcik, Marx, and Soloway (2000, p. 153)

Blumenfeld et al. (2000) described what each axis represents (pp. 153-154). The organizational capability gap axis depicts the extent to which users have the knowledge and ability to implement the innovation. The organizational policy and management gap axis represent how closely aligned the innovation is with the organization's rules and resources,

including infrastructure. The organizational culture gap axis describes how closely the innovation adheres to existing organizational norms and expectations.

The position of the innovation within this space is not static, as a successful innovation will affect an organization's values and procedures, shifting the divergence between the makeup of the organization and the innovation. Successive refinements can be made to innovations to bring them closer to the origin intersection of the axis, although that intersection itself may shift through time and the effects of the innovation (Blumenfeld et al., 2000, p. 162).

For this study, organizational capability is defined as the ability of the participants to articulate and document the competency requirements for eLearning instructional designers and developers. Organizational policy and management are defined as the willingness of leadership to have the participants work on the research project during work hours and at the Company's expense, as well as the availability of the necessary computer hardware, software, and participant access to both. The organizational culture is defined as the extent to which participants believe that OCAN provides value for ongoing internal business operations (such as recruitment and professional development) as well opportunities for further business development.

**Chapter Summary**

Enormous resources are spent on corporate training and much is wasted because the competency analysis required for effective training is expensive, time-consuming, poorly understood, and difficult to implement across organizations that are increasingly distributed across multiple geographic regions. DACUM is one method of competency analysis that has been widely used and accepted, but its current accepted methodology, which requires two to three days of facilitated face-to-face brainstorming and consensus building among five to 12 people, does not lend itself to asynchronous data collection nor the economic and geographic

realities of many corporations. If the DACUM method could be adapted for online, asynchronous collaboration in a virtual space, it might gain more acceptance in workplace training. An asynchronous group decision-making method, the Delphi technique, has been used for decades and has been adapted for computer-mediated communication. Furthermore, the Delphi technique is flexible enough to accommodate an organization's existing information technology infrastructure. While research on the success of online collaboration and virtual teamwork has shown mixed results, among the factors required for success is the team cohesion formed by a community of inquiry (Purvanova, 2014). However, an asynchronous OCAN, modeled on the DACUM process, but conducted using an adapted Delphi technique, may provide significant benefits to corporate training. This research project serves as proof of concept for conducting an OCAN in a business organization.

# Chapter 3: Methodology

## Introduction

The methodology for this research was based on a blend of two well-established and validated procedures, the DACUM method of competency analysis and the Delphi technique for group decision-making (adapted for virtual teams). However, the robustness of each procedure could not guarantee that their combination would be effective. Further, this project was a field study as opposed to experimental research, and required a methodology that could adapt as the study progressed.

This research used design-based implementation research (DBIR) methodology. DBIR is intended to improve local practice. This project intended to improve hiring, training, and development at the corporate study site by providing the Company with two competency analyses that would facilitate those functions. The construction of the competency analyses using an online, asynchronous adaptation of the DACUM process was a field test of a procedure that could extend the application of face-to-face competency analysis for use in distributed organizations. It is a proof of concept only, and in accordance with DBIR, is a starting point, the first in what is hoped to be a "series of approaches, with the intent of producing new theories, artifacts, and practices" (Barab & Squire, 2004).

Workplace instructional design often suffers from a lack of clearly articulated competencies that can inform training learning objectives. If the OCAN process, field tested in this project, can be readily scaled and applied in multiple environments, competency analysis may become more widely implemented in workplace training. In reporting the methodology used and improved, it is hoped that future procedures may be more efficient and effective.

**Design-Based Implementation Research**

Rowlands (2005) differentiated between *variance* research and *process* research. Variance research focuses on correlations between and among variables and how those interactions lead to specific outcomes. Variables must be carefully controlled for the results to be meaningful. However, one of the main characteristics of educational field research is that it is situated in complex environments. Variables for the organization, participants, and activity being researched are so interconnected as to make controlling any one of them almost impossible.

On the other hand, the process research tradition seeks to understand how a sequence of events can lead to a result over time. These studies are inductive examinations of how innovations develop. They rely largely on qualitative data generated from historical analysis, interviews, questionnaires, and field observation (Rowlands, 2005).

DBIR is a type of process research, coming out of the tradition of pragmatic research where the research is used to solve practical problems (Penuel, Fishman, Haugan Cheng, & Sabelli, 2011). It differs from other forms of design research in that the problem definitions are themselves "practice centered" (p. 332). That is, DBIR attempts to find ways to unravel practical problems that persist through multiple environments, and can be scaled widely, sustaining change across those environments (Penuel, Fishman, Haugan Cheng, & Sabelli, 2011). There are four elements which are characteristic of DBIR:

- Focus on persistent problems of practice from the perspective of multiple stakeholders;
- Commitment to collaborative and iterative design;
- Desire to develop theory which informs both learning and implementation;

- Concern with developing capacity and sustaining change (Penuel, Fishman, Haugan Cheng, & Sabelli, 2011, p. 332).

DBIR explicitly rejects the evidence standards required by variance research because those standards tend not to lead to practice that is "useful and useable" (Means & Harris, 2013, p. 351). Means and Harris (2013) stated that more useful interventions can be discovered by requiring "less emphasis on having fully articulated research questions, designs, and instrumentations" at the initial, exploratory stages of research (p. 354) and more emphasis on evidence of the quality of the researcher-practitioner relationship and the importance of the problem being investigated. The goal is to generate findings that are immediately useful to decision-makers, and are reasonable and plausible according to those decision-makers (Means & Harris, 2013). In order to be credible within corporate organizations, research findings must be able to be transformed into sustainable practice in a relatively short period of time. DBIR is therefore particularly appropriate for the corporate environment where decisions regarding process implementation often need to be made within one budget cycle. A study informed by logical positivist epistemology takes too long and requires unnecessary standards of evidence for corporate environments. According to Means and Harris (2013), DBIR considers "the implementation of an intervention in particular settings is itself an object of research" (p. 354).

It is expected that the solution to a specific research problem will be arrived at through successive iterations across multiple studies. In the early stages of a DBIR intervention, there is a tradeoff between gathering causal evidence, in favour of data about implementation in different contexts (Means & Harris, 2013, p. 357). DBIR evidence should be judged on the quality of the infrastructure for collaborative research, and the importance of the problem being addressed. In addition to conforming to the four characteristics set out by Penuel, Fishman, Haugan Cheng,

and Sabelli (2011), the DBIR practitioner must be able to articulate: 1) the problem to be mitigated, 2) the mechanisms to measure progress, 3) how theory and prior research inform the research activities, and 4) how the insights from the research may be scaled (Means & Harris, 2013).

To stretch a metaphor, the proof of a DBIR pudding is not in its ingredients but in the taste of the result and the quantity of people it can feed.

**Applying DBIR in this Study**

While the focus of design research is usually on the classroom as opposed to businesses and corporations, DBIR can be used to implement and scale innovations across entire systems, including those outside traditional learning environments (Fishman, Penuel, Allen, Cheng & Sabelli, 2013). It blends the interventionist approach of design research with the systematic study of innovations (Fishman et al., 2013; Penuel, 2015).

Penuel (2015) explained that DBIR aims to develop theory and knowledge on two levels. The first is concerned with learning theory. In the context of this specific study, learning theory is that which underpins competency analysis as a critical factor in training effectiveness. The second level, a distinguishing feature of DBIR, is the theory informing organizational contexts. In this study, the second level includes online collaboration and teamwork in distributed organizations. It is the organizational context, and its possible scalability across other organizations, that makes DBIR especially appropriate for this study.

This study functions within the four principles of DBIR as stated by Fishman et al. (2013, pp. 142-143).

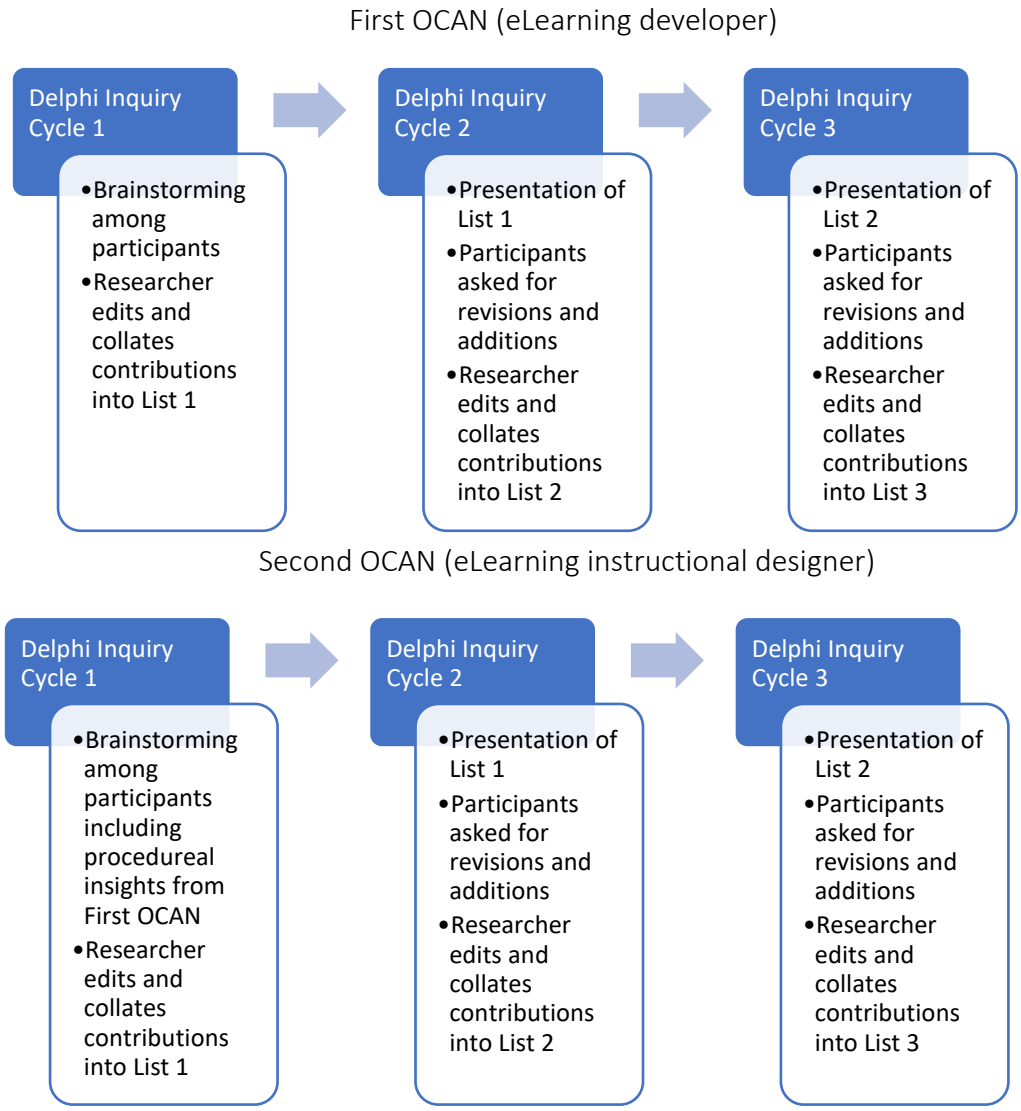
- Focus on persistent problems of practice — developing a competency analysis that can be implemented and scaled across business and industry in order to improve the instructional design of workplace training, especially online training;
- A commitment to iterative and collaborative design — the information gathered during each cycle and iteration was used to revise and improve subsequent cycles and iteration;
- Using systematic inquiry to develop theory and knowledge related to both learning and implementation — the process of formal data gathering and the researcher's reflection about that process were used to develop a framework for conducting OCANs in order to improve training effectiveness, in the context of social collaboration in organizations;
- Developing capacity for sustaining change across systems — the study was the first step in determining whether the practice of conducting competency analysis can be expanded so as to be routine in developing workplace training.

A number of approaches can be used to gather evidence while adhering to these four principles (Fishman et al., 2013, p. 148). This research used an approach that was both collaborative and iterative. An initial collaboration with leadership and participants provided them with a detailed description of this study and asked for their opinion on its position in the Company's fit framework. Senior leadership endorsed the project as aligning well with the Company's organizational culture, capability, and policy. Employees were granted permission to participate in the study on paid, company time.

The study gathered both qualitative and quantitative data across two complete iterations, each with three cycles of data collection. Further collaboration occurred as the participants were consulted for their opinions and ideas about the data collection during each cycle (see Figure 3).

**Figure 3**

*OCAN and Delphi Alignment*



## Research Setting

**The Company.** The research setting was a privately-held, corporate testing and training company. At the time of the study the Company had its head office in Edmonton, Alberta, but was distributed throughout Canada from Halifax to Vancouver, employing over 100 people. However, the actual research activities took place online, asynchronously, among subjects based in Calgary and Edmonton.

In exchange for the OCANs, which the Company expected to use for internal hiring, training, and development requirements, it agreed to provide the resources (people, time, and existing software) required to complete detailed competency analyses of eLearning instructional designers and developers. Two OCANs, one for the position of eLearning developer, the second for eLearning instructional designer, used a three-cycle modified (online) Delphi procedure.

**Participants.** All the research participants were members of the eLearning group at the Company. This group included instructional designers, developers (programmers and coders), artists, graphic designers, project managers, and business development staff. Many of the group were cross-trained: the instructional designers contributed to project management and business development; artists and graphic designers also performed programming and coding tasks. Group members were used to working in close collaboration, handing off projects to other members of the group where their skills were required, and receiving them back once the work was done. Staffing levels changed occasionally during the research, but generally there were always 10-12 people in the group.

All the participants were intermediate to expert users of the Microsoft Office suite, and all used the following online collaboration tools several times per day:

- Messaging and video-conferencing in Slack (the Company's primary internal social networking platform), Lifesize, and Microsoft Teams
- Email
- File sharing over networks

In short, the research participants were highly computer literate and accustomed to collaborating continually with other members of the group. While eLearning instructional designers and developers had different skill sets, they worked together closely enough to be able to comment knowledgeably on the tasks required for each position.

**Researcher/Facilitator.** As well as being the researcher for the study, I am also a certified DACUM facilitator and have facilitated over a dozen DACUMs. I am familiar with the types of participant contribution that tend to produce the most useful and valid competency analyses, and used this expertise during the research.

## Procedure

### *Data Collection Site*

The ethical and privacy considerations for collecting the data required that a Canadian-based server be used. During the period of the first OCAN for eLearning developers, the Company used servers in the United States, and so the data collection could not be hosted by the Company. A WordPress blog site was created on a server in Vancouver to meet the requirements for a Canadian data collection and storage site.

By the time data were collected for the second OCAN for eLearning instructional designers, the Company moved its servers to a Canadian location. The WordPress blog had proved somewhat cumbersome for OCAN 1 participants, and the Company made available a dedicated SharePoint site for this research on their servers, now based in Canada. This made the

collaborative functionality of SharePoint and the Microsoft Office 365 suite available for the OCAN 2 data collection.

### *OCAN Orientation*

Prior to the data collection, an online orientation to the project, the OCAN process, and project methodology was prepared, using Microsoft PowerPoint. The project was introduced at a weekly meeting of the eLearning team and participation was endorsed by the team lead. Shortly after this, participants were surveyed to determine if any of them wished to remain anonymous to each other, as well as remaining anonymous to the public when the research report was written. Three of the initial 12 participants indicated that they would like to remain anonymous to other participants. As a result, all participants were assigned a six-letter pseudonym, generated randomly. Participants were issued logins to the research blog with the pseudonyms as their usernames. Only these pseudonymous usernames were visible to other participants.

The process was divided into two rounds: Round 1 was the OCAN for eLearning developers and Round 2 was the OCAN for eLearning instructional designers. Each round consisted of three cycles of data collection. Participation in all six parts of the process (two rounds with three cycles each), was voluntary and only two participants—one in Calgary and one in Edmonton—contributed data to every part of the project. Other participants contributed data in at least one cycle.

### *Round 1: OCAN for eLearning Developers*

**Cycle 1.** An initial request was posted on the research blog asking that participants brainstorm tasks required of the Company's eLearning developers. This mirrored the usual first step of data collection in a face-to-face DACUM. As Cycle 1 proceeded, these brainstormed tasks were sorted into eight categories or general areas of competence:

- Quality assurance
- Problem solving
- Communication
- Project management
- Professional development
- Customer service
- Creativity
- Technical skills

Next, participants were asked to write specific tasks related to each category. I edited these comments in this first cycle for spelling and clarity. A survey was distributed to participants to ask about their experience in Cycle 1 and if they had suggestions to offer for subsequent cycles. During Cycle 1, some participants had trouble logging in to the research blog, and others found the blog difficult to navigate and add comments to the correct thread. The threads became lengthy, and participants asked that the format be changed to something easier to read. Cycle 1 lasted for 13 weeks.

**Cycle 2.** As a result of participants' comments in Cycle 1, the procedure was modified somewhat in Cycle 2 to make it easier for participants to see each other's comments. Rather than ask participants to post their ideas on the blog, which were displayed as a long vertical thread, a single Microsoft Word document was created, and the document posted on the blog. All the categories and comments from Cycle 1 were copied to the Word document.

In Cycle 2 participants were asked to make whatever revisions they thought appropriate to the data collected in Cycle 1. To avoid personal identification using the Track Changes feature in MS Word, participants highlighted revisions using different colors and fonts for text as they

chose. Where revisions were directly contradictory—for example, whether a specific task belonged in a particular category or in a different category—participants were asked to vote anonymously on the matter in a dedicated Slack channel, and the majority opinion prevailed. The second cycle of the eLearning developers' OCAN was considered complete once input was edited for spelling and clarity. A survey was distributed to participants to ask about their experience in Cycle 2 and if they had suggestions to offer for subsequent cycles.

**Cycle 3.** Data collection for Cycle 3 proceeded the same way as for Cycle 2. Once the general areas of competence and the supporting tasks were agreed on, they were copied to a Microsoft Excel spreadsheet. As is done in a face-to-face DACUM, each participant rated each supporting task for frequency, importance, and performance (FIP), on scales of 0 to 3 (see Figure 4 for rating criteria). This resulted in three scores, per task, per participant.

All the individual FIP scores for each task were averaged to provide final FIP scores for each task. That is, all the participants' frequency scores for Task 1 were averaged to provide a final frequency mean score. Final mean importance and performance scores for every supporting task were calculated the same way.

Participants were asked to complete a third survey, which again asked them about their experience in the brainstorming process, but also the process of collecting the FIP scores.

**Figure 4**

*Frequency, Importance, and Performance Score Criteria*

| | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| **F** — Frequency: How often is the task performed? | Never or less than once/year | Sometimes: 1 – 4 times/year | Often: 1 – 4 times/month | Very often: Once/week or more |
| **I** — Importance: How critical is the task to the delivery of the final product? | No or minor importance to delivery | Moderate importance to delivery | Major importance to delivery | Critical to delivery |
| **P** — Performance: What level of responsibility/supervision is expected? | Direct, continual supervision | Direct, occasional supervision | Occasional performance check | Independent performance (includes peer-to-peer collaboration) |

### *Round 2: OCAN for eLearning Instructional Designers*

The procedure for OCAN 2 was almost identical to OCAN 1, although the data were not collected in the research blog, but on a SharePoint site hosted on the Company's Canadian server. The initial brainstormed tasks were later sorted into 10 general areas of competence, for which supporting tasks were developed:

- Communication
- Instructional Design
- Technical Skills
- Scripting
- Writing
- Research
- Media
- Quality Assurance
- Professional Development
- Project Management

The OCAN for eLearning instructional designers was not preceded by an orientation.

## Ethical Considerations

This research was approved by Athabasca University's Ethics Review Board. Two conditions of this approval significantly hampered the research: first, the requirement that all data be stored on a Canadian server; and second, that participants must remain anonymous not only to the public, but to each other. Neither condition would have been problematic except that the research required participants to collaborate online on a single document. Each participant needed to see and consider the input of all the other participants, as would normally happen in a

face-to-face DACUM. Part of the effectiveness of DACUM is that it draws on the shared knowledge of a group of experts.

The first platform used was a blog hosted on a Canadian server. A password manager software application was used to generate random strings of six lowercase letters, that combined to make easily-said pseudowords, such as “wilent,” “stanto,” or “tionia”. These strings were assigned as usernames that each participant used to log into the research blog. Being short and pronounceable, they were more likely to be used as personal identifiers, than strings such as “xzmjwo,” “tfztjf,” or “wvzajg”. It was felt that it would be easier for participants to sense a real person behind “wilent” than “wvzajg”.

However, once the data collection shifted to a SharePoint site for Round 2, the pseudonyms had to be abandoned. Assigning pseudonyms would have required establishing a second email account on the Company’s servers, something the Company was not willing to do. Up until this point, the research project did not identify the participants to one another. In establishing a SharePoint site, members could see who other members were. All participants agreed to this as they were all colleagues in the same team, and knew the majority of their colleagues were participating. Data collection remained anonymous.

# Chapter 4: Results

## Overall

There were originally 11 participants in the study, which met the DACUM requirements for a study group of five to 12 individuals (Norton & Moser, 2013, p. 15). Through the course of the project, two participants left the study because they left the Company, and one participant was added when they joined the Company. There were ten participants at the end of the study.

Two OCANs were completed over the course of the project. Each took far longer than initially planned. The first cycle of OCAN 1 for eLearning developers took some time for participants to sign in initially to the research WordPress blog and then get used to entering data on the site. Data collection for this cycle was also disrupted for about 3 weeks because of year-end vacations. Second and third cycles for OCAN 1 were completed in 5 weeks total. The first cycle of OCAN 2 for eLearning instructional designers was significantly disrupted by the restructuring and rebranding of the Company which took approximately 2 ½ months, but had consequences that are still ongoing. Second and third rounds of OCAN 2 were completed in 6 weeks total. Each OCAN chart fell within the parameters expected of face-to-face DACUMs, a competency chart built of eight to 20 “duties” (general areas of competence) and six to 20 supporting tasks for each duty.

## Round 1: OCAN for eLearning Developers

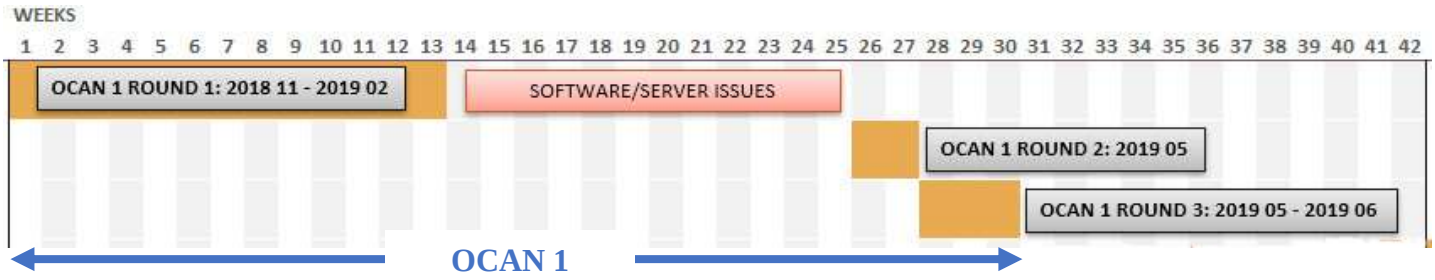
### *OCAN 1 Chart*

OCAN 1 began on 2018 November 05 and data collection was complete by 2019 May 27, a total of 30 weeks. Cycle 1 required 13 weeks to complete. Cycle 2, which began over 3 months later because of server and software issues, took 2 weeks to complete. Cycle 3 took 3 weeks to complete.

The research site was switched over to a SharePoint site in early 2019 April, and ready for data collection by 2019 May 13 (see Figure 5).

**Figure 5**

*Gantt Chart for OCAN 1*




OCAN 1 resulted in eight general areas of competency, with anywhere from five to 20 supporting tasks for each area (see Figures 6-10), broadly meeting the DACUM standard (see Table 2).

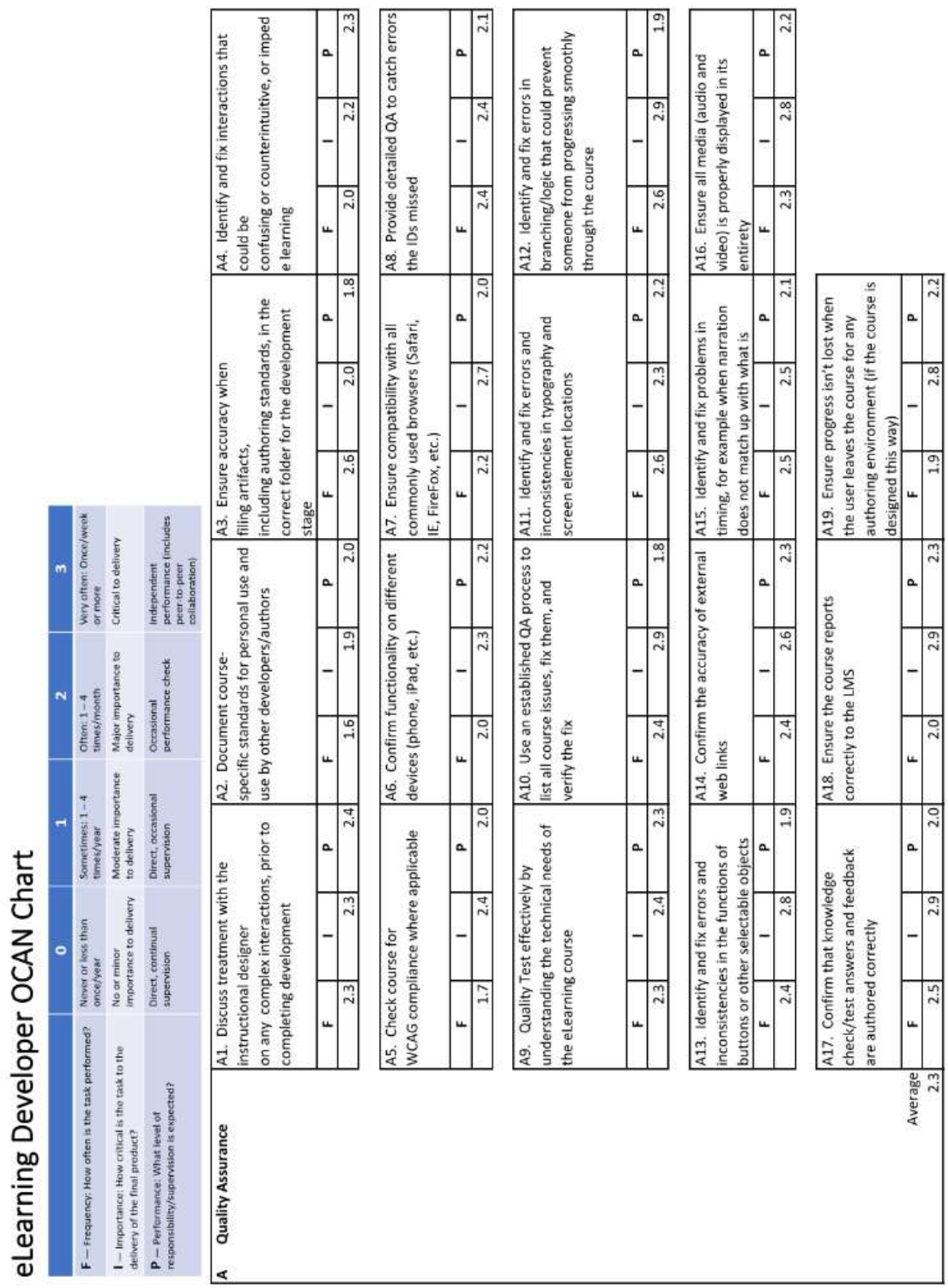
**Table 2**

*Competencies and Tasks, OCAN 1*

| General Area of Competency | Number of supporting tasks |
|---|---|
| Communication | 15 |
| Creativity | 13 |
| Customer service | 5 |
| Problem solving | 17 |
| Professional development | 18 |
| Project management | 20 |
| Quality assurance | 19 |
| Technical skills | 8 |

**Figure 6**

*OCAN 1 Chart Page 1*



eLearning Developer OCAN Chart

| | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| **F** — Frequency: How often is the task performed? | Never or less than once/year | Sometimes: 1 – 4 times/year | Often: 1 – 4 times/month | Very often: Once/week or more |
| **I** — Importance: How critical is the task to the delivery of the final product? | No or minor importance to delivery | Moderate importance to delivery | Major importance to delivery | Critical to delivery |
| **P** — Performance: What level of responsibility/supervision is expected? | Direct, continual supervision | Direct, occasional supervision | Occasional performance check | Independent performance (includes peer to peer collaboration) |

**A Quality Assurance**

| A1. Discuss treatment with the instructional designer on any complex interactions, prior to completing development | | | |
|---|---|---|---|
| F | I | P | |
| 2.3 | 2.3 | 2.4 | |

| A2. Document course-specific standards for personal use and use by other developers/authors | | | |
|---|---|---|---|
| F | I | P | |
| 1.6 | 1.9 | 2.0 | |

| A3. Ensure accuracy when filing artifacts, including authoring standards, in the correct folder for the development stage | | | |
|---|---|---|---|
| F | I | P | |
| 2.6 | 2.0 | 1.8 | |

| A4. Identify and fix interactions that could be confusing or counterintuitive, or imped e learning | | | |
|---|---|---|---|
| F | I | P | |
| 2.0 | 2.2 | 2.3 | |

| A5. Check course for WCAG compliance where applicable | | | |
|---|---|---|---|
| F | I | P | |
| 1.7 | 2.4 | 2.0 | |

| A6. Confirm functionality on different devices (phone, iPad, etc.) | | | |
|---|---|---|---|
| F | I | P | |
| 2.0 | 2.3 | 2.2 | |

| A7. Ensure compatibility with all commonly used browsers (Safari, IE, FireFox, etc.) | | | |
|---|---|---|---|
| F | I | P | |
| 2.2 | 2.7 | 2.0 | |

| A8. Provide detailed QA to catch errors the IDs missed | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 2.4 | 2.1 | |

| A9. Quality Test effectively by understanding the technical needs of the eLearning course | | | |
|---|---|---|---|
| F | I | P | |
| 2.3 | 2.4 | 2.3 | |

| A10. Use an established QA process to list all course issues, fix them, and verify the fix | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 2.9 | 1.8 | |

| A11. Identify and fix errors and inconsistencies in typography and screen element locations | | | |
|---|---|---|---|
| F | I | P | |
| 2.6 | 2.3 | 2.2 | |

| A12. Identify and fix errors in branching/logic that could prevent someone from progressing smoothly through the course | | | |
|---|---|---|---|
| F | I | P | |
| 2.6 | 2.9 | 1.9 | |

| A13. Identify and fix errors and inconsistencies in the functions of buttons or other selectable objects | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 2.8 | 1.9 | |

| A14. Confirm the accuracy of external web links | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 2.6 | 2.3 | |

| A15. Identify and fix problems in timing, for example when narration does not match up with what is | | | |
|---|---|---|---|
| F | I | P | |
| 2.5 | 2.5 | 2.1 | |

| A16. Ensure all media (audio and video) is properly displayed in its entirety | | | |
|---|---|---|---|
| F | I | P | |
| 2.3 | 2.8 | 2.2 | |

| A17. Confirm that knowledge check/test answers and feedback are authored correctly | | | |
|---|---|---|---|
| F | I | P | |
| 2.5 | 2.9 | 2.0 | |

| A18. Ensure the course reports correctly to the LMS | | | |
|---|---|---|---|
| F | I | P | |
| 2.0 | 2.9 | 2.3 | |

| A19. Ensure progress isn't lost when the user leaves the course for any authoring environment (if the course is designed this way) | | | |
|---|---|---|---|
| F | I | P | |
| 1.9 | 2.8 | 2.2 | |

Average
2.3

**Figure 7**

*OCAN Chart 1 Page 2*

**B Problem Solving**

| B1. Collaborate with IDs to formulate easy-to-use interactive elements | | | |
|---|---|---|---|
| F | I | P | |
| 1.9 | 1.9 | 1.8 | |

| B2. Identify ways of making non-accessible interactions more accessible | | | |
|---|---|---|---|
| F | I | P | |
| 1.4 | 2.2 | 2.1 | |

| B3. Identify limitations in technology, budget, or both and communicate to the PM during scoping | | | |
|---|---|---|---|
| F | I | P | |
| 1.8 | 2.7 | 1.8 | |

| B4. Identify when tasks will take longer than planned | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 2.8 | 1.5 | |

| B5. Suggest a more effective way of presenting content | | | |
|---|---|---|---|
| F | I | P | |
| 2.1 | 1.9 | 2.1 | |

| B6. Identify technology restrictions for current design ideas | | | |
|---|---|---|---|
| F | I | P | |
| 1.8 | 2.5 | 1.9 | |

| B7. Meet the client's needs using the simplest design possible | | | |
|---|---|---|---|
| F | I | P | |
| 2.0 | 1.9 | 1.7 | |

| B8. Discuss options if a client request does not translate well in reality (i.e. yellow font on a light blue background), and options should be discussed | | | |
|---|---|---|---|
| F | I | P | |
| 1.8 | 2.4 | 2.2 | |

| B9. Optimize authoring techniques that can shorten the amount of time spent on a task | | | |
|---|---|---|---|
| F | I | P | |
| 1.8 | 2.1 | 2.0 | |

| B10. Communicate with vendors and convey fixes in a clear fashion | | | |
|---|---|---|---|
| F | I | P | |
| 1.7 | 2.3 | 1.8 | |

| B11. Use the internet efficiently to aid in troubleshooting courses | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 1.9 | 2.5 | |

| B12. Research to determine what other developers have done in order to make an interaction function (in order to replicate it or fix it, if it breaks) | | | |
|---|---|---|---|
| F | I | P | |
| 1.8 | 1.8 | 2.0 | |

| B13. Investigate and solve browser-related issues with SCORM packages | | | |
|---|---|---|---|
| F | I | P | |
| 1.7 | 2.6 | 2.0 | |

| B14. Fix bugs when a course breaks | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 2.8 | 2.0 | |

| B15. Troubleshoot non-functional web objects or buttons | | | |
|---|---|---|---|
| F | I | P | |
| 2.2 | 2.6 | 2.3 | |

| B16. Document fixes implemented in case the issue comes up in the future | | | |
|---|---|---|---|
| F | I | P | |
| 1.6 | 1.6 | 1.8 | |

| B17. Contribute willingly, especially when projects take unexpected turns | | | |
|---|---|---|---|
| F | I | P | |
| 2.6 | 2.8 | 2.3 | |

Average 2.1

**C Communication continued next page**

| C1. Use professional email etiquette | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 2.2 | 1.9 | |

| C2. Speak clearly and concisely | | | |
|---|---|---|---|
| F | I | P | |
| 2.8 | 2.5 | 2.0 | |

| C3. Ask for help if needed | | | |
|---|---|---|---|
| F | I | P | |
| 2.6 | 2.5 | 1.9 | |

| C4. Lay out expectations of vendors/contractors clearly | | | |
|---|---|---|---|
| F | I | P | |
| 1.4 | 2.7 | 1.7 | |

| C5. Explain to a client how something in the course functions | | | |
|---|---|---|---|
| F | I | P | |
| 1.0 | 2.2 | 1.6 | |

| C6. Listen to clients' needs and wants for their visual mock-ups | | | |
|---|---|---|---|
| F | I | P | |
| 1.8 | 2.7 | 1.9 | |

| C7. Speak with confidence to persuade a client to accept a helpful idea or treatment | | | |
|---|---|---|---|
| F | I | P | |
| 1.2 | 2.2 | 1.4 | |

| C8. Be patient and friendly respectful with other developers and IDs at all times | | | |
|---|---|---|---|
| F | I | P | |
| 2.8 | 2.8 | 2.0 | |

| C9. Answer IDs' questions regarding the capabilities of the authoring tools/frameworks | | | |
|---|---|---|---|
| F | I | P | |
| 2.7 | 2.7 | 2.3 | |

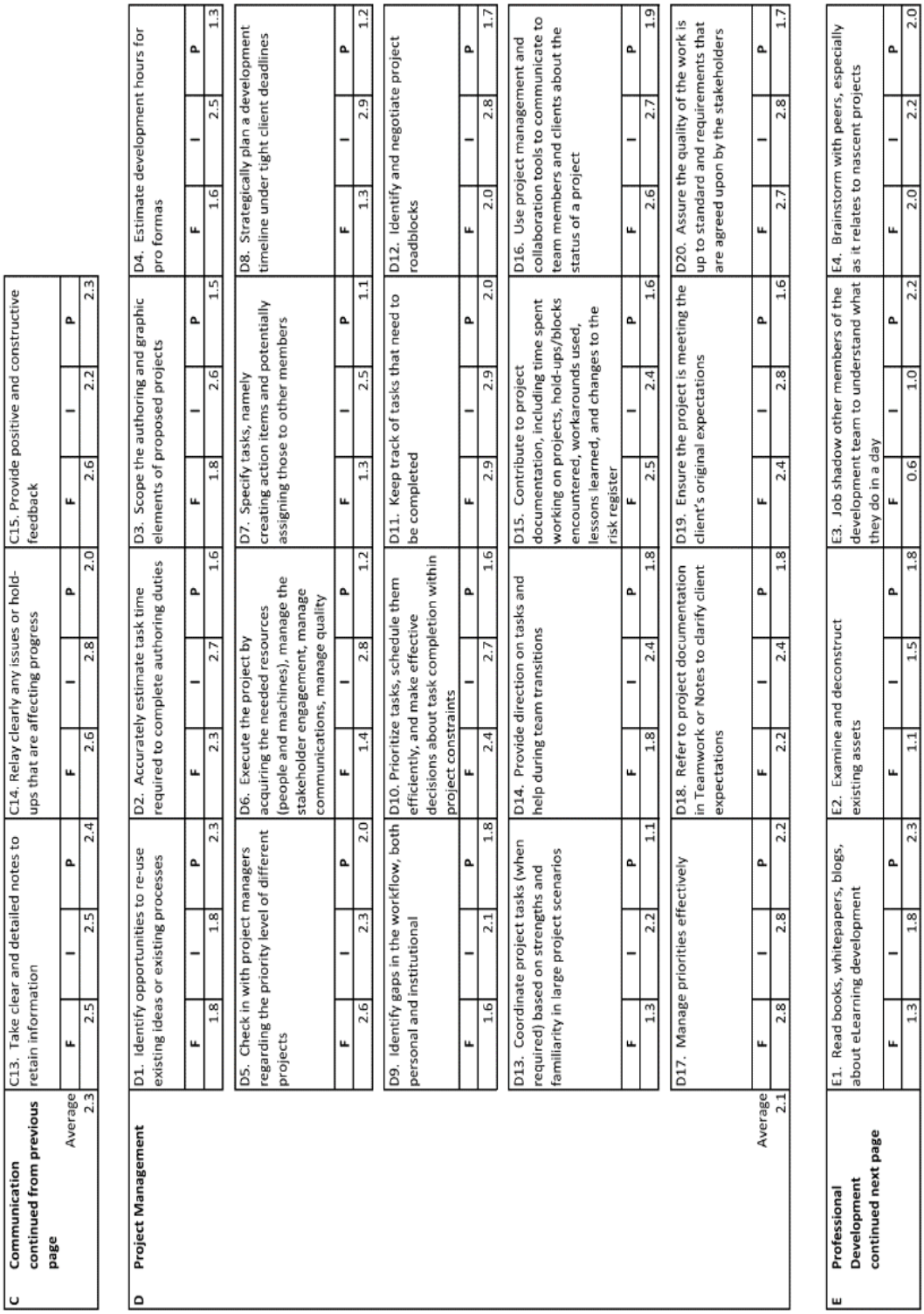
| C10. Ensure team members have all the information needed to continue/complete the project | | | |
|---|---|---|---|
| F | I | P | |
| 2.4 | 2.8 | 2.3 | |

| C11. Ask clarifying questions when necessary, either of clients or IDs | | | |
|---|---|---|---|
| F | I | P | |
| 2.6 | 2.8 | 2.3 | |

| C12. Coordinate file access with team mates when working on projects with multiple developers | | | |
|---|---|---|---|
| F | I | P | |
| 2.3 | 2.7 | 2.4 | |

**Figure 8**

*OCAN Chart 1 Page 3*



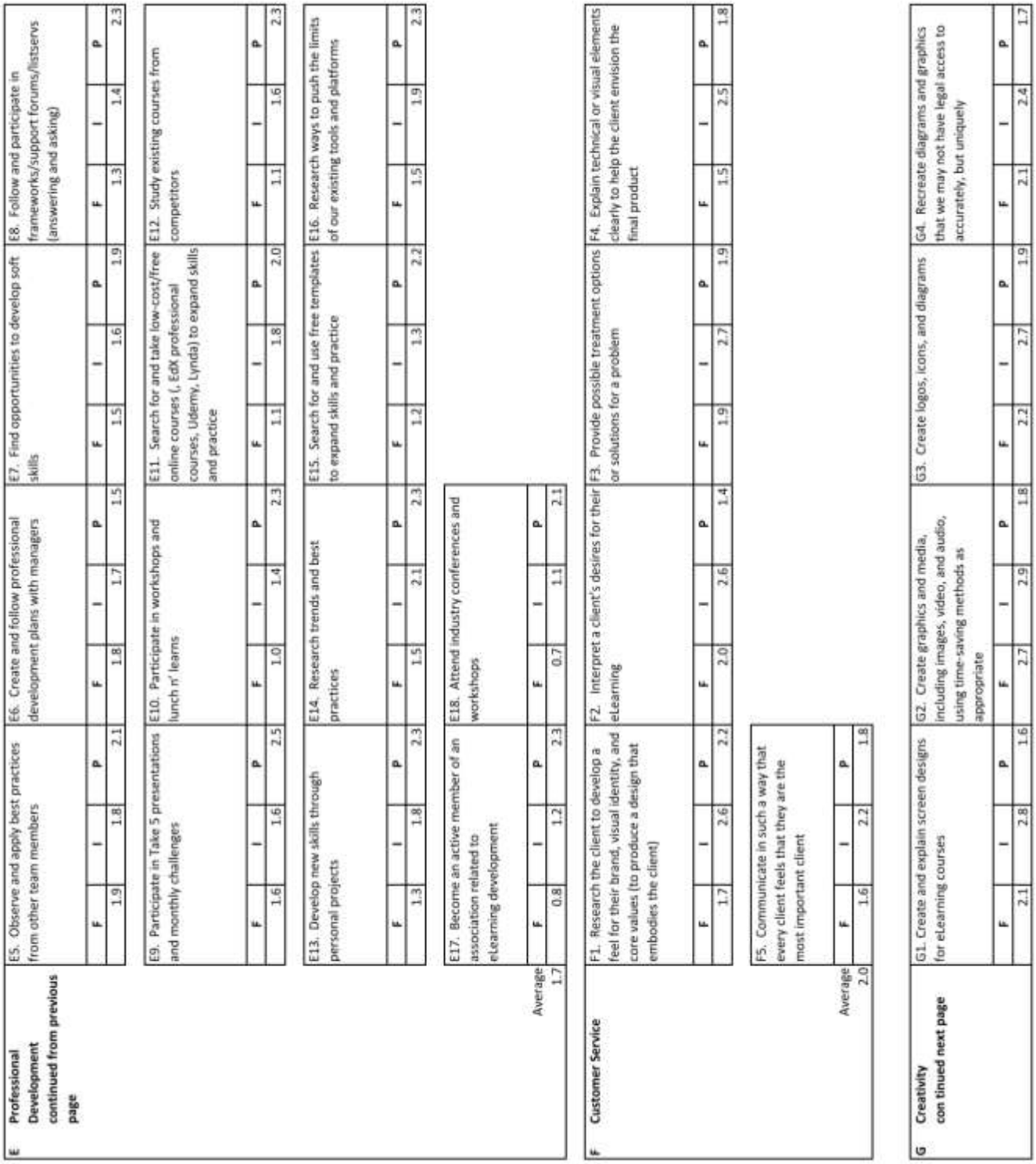
| C | Communication continued from previous page | C13. Take clear and detailed notes to retain information | | | | C14. Relay clearly any issues or hold-ups that are affecting progress | | | | C15. Provide positive and constructive feedback | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average | F | I | P | | F | I | P | | F | I | P | |
| | 2.3 | 2.5 | 2.5 | 2.4 | | 2.6 | 2.8 | 2.0 | | 2.6 | 2.2 | 2.3 | |

| D | Project Management | D1. Identify opportunities to re-use existing ideas or existing processes | | | | D2. Accurately estimate task time required to complete authoring duties | | | | D3. Scope the authoring and graphic elements of proposed projects | | | | D4. Estimate development hours for pro formas | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 1.8 | 1.8 | 2.3 | | 2.3 | 2.7 | 1.6 | | 1.8 | 2.6 | 1.5 | | 1.6 | 2.5 | 1.3 | |
| | | D5. Check in with project managers regarding the priority level of different projects | | | | D6. Execute the project by acquiring the needed resources (people and machines), manage the stakeholder engagement, manage communications, manage quality | | | | D7. Specify tasks, namely creating action items and potentially assigning those to other members | | | | D8. Strategically plan a development timeline under tight client deadlines | | | |
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 2.6 | 2.3 | 2.0 | | 1.4 | 2.8 | 1.2 | | 1.3 | 2.5 | 1.1 | | 1.3 | 2.9 | 1.2 | |
| | | D9. Identify gaps in the workflow, both personal and institutional | | | | D10. Prioritize tasks, schedule them efficiently, and make effective decisions about task completion within project constraints | | | | D11. Keep track of tasks that need to be completed | | | | D12. Identify and negotiate project roadblocks | | | |
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 1.6 | 2.1 | 1.8 | | 2.4 | 2.7 | 1.6 | | 2.9 | 2.9 | 2.0 | | 2.0 | 2.8 | 1.7 | |
| | | D13. Coordinate project tasks (when required) based on strengths and familiarity in large project scenarios | | | | D14. Provide direction on tasks and help during team transitions | | | | D15. Contribute to project documentation, including time spent working on projects, hold-ups/blocks encountered, workarounds used, lessons learned, and changes to the risk register | | | | D16. Use project management and collaboration tools to communicate to team members and clients about the status of a project | | | |
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 1.3 | 2.2 | 1.1 | | 1.8 | 2.4 | 1.8 | | 2.5 | 2.4 | 1.6 | | 2.6 | 2.7 | 1.9 | |
| | | D17. Manage priorities effectively | | | | D18. Refer to project documentation in Teamwork or Notes to clarify client expectations | | | | D19. Ensure the project is meeting the client's original expectations | | | | D20. Assure the quality of the work is up to standard and requirements that are agreed upon by the stakeholders | | | |
| | Average | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | 2.1 | 2.8 | 2.8 | 2.2 | | 2.2 | 2.4 | 1.8 | | 2.4 | 2.8 | 1.6 | | 2.7 | 2.8 | 1.7 | |

| E | Professional Development continued next page | E1. Read books, whitepapers, blogs, about eLearning development | | | | E2. Examine and deconstruct existing assets | | | | E3. Job shadow other members of the development team to understand what they do in a day | | | | E4. Brainstorm with peers, especially as it relates to nascent projects | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 1.3 | 1.8 | 2.3 | | 1.1 | 1.5 | 1.8 | | 0.6 | 1.0 | 2.2 | | 2.0 | 2.2 | 2.0 | |

**Figure 9**

*OCAN 1 Chart Page 4*



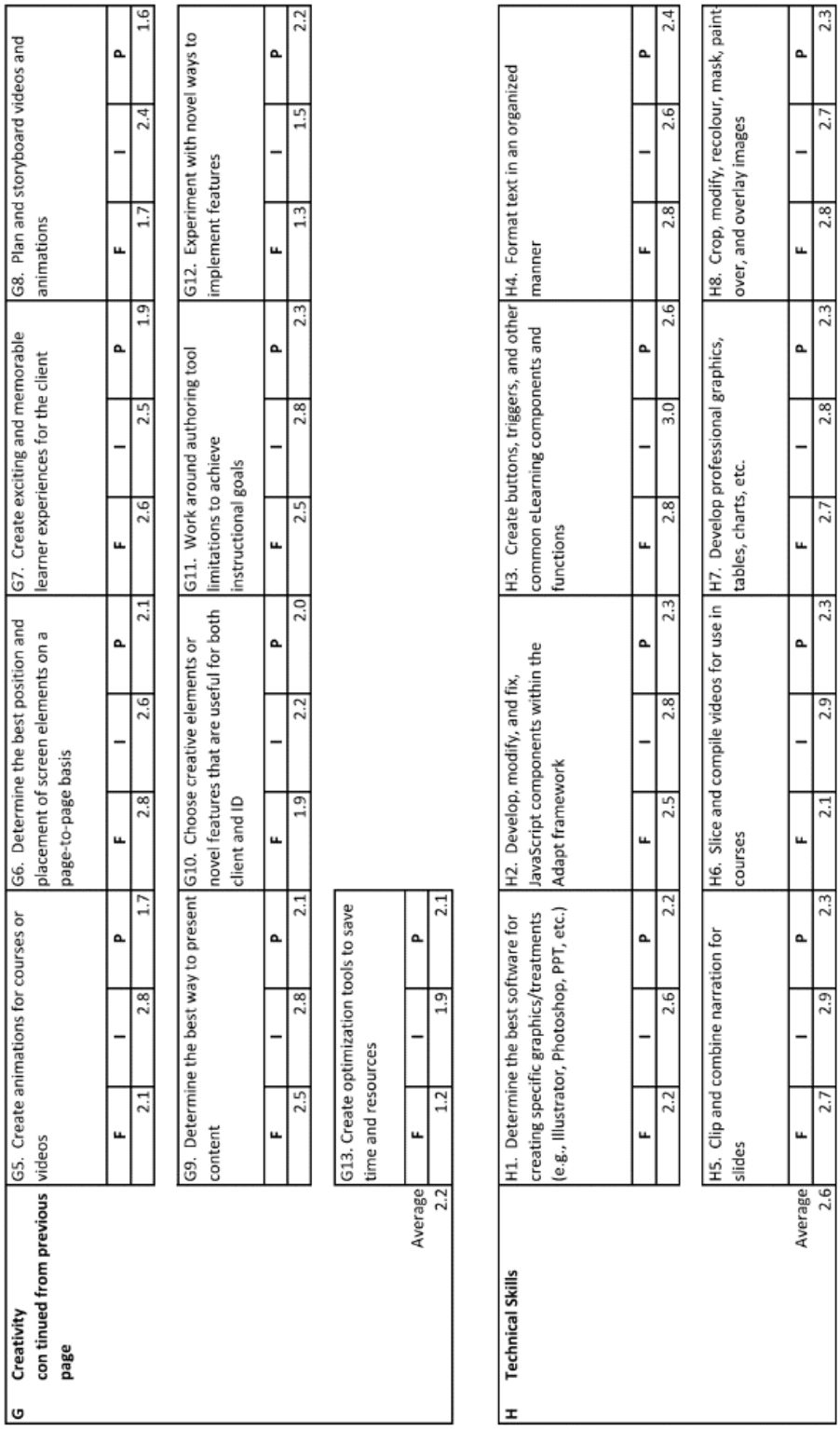
| E | **Professional Development continued from previous page** | E5. Observe and apply best practices from other team members | | | | E6. Create and follow professional development plans with managers | | | | E7. Find opportunities to develop soft skills | | | | E8. Follow and participate in frameworks/support forums/listservs (answering and asking) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 1.9 | 1.8 | 2.1 | | 1.8 | 1.7 | 1.5 | | 1.5 | 1.6 | 1.9 | | 1.3 | 1.4 | 2.3 | |
| | | E9. Participate in Take 5 presentations and monthly challenges | | | | E10. Participate in workshops and lunch n' learns | | | | E11. Search for and take low-cost/free online courses (, EdX professional courses, Udemy, Lynda) to expand skills and practice | | | | E12. Study existing courses from competitors | | | |
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 1.6 | 1.6 | 2.5 | | 1.0 | 1.4 | 2.3 | | 1.1 | 1.8 | 2.0 | | 1.1 | 1.6 | 2.3 | |
| | | E13. Develop new skills through personal projects | | | | E14. Research trends and best practices | | | | E15. Search for and use free templates to expand skills and practice | | | | E16. Research ways to push the limits of our existing tools and platforms | | | |
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 1.3 | 1.8 | 2.3 | | 1.5 | 2.1 | 2.3 | | 1.2 | 1.3 | 2.2 | | 1.5 | 1.9 | 2.3 | |
| | | E17. Become an active member of an association related to eLearning development | | | | E18. Attend industry conferences and workshops | | | | | | | | | | | |
| | | F | I | P | | F | I | P | | | | | | | | | |
| | | 0.8 | 1.2 | 2.3 | | 0.7 | 1.1 | 2.1 | | | | | | | | | |
| | Average 1.7 | | | | | | | | | | | | | | | | |

| F | **Customer Service** | F1. Research the client to develop a feel for their brand, visual identity, and core values (to produce a design that embodies the client) | | | | F2. Interpret a client's desires for their eLearning | | | | F3. Provide possible treatment options or solutions for a problem | | | | F4. Explain technical or visual elements clearly to help the client envision the final product | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 1.7 | 2.6 | 2.2 | | 2.0 | 2.6 | 1.4 | | 1.9 | 2.7 | 1.9 | | 1.5 | 2.5 | 1.8 | |
| | | F5. Communicate in such a way that every client feels that they are the most important client | | | | | | | | | | | | | | | |
| | | F | I | P | | | | | | | | | | | | | |
| | | 1.6 | 2.2 | 1.8 | | | | | | | | | | | | | |
| | Average 2.0 | | | | | | | | | | | | | | | | |

| G | **Creativity con tinued next page** | G1. Create and explain screen designs for eLearning courses | | | | G2. Create graphics and media, including images, video, and audio, using time-saving methods as appropriate | | | | G3. Create logos, icons, and diagrams | | | | G4. Recreate diagrams and graphics that we may not have legal access to accurately, but uniquely | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | F | I | P | | F | I | P | | F | I | P | | F | I | P | |
| | | 2.1 | 2.8 | 1.6 | | 2.7 | 2.9 | 1.8 | | 2.2 | 2.7 | 1.9 | | 2.1 | 2.4 | 1.7 | |

**Figure 10**

*OCAN 1 Chart Page 5*



### *OCAN 1 Survey Results*

Seven of 12 participants answered this survey. Not all seven people answered every question.

**Cycle 1 Only Questions.**

*Question 1: Before this eLearning Developer competency analysis, had you ever participated in a competency analysis before?*

Only two people had ever participated in a competency analysis before.

*Question 2: What type of competency analysis did you participate in (check all that apply)?*

Each of those two people had participated in multiple types of analysis, but none had participated in a DACUM.

- Competency mapping 2
- Competency-based interview 1
- Critical incident analysis 0
- DACUM 0
- Questionnaire 1
- Repertory Grid 0
- Skills checklist 1
- Other 0

*Question 3: Did the PowerPoint OCAN orientation video explain the OCAN process adequately?*

Six of the seven reporting participants viewed the orientation presentation. Three reported that the orientation provided a basic familiarity with the OCAN process. Three reported that the

orientation provided a solid understanding of the process. While it is believed that 11 of the 12 participants viewed the orientation, not all 11 people responded to the survey, so it is impossible to confirm this was the case.

*Question 4: How easy was it to enter your ideas in the research blog? Feel free to comment on any aspect of data entry.*

None of the survey respondents had difficulty entering the data or understanding the procedure. Six of the seven survey respondents said it was "easy" to enter the data, and that "no problems or almost no problems" were experienced with the software or the procedure. One respondent reported that it was "fairly easy" to enter the data, and had "just a few problems" that the respondent was able to resolve.

**Cycles 1, 2, and 3 Questions.**

*Question 5: HOW OFTEN did you enter data in the eLearning Developer OCAN?*

Most survey respondents entered data once a week (see Table 3).

**Table 3**

*Frequency of Data Entry, OCAN 1*

| | At least once a day | Several times a week | Once a week | I don't remember | I did not enter data in this round |
|---|---|---|---|---|---|
| Cycle 1 (n = 7) | | 1 | 5 | 1 | |
| Cycle 2 (n = 4) | | | 3 | | 1 |
| Cycle 3 (n = 8) | | | 5 | 2 | 1 |

*Question 6: About HOW LONG DID IT USUALLY TAKE you to enter the data?*

Most respondents spent between 5 and 20 minutes entering data (see Table 4).

**Table 4**

*Time to Enter Data, OCAN 1*

| | I did not enter data in this cycle | Less than 5 minutes | Between 5 and 10 minutes | Between 11 and 20 minutes | Between 21 and 30 minutes | More than 30 minutes |
|---|---|---|---|---|---|---|
| Cycle 1 (n = 7) | | | 5 | 2 | | |
| Cycle 2 (n = 4) | 1 | | | 2 | 1 | |
| Cycle 3 (n = 8) | 1 | 1 | | 4 | | 2 |

*Question 7: Apart from the actual data entry, about HOW MUCH TIME did you SPEND OFFLINE on the project during this round (for example, thinking about or discussing the project with others)?*

Most survey respondents spent less than 10 minutes thinking or talking about the project while offline (see Table 5).

**Table 5**

*Time Spent Offline on Project, OCAN 1*

| | No time | Less than 10 minutes | Between 10 and 20 minutes | Between 20 and 30 minutes | Between 30 and 45 minutes |
|---|---|---|---|---|---|
| Cycle 1 (n = 7) | 2 | 3 | 1 | | 1 |
| Cycle 2 (n = 4) | 1 | | 1 | 1 | |
| Cycle 3 (n = 8) | 1 | 5 | 1 | 1 | |

**Cycle 3 Only Questions.**

*Question 8: How easy was it to enter Frequency, Importance, and Performance scores for each task for the eLearning Developer's OCAN?*

This question was asked during the last cycle of OCAN 1. Eight people responded to the survey in this cycle. Most people found it fairly easy to rate the Frequency (how often the task is performed) and Importance (how critical the task is to delivery of the final product) of each task. Rating the Performance level required of each task was slightly more challenging for survey respondents (see Table 6).

**Table 6**

*Ease of FIP Score Entry, OCAN 1*

| (n = 8) | EASY. I could decide on a rating for ALL OR NEARLY ALL THE TASKS FAIRLY QUICKLY | FAIRLY EASY. It took a LONG TIME to decide on a rating for SOME OF THE TASKS | CHALLENGING. It took a LONG TIME to decide on a rating for MANY OF THE TASKS | VERY DIFFICULT. It took a LONG TIME to decide on a rating for ALL OR NEARLY ALL THE TASKS. |
|---|---|---|---|---|
| Frequency | 1 | 4 | 3 | |
| Importance | 1 | 5 | 2 | |
| Performance | 1 | 3 | 4 | |

*Question 9: Is there anything else about the procedure you'd like to share?*

The comments below are verbatim, edited only for spelling and punctuation. Generally, survey respondents had no or few problems with the process. Three respondents reported difficulty determining FIP scores.

Cycle 1

- There is onus on the participants to regularly check and participate within the time frame. I'm not sure how to better handle this issue based on the nature of data collection.

- I’m curious to see what the result will look like.

Cycle 2

- This format is a lot easier to use! I'd like clarification on whether original text should be edited in any case, or if we should just be adding color coded comments though.
- I loved the collaboration, organizing the feedback into the categories, and looking for any common elements.
- I'm wondering how final decisions are made--for example, if one person suggests moving something, and another person says, "No, leave it where it is."

Cycle 3

- It [eLearning Developer] isn't my role, so it was difficult to determine the FIP scores. The process was fine--hopefully it will be faster next cycle.
- Gave insight to aspects of the industry outside my role.
- I found it difficult to determine importance [one of the FIP scores] as this can vary from time to time and person to person. I liked the overall process, and seeing it all come together is rewarding.
- I thought it was interesting. It made me think differently about how work is being done.
- The FIP rating was definitely the most time-consuming part. I think the fact that I'm not a developer made it a little more challenging. There were also a lot of items! I enjoyed collaborating on the table.
- It was not difficult and did not take very much of my time to do. A reminder to set aside some time to do it was needed often though.

- I'm not sure we have gotten all of the competencies from the start. We did pretty good, but I feel that if this was done in a group setting, where people could just collaborate, the output would be somewhat more accurate and all encompassing. What we have here is still pretty good and will be helpful moving forward.

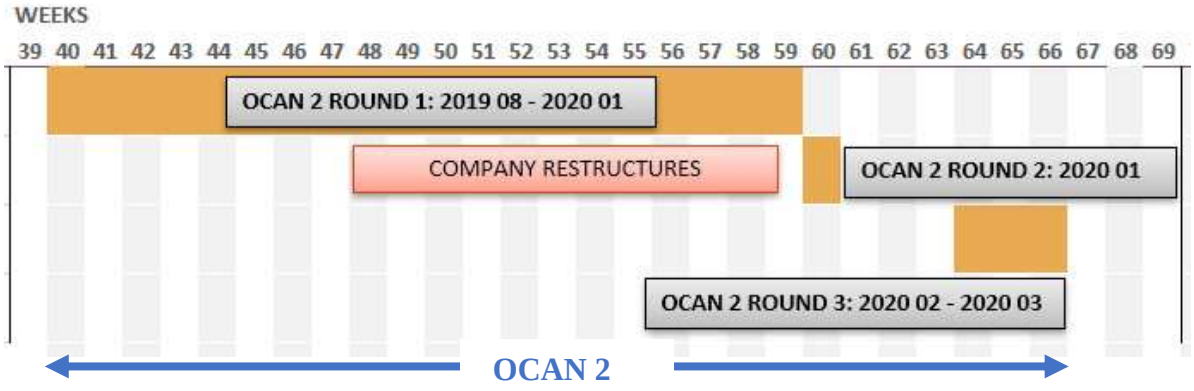
## Round 2: OCAN for eLearning Instructional Designers

### *OCAN 2 Chart*

OCAN 2 began on 2019 August 22 and data collection was complete by 2020 March 02, a total of 27 weeks. Cycle 1 required 20 weeks to complete, during which time the Company underwent complete restructuring. Cycle 2 took one week to complete. Cycle 3 took 3 weeks to complete (see Figure 11). Ten people participated in this round, although levels of participation varied greatly from cycle to cycle, and from person to person.

**Figure 11**

*Gantt Chart for OCAN 2*




OCAN 2 resulted in 10 general areas of competency, with anywhere from three to 13 supporting tasks for each area (see Figures 12-14), broadly meeting the DACUM standard (see Table 7).

**Table 7**

*Competencies and Tasks, OCAN 2*

| General Area of Competency | Number of supporting tasks |
|---|---|
| Communication | 9 |
| Instructional design | 4 |
| Media | 7 |
| Professional development | 3 |
| Project management | 6 |
| Quality assurance | 7 |
| Research | 5 |
| Scripting | 11 |
| Technical skills | 13 |
| Writing | 8 |

**Figure 12**

*OCAN 2 Chart Page 1*

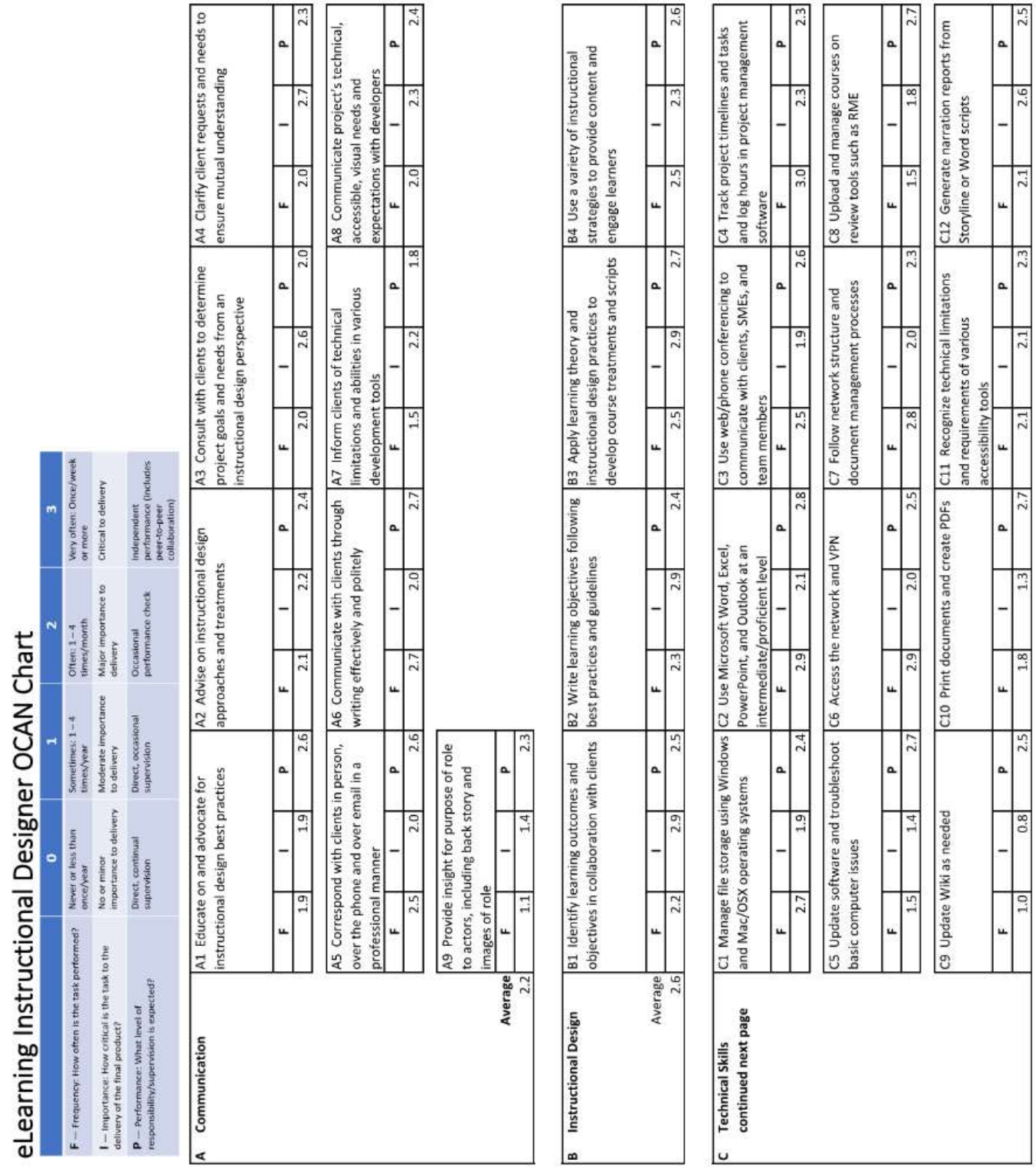


**Figure 13**

*OCAN 2 Chart Page 2*

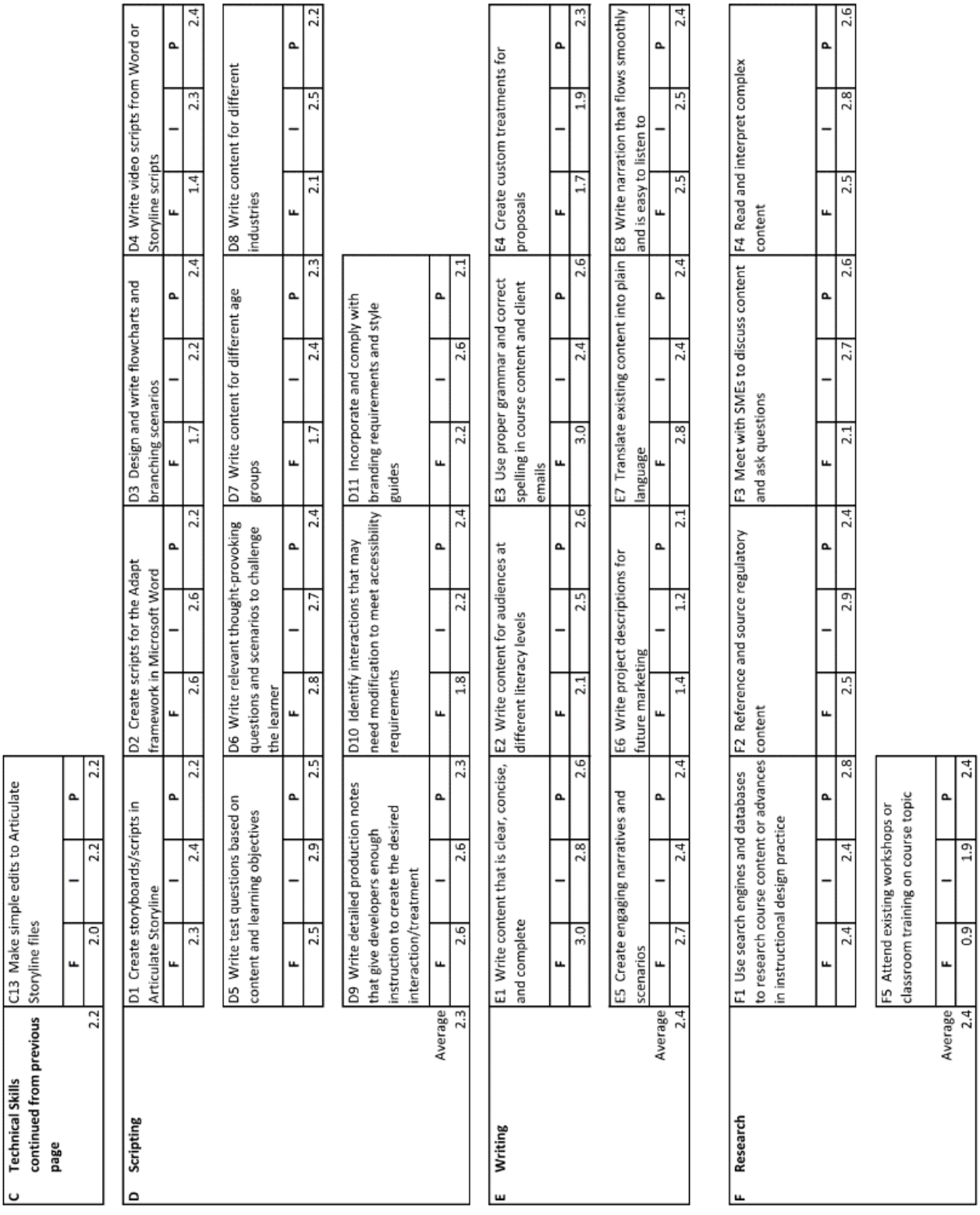
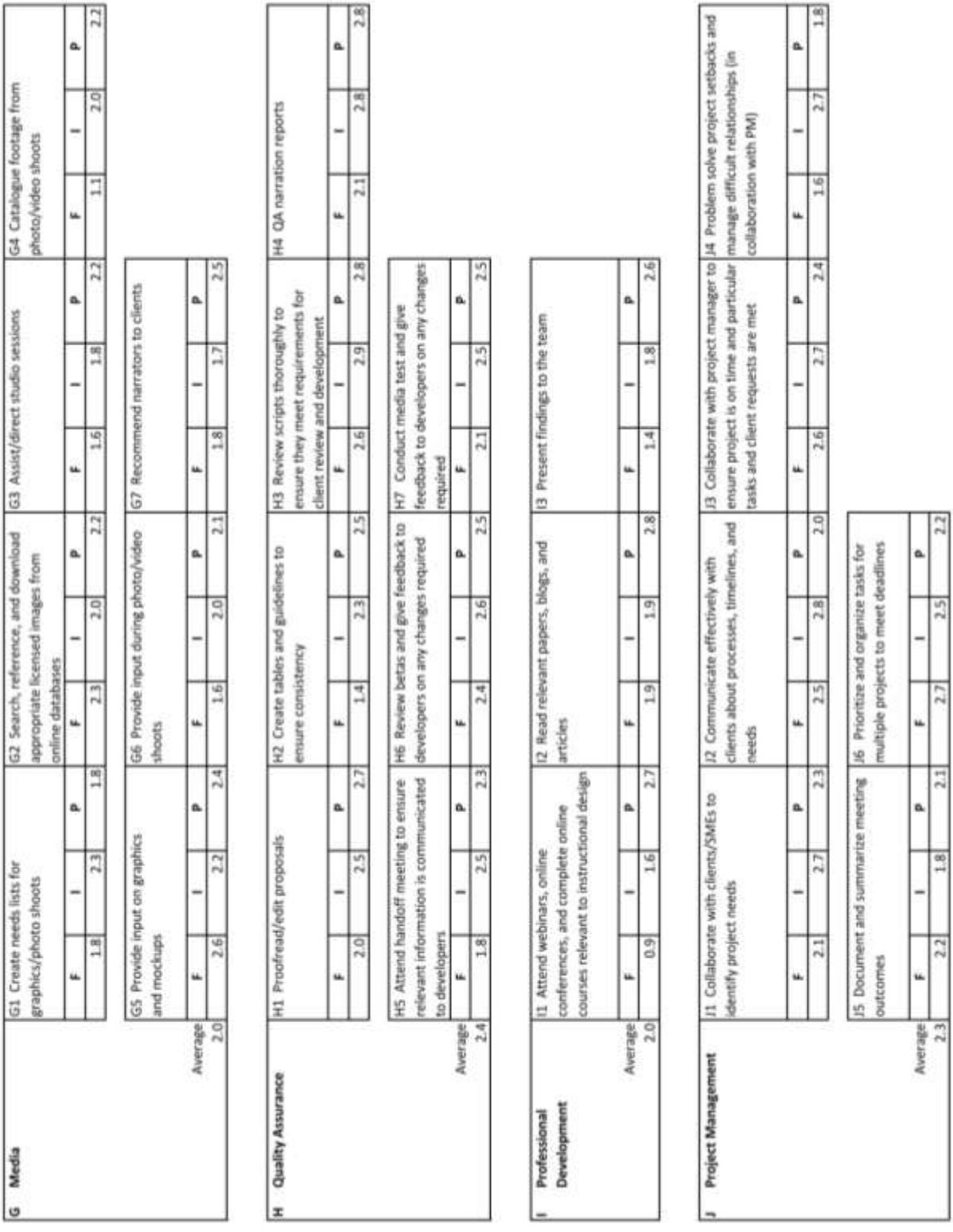


**Figure 14**

*OCAN 2 Chart Page 3*



## *OCAN 2 Survey Results*

### Cycles 1 and 2 Questions.

*Question 1: HOW OFTEN did you enter data in the Instructional Designer OCAN?*

As in OCAN 1, most respondents to OCAN 2 surveys entered data once per week (see Table 8).

**Table 8**

*Frequency of Data Entry, OCAN 2*

| | At least once a day | Several times a week | Once a week | I don't remember | I did not enter data in this cycle |
|---|---|---|---|---|---|
| Cycle 1 (n = 4) | | | 3 | | 1 |
| Cycle 2 (n = 7) | | 1 | 5 | 1 | |
| Cycle 3 (n =5) | | | 3 | 2 | |

*Question 2: About HOW LONG DID IT USUALLY TAKE you to enter the data?*

Respondents to OCAN 2 surveys took slightly more time to enter data than OCAN 1 respondents. More respondents answered that they took between 21 and 30 minutes to enter data than did OCAN 1 survey respondents (see Table 9).

**Table 9**

*Time to Enter Data, OCAN 2*

| | I did not enter data in this cycle | Less than 5 minutes | Between 5 and 10 minutes | Between 11 and 20 minutes | Between 21 and 30 minutes | More than 30 minutes |
|---|---|---|---|---|---|---|
| Cycle 1 (n = 4) | 1 | | 2 | 1 | | |
| Cycle 2 (n = 7) | | | 4 | | 3 | |
| Cycle 3 (n = 5) | | 1 | 1 | | 3 | |

*Question 3: Apart from the actual data entry, about HOW MUCH TIME did you SPEND OFFLINE on the project during this cycle (for example, thinking about or discussing the project with others)?*

Most respondents to the OCAN 2 surveys spent less than 20 minutes engaged in offline thought or discussion about the OCAN project, compared to less than 10 minutes for OCAN 1. One respondent to the OCAN 2 survey spent up to an hour offline engaged in the project (see Table 10).

**Table 10**

*Time Spent Offline on Project, OCAN 2*

| | No time | Less than 10 minutes | Between 10 and 20 minutes | Between 20 and 30 minutes | Between 30 and 45 minutes | Between 45 and 60 minutes |
|---|---|---|---|---|---|---|
| Cycle 1 (n = 4) | 3 | | | | | 1 |
| Cycle 2 (n = 7) | 2 | 4 | 1 | | | |
| Cycle 3 (n = 5) | 1 | 2 | 2 | | | |

**Cycle 3 Only Questions.**

*Question 4: How easy was it to enter Frequency, Importance, and Performance scores for each task for the Instructional Designer's OCAN?*

This question was asked during the last cycle of OCAN 2. Only four results are recorded as one OCAN 2 participant did not enter any FIP scores (see Table 11).

**Table 11**

*Ease of FIP Score Entry, OCAN 2*

| (n = 8) | EASY. I could decide on a rating for ALL OR NEARLY ALL THE TASKS FAIRLY QUICKLY | FAIRLY EASY. It took a LONG TIME to decide on a rating for SOME OF THE TASKS | CHALLENGING. It took a LONG TIME to decide on a rating for MANY OF THE TASKS | VERY DIFFICULT. It took a LONG TIME to decide on a rating for ALL OR NEARLY ALL THE TASKS. |
|---|---|---|---|---|
| Frequency | 1 | 2 | 1 | |
| Importance | 1 | 2 | 1 | |
| Performance | | 3 | 1 | |

*Question 5: Is there anything else about the procedure you'd like to share?*

There was only one comment, made in Cycle 3. No comments were made in Cycles 1 or 2. The comment is verbatim, edited only for spelling and punctuation.

Cycle 3

- I think there would still be a benefit of getting a group together (even virtually) to discuss some items that seem to be a bit contentious between the group, and coming to a better consensus.

**OCAN 1 and 2 Survey Results Compared**

There were too few results to determine probability of differences in responses among cycles of each OCAN, or between the OCANs themselves. However, the graphs show some differences. The statistical significance of these differences is unknown.

- Frequency of data entry—Generally, respondents entered data a little less often during OCAN 1 than OCAN 2 (see Figure 7).

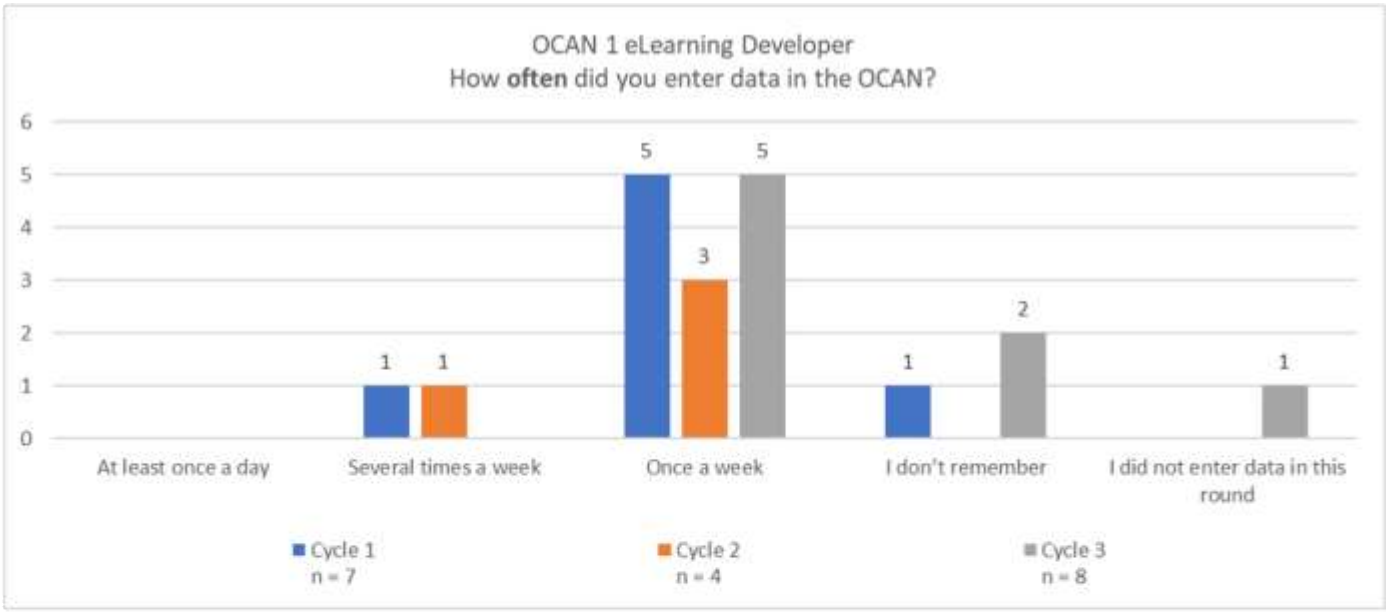
- Time to enter data—There is too much variance in the data to draw any conclusion, except that in both OCAN 1 and OCAN 2, respondents spent more time entering data in the third cycle of each OCAN than in the first and second cycles (see Figure 8).
- Time spent offline—The data suggest that most people spent less than 10 minutes offline considering or discussing the OCANs. In OCAN 1, however, there was one respondent who spent up to 45 minutes offline engaged in the OCAN process. In OCAN 2, three respondents spent between 20 and 45 minutes engaged in the project offline.

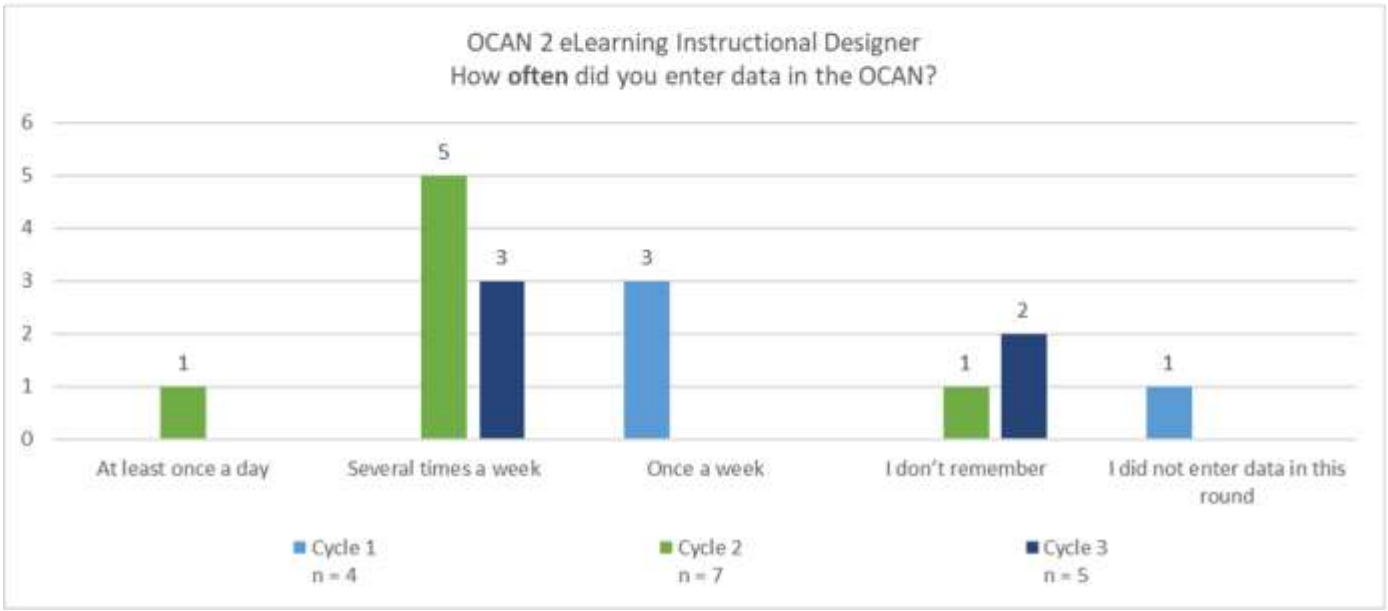
***Estimating Frequency of Data Entry, Per Respondent***

Most respondents for both OCANs entered data from once to several times a week. In Cycle 2 of OCAN 2, one respondent entered data daily during the workweek (see Figure 15).

**Figure 15**

*Comparing Frequency Survey Respondents Entered Data*



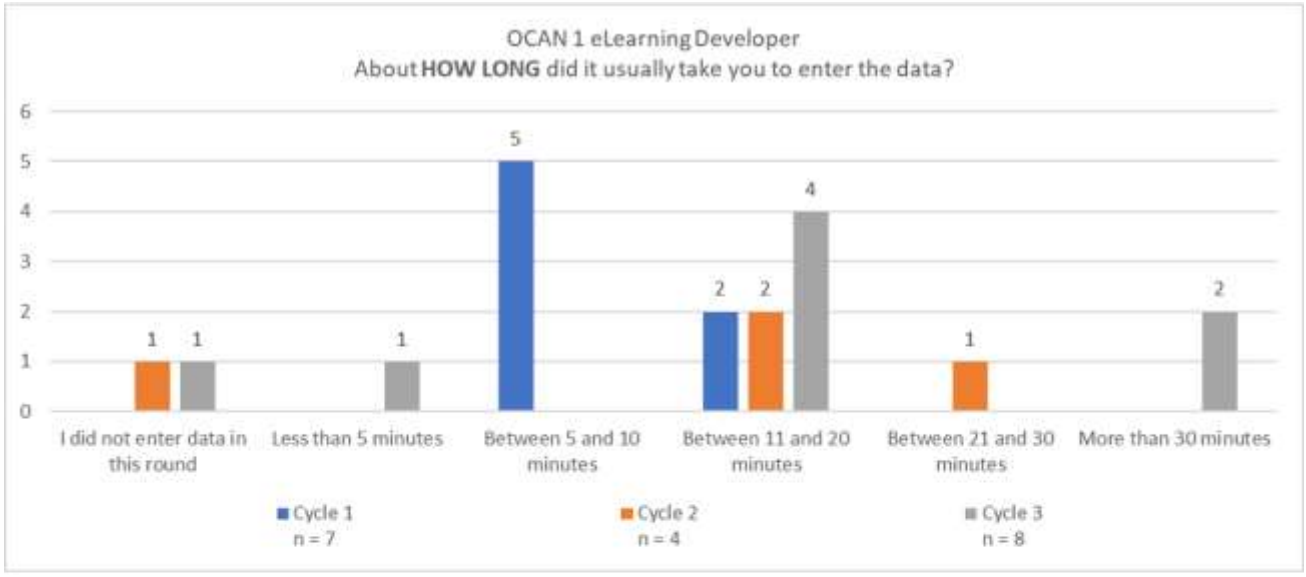



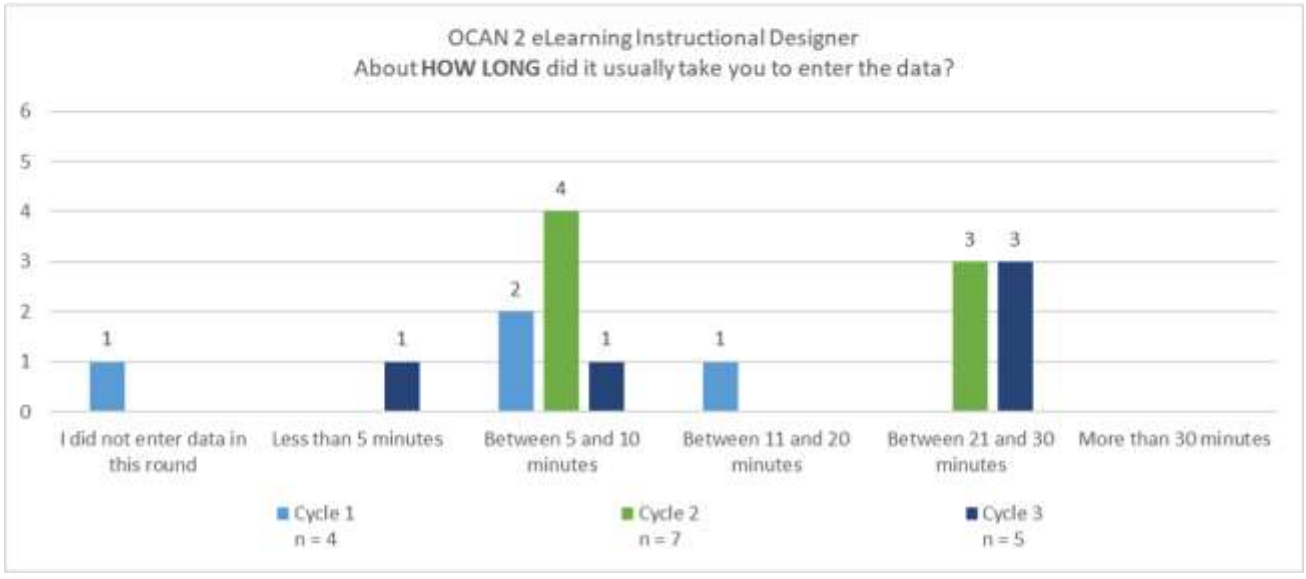
### *Estimating Time Spent Entering Data, Per Respondent*

Generally, respondents spent more time entering data in the second and third cycles of both OCANs, than in the first cycle (see Figure 16).

**Figure 16**

*Comparing Time Survey Respondents Took to Enter Data*



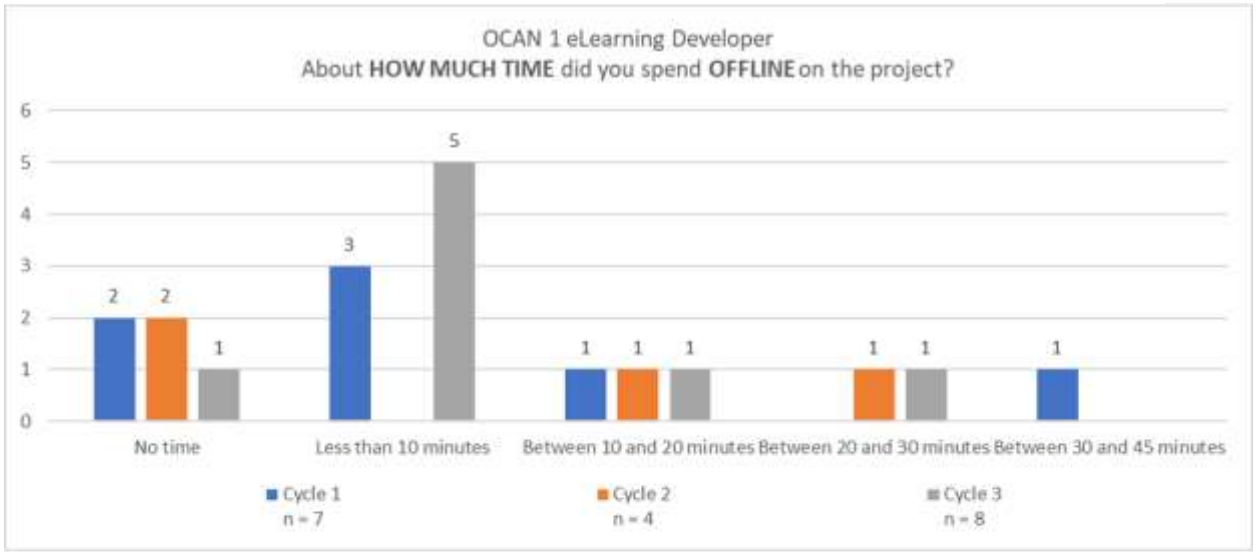



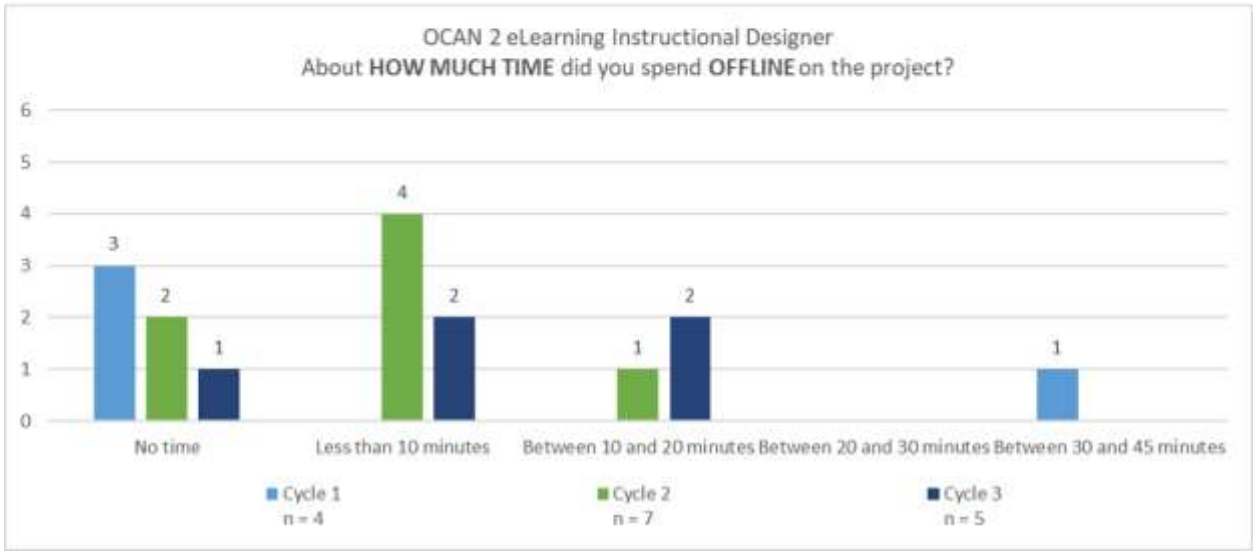
### *Estimating Time Spent Offline Engaging in the Project*

Generally, respondents spent no more than 20 minutes thinking or talking about the OCANs. Respondents in OCAN 1 spent more time thinking or talking about the project than respondents for OCAN 2 (see Figure 17).

**Figure 17**

*Comparing Time Survey Respondents Spent on the OCANs Offline*



### *Estimating Staff Resource Costs*

The OCAN surveys asked respondents to estimate their frequency of data entry, time taken to enter data, and time spent offline thinking or talking about the research project. These estimates were expressed as ranges of time, for example, “between 5 and 10 minutes”. This makes calculating exact average frequencies and times impossible. However, to create a general estimate of frequency and time, the following amounts were assigned arbitrarily (see Tables 12 and 13).

**Table 12**

*Estimating Frequency of Data Entry*

| Frequency estimate | Numerical frequency used in calculation (times per week) |
|---|---|
| At least once a day | 5 |
| Several times a week | 3 |
| Once a week | 1 |
| I don’t remember | 3 |
| I did not enter data in this cycle | 0 |

**Table 13**

*Estimating Time Spent in Data Entry*

| Time estimate | Numerical time used in calculation (minutes) |
|---|---|
| I did not enter data in this cycle | 0 |
| Less than 5 minutes | 4 |
| Between 5 and 10 minutes | 10 |
| Between 11 and 20 minutes | 20 |
| Between 21 and 30 minutes | 30 |
| Between 30 and 45 minutes | 45 |
| Between 45 and 60 minutes | 60 |
| Less than 10 minutes | 9 |
| More than 30 minutes | 45 |

To estimate how often survey respondents entered data, the following formula was used:

*(Number of weeks per cycle) x (Numerical frequency)*

*= Total frequency of data entry*

For example, the third cycle of OCAN 1 lasted 3 weeks. If a respondent reported that they entered data once per week, it was estimated the respondent entered data a total of three times for that cycle: 3 x 1 = 3. If a respondent recorded that they entered data several times a week, it was estimated that the respondent entered data a total of nine times: 3 x 3 = 9.

A similar calculation was made to estimate the total amount of time respondents spent on data entry:

*(Numerical frequency of data entry) x (Numerical time [minutes] per entry)*

*= Total time for data entry*

For example, the first cycle of OCAN 1 lasted 13 weeks. A respondent who reported that they entered data "several times a week" was estimated to have entered data 39 times: 13 x 3 = 39. If that respondent also recorded that they spent "between 5 and 10 minutes" entering data, the total amount of time spent on data entry for that cycle was 390 minutes: 39 instances of data entry x 10 minutes taken per entry.

Using those calculations, it is estimated that survey respondents spent a total of 3.7 hours engaged in OCAN 1, either entering data, or thinking or discussing the project. Respondents spent about an hour less on OCAN 2, about 2.5 hours. Table 14 shows comparisons between OCANs 1 and 2, and DACUM lasting 2 ½ working days, or about 15 hours, assuming 10 staff participating at a cost of $50 per hour. OCANs will cost a company between 17% and 25% of the cost of a face-to-face DACUM; an OCAN will cost under $2,000 in staff resources, as opposed to $7,500 in staff resources for a DACUM. (The costs in staff resources do not take into account a fee charged by the DACUM or OCAN facilitator.)

**Table 14**

*Comparing Time Costs for OCANs 1, 2, and DACUM*

| | Respondents' estimated total time for data entry (hrs) | Respondents' estimated total time offline (hrs) | Total paid hours for 10 staff (hrs) | Total cost (assume $50/hr/person) |
|---|---|---|---|---|
| OCAN 1 | 2.3 | 1.4 | 37 | $1,850 |
| OCAN 2 | 1.6 | 0.85 | 24.5 | $1,225 |
| DACUM | 15 | n/a | 150 | $7,500 |

**Results Summary**

Two OCANs were completed, with the first taking 30 weeks while the second took 27 weeks. These timelines are very much longer than the anticipated 6 to 8 weeks completion time for each analysis. However, the number of general areas of competence and supporting tasks for both OCANs were within the usual parameters expected of face-to-face DACUMs.

Most participants entered data with little or no difficulty, with the exception of the FIP score ratings. Four of seven survey respondents reported that determining Performance scores was “challenging” in the first OCAN for eLearning Developers. Only one of four respondents found the same task challenging in the second OCAN for eLearning Instructional Designers.

The few comments provided about the overall OCAN process were generally positive, although three of seven OCAN 2 survey respondents noted that entering FIP scores was challenging.

Using broad estimates and generalizing from survey results, OCANs could cost an organization between 17% and 25% of the cost of a face-to-face DACUM.

# Chapter 5: Discussion

## Introduction

It is an unfortunate fact that much of workplace training—up to 50%—is ineffective in that it does not transfer to the job (Baldwin & Ford, 1988; Burke & Hutchins, 2007); employees fail to demonstrate the desired behaviour the training was meant to evoke. Speaking generally, ineffective workplace training is costly and inefficient, but in safety-sensitive occupations, it can have catastrophic consequences. The latest complete statistics for Canada are from 2018, when there were 362 injury-related fatalities and 264,438 lost-time injuries reported to workers' compensation boards (Tucker & Keefe, 2020). Ineffective safety training cannot be blamed for all these incidents, but the importance of effective safety training cannot be overemphasized. This research was initially prompted by my desire to improve workplace training in general, in the hope that it might affect workplace safety training in particular.

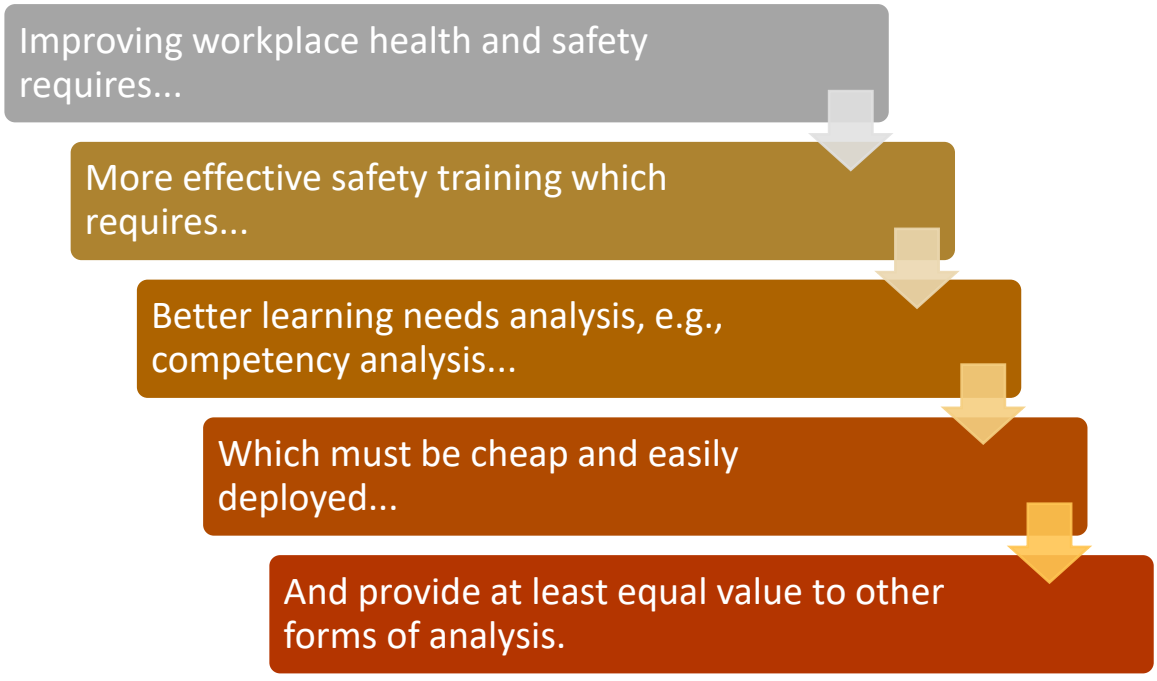
There are many reasons why workplace training is ineffective, but one important reason is that a learning needs analysis, specifically determining what competencies employees require to meet organizational goals, is overlooked and ignored when developing training (Garavan et al, 2020, p. 63; Lacrenza, Reyes, Marlow, Joseph, & Salas, 2017, p. 1689). Unfortunately, this lack of competency analysis means that employees receive training that may be engaging, and may even result in the acquisition of new information, but does not change their on-the-job behaviour. Since the training does not result in better (or safer) job performance, it is ineffective in the context of the workplace.

Most methods of workplace competency analysis process, whether based on interviews, surveys, observations, or focus groups, are time-consuming and expensive. The goal of this research was to develop and test a framework for asynchronous online competency analysis that

would use tools widely available in most Canadian workplaces. Organizations continually wrestle with the Iron Triangle, and any initiative that will increase the pressure on cost, such as a competency analysis that requires or significant deployment of human or other resources (such as the installation of proprietary software), is unwelcome. If competency analysis is to become more widely used in developing workplace training (and therefore health and safety training), its disruption and cost must be minimal. It must also provide equivalent results to other forms of competency analysis (see Figure 18).

**Figure 18**

*Rationale for OCAN*




**Answering the Initial Research Questions**

This project was intended to answer the research question, "How can a competency analysis be conducted online, in a way that is cost-effective in both human and financial resources, and provides results of comparable rigour and quality as a competency profile

developed face-to-face?" Inherent in this question are three other questions that must be answered first:

1. What is the framework of an OCAN that meets those standards?
2. How fit for purpose are the online collaboration tools widely available in a corporate environment (e.g., Microsoft OneNote) in conducting an OCAN?
3. What will an OCAN cost an organization in terms of the resources required?

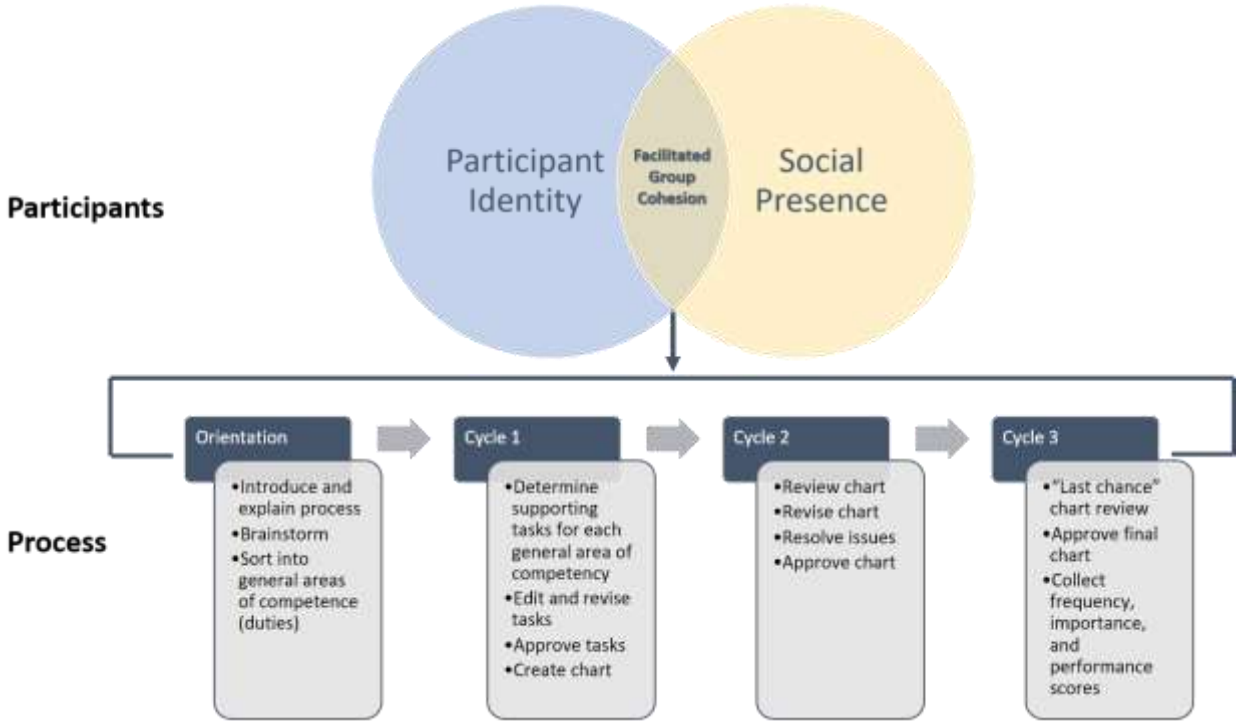
Each of these questions is considered below.

### *OCAN Framework*

There are two parts to the framework of an OCAN, the participants and the process. The first part of the framework, the participants, depends largely on the social presence and resulting group cohesion developed among OCAN participants and the facilitator. The process part of the framework consists of an orientation that includes establishing the general areas of competence (which the DACUM process calls "duties"), followed by three cycles. The first cycle articulates most of the supporting tasks for each area of competence and formats the results into a competency profile chart. The second and third cycles are opportunities for the participants to review and revise the chart (see Figure 19).

**Figure 19**

*Framework for OCAN*




**Participants.** As mentioned in the earlier literature review, "The degree of team success depends on the level of social presence necessary to complete the task" (Bickle, Hirudayaray, & Doyle, 2019, p. 386). The social presence of DACUM participants—enabled by face-to-face, synchronous, verbal and non-verbal communication, and enhanced by facilitation—increases the chances of a successful competency analysis. The computer-mediated, anonymous, text-only, and asynchronous communication of an OCAN makes it a more difficult task for any member of the group to express themselves socially and emotionally.

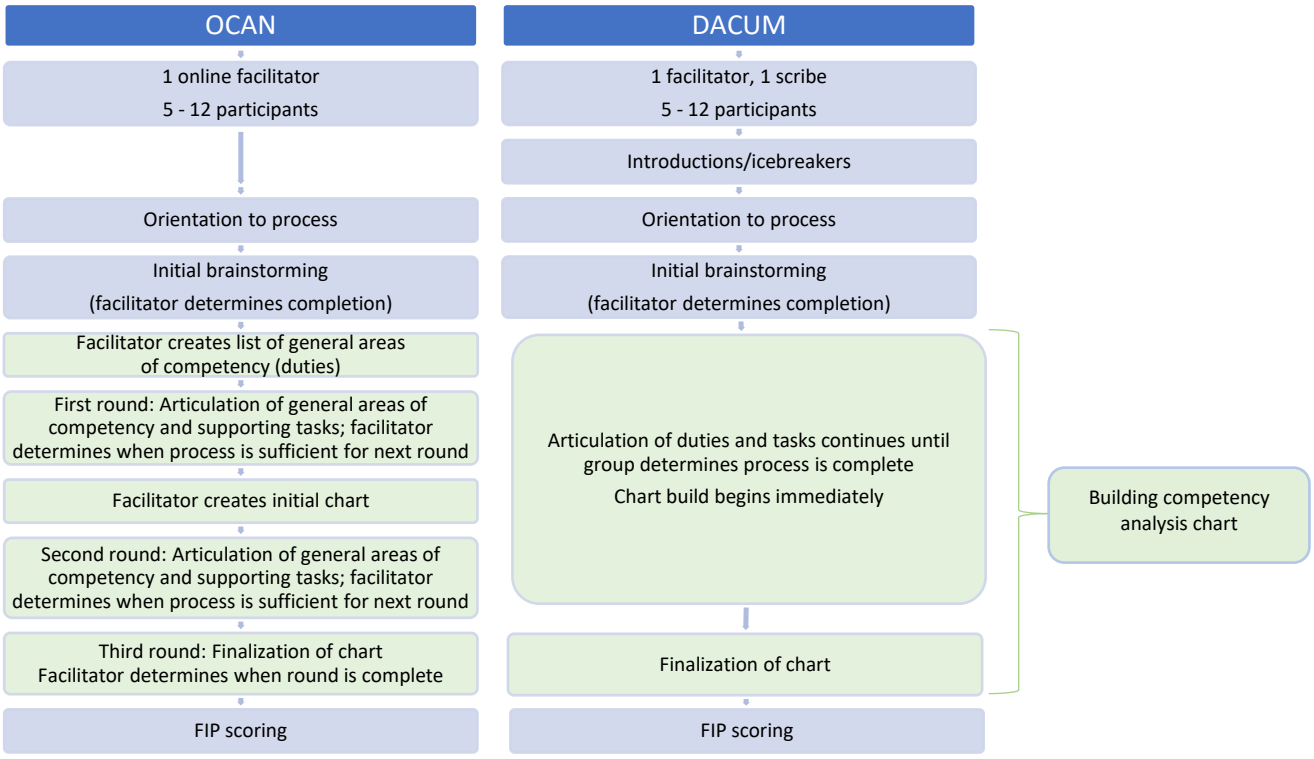
If sufficient social presence to create group cohesion is lacking or unexpressed during a DACUM, it is the facilitator's role to elicit and enhance participants' social presence to build the group cohesion necessary for success. An OCAN facilitator must manufacture group cohesion

out of thin air, so to speak, with none of the advantages of face-to-face, synchronous communication. In addition, the facilitator of an anonymous, asynchronous OCAN must build and maintain social presence and a sense of community over a period of several weeks rather than several contiguous days.

**Process.** The processes for OCAN and DACUM are similar in that they both use iterative processes to brainstorm and build consensus. However, OCAN's use of separate cycles for slices the process into discrete units of analysis, whereas the DACUM analysis chart is continuous (see Figure 20).

**Figure 20**

*OCAN and DACUM Frameworks Compared*




In this research project, there were always opportunities for OCAN participants to revisit any decision—something that happened frequently in the third cycle of each OCAN—but the

discontiguous cycle structure of the OCAN imposed a more linear process than is the case in a DACUM. . It is relatively easy for a DACUM facilitator to direct participants to revisit decisions, and to revise or revoke them if there is group consensus to do so. It is much more difficult for an OCAN facilitator to enable participants to overcome the pull of the linearity of the process to edit previous decisions. Both OCANs met the general standards required of DACUM: identification of six to 12 general areas of competence (or duty areas), with each general area of competence comprising six to 20 supporting tasks (Norton & Moser, 2013, p. E-3 and Appendix A, p. 6). Given that both OCANs resulted in competency analyses within the accepted parameters of a DACUM, the linearity of the OCAN framework may not have had much effect. But it is possible that a DACUM produces a more faithful reflection of a group's decisions both because the initial brainstorming may be more inclusive, and because the DACUM framework may facilitate revisions better than the framework for an OCAN.

***Recommendation 1.*** *Future OCAN frameworks should include time for participants to create the initial list of general areas of competency.*

The initial list is the foundation for the rest of the analysis and should be as inclusive as possible. This might take several iterations before a consensus is reached and could constitute an additional cycle, the first of four, rather than three.

***Recommendation 2.*** *OCAN facilitators must keep continually encouraging participants to engage with the project.*

Comments from two survey respondents noted that it was easy to overlook their commitments to enter relevant data, noting that "There is onus on the participants to regularly check and participate within the time frame" and "It was not difficult and did not take very much of my time to do. A reminder to set aside some time to do it was needed often though."

***Recommendation 3.*** *OCAN facilitators should engage daily with participants as part of an online group chat space such as Slack or Microsoft Teams in order to enrich social presence.*

Social presence also relies on identity, the "unique characteristics communicated by a specific individual's presence" (Dennen & Burner, 2017, p. 174). The lack of any identity cues resulting from the ethical requirement of anonymity in this research, was a significant barrier to social presence and group cohesion. The face-to-face nature of a DACUM means that there is little anonymity among participants. Ice-breaker activities also help remove anonymity.

However, anonymity does not preclude the development of a social identity. Individuals can hide their real-life identity, but can create a pseudonymous identity. Millions of online gamers routinely build personae behind pseudonyms; those personae congregate online to become communities. Ethics board approval for this research required that participants be anonymous.

It was initially thought that a community of inquiry could still be formed by anonymous individuals through the use of pseudonymous usernames. However, Microsoft SharePoint, the collaboration space offered by the Company (and widely used in other workplaces) recognizes users through their email addresses. Members of the Company's SharePoint community all use the email addresses assigned by the Company. For an individual to create a pseudonymous identity with access to the Company's SharePoint server, the individual would need an additional email address assigned by the Company. Understandably, the Company's information technology department was unwilling to do this because of resource and security concerns. Thus, OCAN participants were not only anonymous, but they also had no personae whatsoever. In this environment it was very difficult to create an effective community of inquiry because the only person in the group with any social presence was me, the researcher/facilitator.

The irony of this situation is that the Company provided an almost ideal position for innovation in the framework for fit as noted by Blumenfeld, Fishman, Krajcik, Marx, and Soloway (2000). In the three-dimensional space bounded by axes of organizational culture, capability, and policy, the Company was situated very close to the intersection of all three axes. However, implicit in organizational culture are the interactions—the social presence—of the organization's members. The Blumenfeld et al. framework assumes social presence, but needs to be modified for distributed organizations where social presence is not inherent in the organization.

***Recommendation 4.*** *OCAN participants should be known to each other, at least by pseudonymous user-names, and ideally by their actual identities as would occur in a face-to-face environment or in any other online group project.*

In a DACUM, the participants may not know each other initially (although they often do) but are certainly not anonymous. OCAN participants should be made aware that the process relies on group cohesion which cannot develop in the absence of social presence, and that social presence requires a persona, if not an actual identity.

**Framework Summary.** A modified DACUM framework, using distinct Delphi-cycles for group decision-making and consensus building, produced two OCANs that were acceptable, and considered helpful, to the Company. Adding an additional Delphi cycle after initial brainstorming would reduce the facilitator's influence in the process. However, the process must include ways to maximize online social presence. Ideally, that would occur because participants shared their workplace identities with each other. If that were not possible, participants must be allowed to create pseudonyms, or have them assigned. A framework for OCAN that does not include social presence must overcome this hurdle to be effective.

### *OCAN Collaboration Tools*

While one survey respondent noted that a tool specifically built for completing OCANs would be useful, such a tool would be contrary to the aims of this research. One of the impediments to accepting organizational innovation is any additional burden to the organization's infrastructure. The wide acceptance of OCANs will depend on ensuring that workplaces need to invest as few resources as possible. Additional software installation, even if the software were open source, would be viewed by many organizations as an unacceptable condition. Businesses and corporations must be able to implement OCANs on their existing computing infrastructure.

The Microsoft Office 365 suite and SharePoint have large installed user bases, and provide comprehensive online collaboration tools. The identity and privacy issues that made using SharePoint challenging during this research should not be present in a normal workplace environment. Further, the increase in remote working since the COVID-19 pandemic has encouraged major software developers like Microsoft to enhance online collaboration tools such as MS Teams.

Almost any online collaborative tool could be used to conduct an OCAN providing that it allowed for lengthy comments and threaded discussions, real-time document collaboration, and a chat space. The first research collaboration space, a WordPress blog, was fit for purpose for discussions and casual chat. But trying to collaborate on a separate document or file within the blog proved unworkable. While a private Facebook group could also offer the discussion and chat space for a future OCAN, it would not be feasible to collaborate on a specific document. Google Docs also offers robust online collaboration tools. It could not be used for this research because of the requirement to keep all data on a Canadian server. While the Microsoft

SharePoint environment allows for all three functions and has a very large user community, it should be possible to implement an OCAN in any environment that facilitates threaded discussions, casual chat, and document collaboration among multiple users.

***Recommendation 5.*** *Every OCAN should field-test all the online collaborative tools prior to launch.*

Even if all organizations used the same online collaboration tools, each individual installation of the tools would have its own idiosyncrasies. It is far better to determine and mitigate potential problems through a field-test than in the middle of a project.

**Collaboration Tools Summary.** There are widely available online collaboration tools that can be used for OCAN including the Microsoft SharePoint environment, Google Docs, and Facebook. Existing organizational infrastructure should determine which tool would be used in an OCAN, but any tool must be field-tested for its suitability as an OCAN platform before actual implementation.

### *Cost*

It is impossible to say with absolute certainty that OCANs are cheaper than DACUMs, given the data generated by this research, However, it seems very likely that an OCAN would cost about 25% of the cost of a DACUM, or less, in human resources alone. In addition, an OCAN does not require the expenses of meeting space, hospitality, travel, or accommodation that are incurred during a DACUM. Because an OCAN uses an organization's existing collaboration and communication software, there is no need for additional technology resources, either. It is possible that the result of an OCAN is not quite as complete or comprehensive as a DACUM. But it is also possible that many organizations would not mind a few deficiencies in exchange for significant cost savings.

**Limitations of the Study**

The study was first limited by its scope. A complete DACUM includes external validation of the DACUM chart, and a discussion and articulation of the personal attributes required by people in the occupation under study. This study did not include them. These components, which are additional to the DACUM chart, are usually created apart from the actual group brainstorming, decision-making, and consensus building. The intent of this project was to investigate whether the face-to-face components of DACUM, which are by far the costliest in terms of time and resources, could be effectively produced asynchronously, online. This project did not include the additional components of DACUM that are themselves completed asynchronously and at a distance.

The difficulties of establishing a stable, online collaborative space were another significant limitation in the study because they may have disrupted an already fragile online community. Participants may have been more reluctant to engage with the project subsequent to early difficulties. A similar disruption occurred during the project when the Company completely restructured between the first and second cycle of OCAN 2, the analysis of eLearning instructional designers' competencies. The disruption was exacerbated when the Company migrated their SharePoint sites, including the research site, to a different server.

There were significant limitations in the collection of survey data. First, the survey was optional for participants, in keeping with the ethical requirement that they could refuse to engage in any part of the project they desired. Surveys for the second cycle in both OCANs were completed by fewer than half the participants. Anonymity was another limitation of the research, and not just because it impeded social presence. It was impossible to track participants' survey respondents across cycles and OCANs because every survey was completed and submitted

anonymously. There was no way of knowing if a person who reported spending between 5 and 10 minutes on data entry in one cycle was the same person who reported spending between 21 and 30 minutes in a different cycle in the same OCAN. Similarly, there is no way to compare individual data between both cycles.

The value of the surveys was also limited by the self-reports of frequency and time spent in data entry. Ideally, participants' contributions would have been objectively and more precisely timed. However, there was no way to do this without making the data entry task more onerous which would have reduced participation, or by requiring additional time-tracking software which was contrary to the intent of the project.

The original intent of this research was to develop competency analyses for psychometricians employed by the Company. Unfortunately, it was not possible to recruit enough participants for that project, even though it had the full support of the head of the psychometric team and the Company's executive leadership group. One of the advantages of examining that occupation, however, is that the researcher was in an entirely different division of the Company, and apart from being employed by the same company, had no further relationship with the psychometric group. The absence of any close working relationship might have been judged to be beneficial for the research project by reducing researcher bias.

However, the eventual group studied was the eLearning content development team comprised of eLearning developers and instructional designers. As a member of that same team, I may have introduced bias into the OCAN results, particularly since I edited the initial brainstorming lists in both OCANs to create the original competency areas. This limitation is mitigated by the approach of Design Based Implementation Research (DBIR), a process approach that seeks to understand inductively how a sequence of events can lead to a result over

time (Rowlands, 2005). DBIR does not focus on correlations between and among controlled variables and how those interactions lead to specific outcomes. Indeed, it is a collaborative approach which places "more emphasis on evidence of the quality of the researcher-practitioner relationship and the importance of the problem being investigated" (Means & Harris, 2013).

By far the largest limitation of this research is that it was initial, exploratory research. The DBIR approach considers this initial research a "stake in the ground" as noted by Barab and Squire (2004). This research is just the first step, and needs to be repeated in different environments, for different occupations, and using a variety of frameworks before OCANs can have widespread acceptance in workplace training.

This research was an attempt at proof of concept for the OCAN process. For an OCAN to be feasible in corporate training departments, not only must it return results comparable to the general standards of DACUM, but it must also cost less and be completed in a timely fashion. Irrespective of the credibility of its results, an OCAN will have little appeal if it cannot also be delivered economically, with only a moderate increase in duration from a traditional DACUM.

# Chapter 6: Conclusions and Recommendations

## The Necessity of Competency Analysis in Workplace Training

Conducting a comprehensive competency analysis is just one aspect of increasing the effectiveness of workplace training. However, it is an aspect under employers' control and relatively simple to implement, unlike changing other training inputs such as trainee characteristics or the workplace environment (Baldwin & Ford, 1988). More to the point of this research, is also an aspect of instructional design which has been part of my professional practice toolbox for over 15 years.

But convincing employers to fund a competency analysis is challenging. While a competency analysis is a crucial foundation of an effective training program (Marrelli, 1998; Taylor, O'Driscoll, & Binning, 1998), about 94% of organizations neglect this step when developing workplace training (Arthur, Bennett, Edens, & Bell, 2003; Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). I felt that more workplaces would consider funding a competency analysis if it were less of a burden on their resources, and could minimize expert workers' time commitment, technological capacity, and overall cost. I needed to test the feasibility of an online, asynchronous competency analysis before conducting further research on maximizing the ease of implementation and effectiveness. Furthermore, I wanted to use methods that had already established their credibility and chose DACUM and the Delphi method of inquiry.

It was entirely coincidental that the COVID-19 pandemic was concurrent with reporting this research, but only underscores the need for instructional design tools that work for a distributed or remote workforce.

**The Feasibility of OCAN**

The issues of OCAN framework, appropriate online collaboration tools, and cost were subsidiary to the overall research question, "How can a competency analysis be conducted online, in a way that is cost-effective in both human and financial resources, and provides results of comparable rigour and quality as a competency profile developed face-to-face?" The results indicate that such an analysis (called an OCAN in this research) can be built using a DACUM-like process, by means of a Delphi decision-making method, modified for three or four online data collection and collaboration cycles. However, the research found that the OCAN process must also include opportunities to establish social presence among participants and between the participants and the facilitator. The facilitator must be prepared to engage continually with the participants. An organization's pre-installed collaboration software will meet the purpose of an OCAN, although a pilot test should be implemented before the actual project roll-out to ensure the tools function as expected.

An OCAN produces a credible competency analysis for about 25% of the cost of a DACUM (or less) making this form of competency analysis more affordable for organizations. The use of an organization's existing tools makes an OCAN more convenient. Greater convenience at lower cost could make competency analysis more widely accepted and implemented.

The two competency charts that resulted from the OCAN could no doubt be improved, and the DBIR approach to research requires additional research to make those improvements. But they are a starting point—a proof of concept—that could result not only in better returns on training investment and effort, but safer workers and workplaces.

## Lessons Learned

The lessons learned from this OCAN are compiled from the Recommendations made earlier in this document.

### *Recommendation 1*

*Future OCAN frameworks should include time for participants to create the initial list of general areas of competency.*

It would be helpful, and align with the DBIR approach to expand OCAN participants' opportunities to engage with the process as fully as possible.

### *Recommendation 2*

*OCAN facilitators must keep continually encouraging participants to engage with the project.*

Effective facilitators in face-to-face groups expend a lot of energy and expertise in creating group cohesion, encouraging participation from everyone in the group, and restoring flagging group energy. Facilitators of online asynchronous groups have an even more difficult task. They must project large amounts of social presence to light the spark to ignite participants' engagement and interaction, and then continually fan the flames of group cohesion by inspiring participants to cultivate their own presence.

### *Recommendation 3*

*OCAN facilitators should engage daily with participants as part of an online group chat space such as Slack or Microsoft Teams in order to enrich social presence.*

OCAN facilitators cannot expect participants to maintain group cohesion on their own. OCAN facilitators must encourage participants' engagement not only with the quality of their interactions, but the quantity.

***Recommendation 4***

*OCAN participants should be known to each other, at least by pseudonymous user-names, and ideally by their actual identities as would occur in a face-to-face environment or in any other online group project.*

It must be remembered that, "The degree of team success depends on the level of social presence necessary to complete the task" (Bickle, Hirudayaray, & Doyle, 2019, p. 386), and that social presence requires a persona, if not an actual identity. It would be a strange group project that isolated all its members, but that is what complete anonymity does.

***Recommendation 5***

*Every OCAN should field-test all the online collaborative tools prior to launch.*

The challenges presented by software and other technical difficulties could have been largely overcome by prior field-testing. Field-testing will lead to greater OCAN effectiveness and credibility in workplace training.

**Future research suggestions**

OCANs should be attempted in organizations of different sizes, with participants drawn from more widely-distributed organizations, and in different occupations and industries. It would also be extremely informative to conduct and compare OCANs for the same occupations for which there are recent DACUMs available. Another possibility that would be available in larger organizations would be to conduct an OCAN for a specific occupation with one group of distributed workers, and a simultaneous DACUM for the same occupation, but with a different group of workers.

Another type of research would be to conduct an analysis that blends asynchronous with synchronous data collection. As one survey respondent noted, "there would still be a benefit of

getting a group together (even virtually) to discuss some items that seem to be a bit contentious between the group, and coming to a better consensus". Moving some data collection to a synchronous environment would incur greater costs than keeping all data collection asynchronous, but there may be a "sweet spot" where a small investment of resources produces significantly better returns.

Future OCAN studies are imperative if this innovation is to become widely accepted among business and industry, and create the needed changes in worker safety.

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## Appendix A:

## Elearning Developer OCAN Survey 1st Iteration

1. Before this eLearning Developer competency analysis, had you ever participated in a competency analysis before?
   a) Yes
   b) No
   c) Not sure

2. What type of competency analysis did you participate in (check all that apply)
   a) Candidate observation
   b) Competency mapping
   c) Competency-based interview
   d) Critical incident analysis
   e) DACUM
   f) Questionnaire
   g) Repertory Grid
   h) Skills checklist
   i) Other

3. Did the OCAN orientation on PowerPoint explain the OCAN process adequately?
   a) I DID NOT ATTEND the orientation
   b) The orientation left me with SIGNIFICANT CONFUSION or BLIND SPOTS
   c) The orientation provided a BASIC FAMILIARITY with OCAN
   d) The orientation provided a SOLID UNDERSTANDING of OCAN

**The following questions are about how often you entered data during the first cycle of the ELEARNING DEVELOPER OCAN.**

4. How easy was it to enter your ideas online?
   a) EASY. I had NO PROBLEMS OR ALMOST NO PROBLEMS using the software and/or understanding the procedure, but I was able to resolve them.
   b) FAIRLY EASY. I had JUST A FEW PROBLEMS using the software and/or understanding the procedure, but I was able to resolve them.
   c) CHALLENGING. I had SOME PROBLEMS using the software and/or understanding the procedure, but I was able to resolve them.

d) VERY DIFFICULT. I had MANY PROBLEMS using the software and/or understanding the procedure I was to follow.

5. HOW OFTEN did you enter data in the FIRST cycle of the eLearning Developer OCAN?
   a) At least once a day
   b) Several times a week
   c) Once a week
   d) I don't remember
   e) I did not enter data in the first cycle

6. About HOW LONG DID IT USUALLY TAKE you to enter the data during the FIRST cycle?
   a) I did not enter data in the first cycle
   b) Less than 5 minutes
   c) Between 5 and 10 minutes
   d) Between 10 and 20 minutes
   e) Between 20 and 30 minutes
   f) More than 30 minutes

7. Apart from the actual data entry, about HOW MUCH TIME did you SPEND OFFLINE on the project during the FIRST cycle (for example, thinking about or discussing the project with others)?
   a) I did not spend any time thinking about or discussing the research in the first cycle.
   b) I spent less than 10 minutes
   c) Between 10 and 20 minutes
   d) Between 20 and 30 minutes
   e) Between 30 and 45 minutes
   f) Between 45 and 60 minutes
   g) More than 60 minutes
      a. Please estimate the amount of time you spent _____

8. What problems, if any, did you have using the software and/or understanding the procedure? (OPEN)

   _____

   _____

   _____

9. What comments about the procedure or the project would you like to add? (OPEN)

_____

_____

_____

## Appendix B:

## Elearning Developer OCAN Survey 2nd Iteration

1. HOW OFTEN did you enter data in the SECOND cycle of the eLearning Developer OCAN?
   a) At least once a day
   b) Several times a week
   c) Once a week
   d) I don't remember
   e) I did not enter data in the second cycle

2. About HOW LONG DID IT USUALLY TAKE you to enter the data during the SECOND cycle?
   a) I did not enter data in the second cycle
   b) Less than 5 minutes
   c) Between 5 and 10 minutes
   d) Between 10 and 20 minutes
   e) Between 20 and 30 minutes
   f) More than 30 minutes

3. Apart from the actual data entry, about HOW MUCH TIME did you SPEND OFFLINE on the project during the SECOND cycle (for example, thinking about or discussing the project with others)?
   a) I did not spend any time thinking about or discussing the research in the first cycle.
   b) I spent less than 10 minutes
   c) Between 10 and 20 minutes
   d) Between 20 and 30 minutes
   e) Between 30 and 45 minutes
   f) Between 45 and 60 minutes
   g) More than 60 minutes
      a. Please estimate the amount of time you spent _____

4. What problems, if any, did you have using the software and/or understanding the procedure? (OPEN)

_____

_____

_____

5. What comments about the procedure or the project would you like to add? (OPEN)

_____

_____

_____

## Appendix C:

## Elearning Developer OCAN Survey 3rd Iteration

1. HOW OFTEN did you enter data in the THIRD cycle of the eLearning Developer OCAN?
   a) At least once a day
   b) Several times a week
   c) Once a week
   d) I don't remember
   e) I did not enter data in the third cycle

2. About HOW LONG DID IT USUALLY TAKE you to enter the data during the THIRD cycle?
   a) I did not enter data in the third cycle
   b) Less than 5 minutes
   c) Between 5 and 10 minutes
   d) Between 10 and 20 minutes
   e) Between 20 and 30 minutes
   f) More than 30 minutes

3. Apart from the actual data entry, about HOW MUCH TIME did you SPEND OFFLINE on the project during the THIRD cycle (for example, thinking about or discussing the project with others)?
   a) I did not spend any time thinking about or discussing the research in the first cycle.
   b) I spent less than 10 minutes
   c) Between 10 and 20 minutes
   d) Between 20 and 30 minutes
   e) Between 30 and 45 minutes
   f) Between 45 and 60 minutes
   g) More than 60 minutes
      a. Please estimate the amount of time you spent _____

4. Did you enter Frequency, Importance, and Performance ratings for each task in the eLearning Developer OCAN?
   a) I did not provide any ratings
   b) I provided a few ratings
   c) I provided many ratings
   d) I provided all the ratings

5. How easy was it to DETERMINE the FREQUENCY rating for each task for the eLearning Developer OCAN?
   a) EASY. I could decide on a frequency for ALL OR NEARLY ALL THE TASKS FAIRLY QUICKLY.
   b) FAIRLY EASY. It took a LONG TIME to decide on a frequency for SOME OF THE TASKS I had to rate.
   c) CHALLENGING. It took a LONG TIME to decide on a frequency for MANY OF THE TASKS I had to rate.
   d) VERY DIFFICULT. It took a LONG TIME to decide on a frequency for ALL OR NEARLY ALL THE TASKS I had to rate.

6. How easy was it to DETERMINE the IMPORTANCE rating for each task for the eLearning Developer OCAN?
   a) EASY. I could decide on an importance rating for ALL OR NEARLY ALL THE TASKS FAIRLY QUICKLY.
   b) FAIRLY EASY. It took a LONG TIME to decide on an importance rating for SOME OF THE TASKS I had to rate.
   c) CHALLENGING. It took a LONG TIME to decide on an importance rating for MANY OF THE TASKS I had to rate.
   d) VERY DIFFICULT. It took a LONG TIME to decide on an importance rating for ALL OR NEARLY ALL THE TASKS I had to rate.

7. How easy was it to DETERMINE the PERFORMANCE rating for each task for the eLearning Developer OCAN?
   a) EASY. I could decide on a performance rating for ALL OR NEARLY ALL THE TASKS FAIRLY QUICKLY.
   b) FAIRLY EASY. It took a LONG TIME to decide on a performance rating for SOME OF THE TASKS I had to rate.
   c) CHALLENGING. It took a LONG TIME to decide on a performance rating for MANY OF THE TASKS I had to rate.
   d) VERY DIFFICULT. It took a LONG TIME to decide on a performance rating for ALL OR NEARLY ALL THE TASKS I had to rate.

8. Overall, how did you find the OCAN process for the eLearning Developer's position? (OPEN)

   _____

   _____

   _____

9. Do you have any recommendations as to how the OCAN process could be improved? (OPEN)

_____

_____

_____

10. What other comments do you have about the eLearning Developer OCAN? (OPEN)

_____

_____

_____

## Appendix D:

### Elearning Instructional Designer OCAN Survey 1st Iteration

1. How easy was it to enter your ideas online?
   a) EASY. I had NO PROBLEMS OR ALMOST NO PROBLEMS using the software and/or understanding the procedure, but I was able to resolve them.
   b) FAIRLY EASY. I had JUST A FEW PROBLEMS using the software and/or understanding the procedure, but I was able to resolve them.
   c) CHALLENGING. I had SOME PROBLEMS using the software and/or understanding the procedure, but I was able to resolve them.
   d) VERY DIFFICULT. I had MANY PROBLEMS using the software and/or understanding the procedure I was to follow.

2. HOW OFTEN did you enter data in the FIRST cycle of the eLearning Instructional Designer OCAN?
   a) At least once a day
   b) Several times a week
   c) Once a week
   d) I don't remember
   e) I did not enter data in the first cycle

3. About HOW LONG DID IT USUALLY TAKE you to enter the data during the FIRST cycle?
   a) I did not enter data in the first cycle
   b) Less than 5 minutes
   c) Between 5 and 10 minutes
   d) Between 10 and 20 minutes
   e) Between 20 and 30 minutes
   f) More than 30 minutes

4. Apart from the actual data entry, about HOW MUCH TIME did you SPEND OFFLINE on the project during the FIRST cycle (for example, thinking about or discussing the project with others)?
   a) I did not spend any time thinking about or discussing the research in the first cycle.
   b) I spent less than 10 minutes
   c) Between 10 and 20 minutes
   d) Between 20 and 30 minutes
   e) Between 30 and 45 minutes
   f) Between 45 and 60 minutes
   g) More than 60 minutes
      a. Please estimate the amount of time you spent _____

5. What problems, if any, did you have using the software and/or understanding the procedure? (OPEN)

_____

_____

_____

6. What comments about the procedure or the project would you like to add? (OPEN)

_____

_____

_____

## Appendix E:

## Elearning Instructional Designer OCAN Survey 2nd Iteration

1. HOW OFTEN did you enter data in the SECOND cycle of the eLearning Instructional Designer OCAN?

    a) At least once a day
    b) Several times a week
    c) Once a week
    d) I don't remember
    e) I did not enter data in the second cycle

2. About HOW LONG DID IT USUALLY TAKE you to enter the data during the SECOND cycle?

    a) I did not enter data in the second cycle
    b) Less than 5 minutes
    c) Between 5 and 10 minutes
    d) Between 10 and 20 minutes
    e) Between 20 and 30 minutes
    f) More than 30 minutes

3. Apart from the actual data entry, about HOW MUCH TIME did you SPEND OFFLINE on the project during the SECOND cycle (for example, thinking about or discussing the project with others)?

    a) I did not spend any time thinking about or discussing the research in the first cycle.
    b) I spent less than 10 minutes
    c) Between 10 and 20 minutes
    d) Between 20 and 30 minutes
    e) Between 30 and 45 minutes
    f) Between 45 and 60 minutes
    g) More than 60 minutes
        a. Please estimate the amount of time you spent _____

4. What problems, if any, did you have using the software and/or understanding the procedure? (OPEN)

_____

_____

_____

5. What comments about the procedure or the project would you like to add? (OPEN)

_____

_____

_____

## Appendix F:

## Elearning Instructional Designer OCAN Survey 3nd Iteration

1. HOW OFTEN did you enter data in the THIRD cycle of the eLearning Instructional Designer OCAN?
   a) At least once a day
   b) Several times a week
   c) Once a week
   d) I don't remember
   e) I did not enter data in the third cycle

2. About HOW LONG DID IT USUALLY TAKE you to enter the data during the THIRD cycle?
   a) I did not enter data in the third cycle
   b) Less than 5 minutes
   c) Between 5 and 10 minutes
   d) Between 10 and 20 minutes
   e) Between 20 and 30 minutes
   f) More than 30 minutes

3. Apart from the actual data entry, about HOW MUCH TIME did you SPEND OFFLINE on the project during the THIRD cycle (for example, thinking about or discussing the project with others)?
   a) I did not spend any time thinking about or discussing the research in the first cycle.
   b) I spent less than 10 minutes
   c) Between 10 and 20 minutes
   d) Between 20 and 30 minutes
   e) Between 30 and 45 minutes
   f) Between 45 and 60 minutes
   g) More than 60 minutes
      a. Please estimate the amount of time you spent _____

4. What problems, if any, did you have using the software and/or understanding the procedure? (OPEN)

   _____

   _____

   _____

5. Did you enter Frequency, Importance, and Performance ratings for each task in the eLearning Instructional Designer OCAN?
   a) I did not provide any ratings
   b) I provided a few ratings
   c) I provided many ratings
   d) I provided all the ratings

6. How easy was it to DETERMINE the FREQUENCY rating for each task for the eLearning Instructional Designer OCAN?
   a) EASY. I could decide on a frequency for ALL OR NEARLY ALL THE TASKS FAIRLY QUICKLY.
   b) FAIRLY EASY. It took a LONG TIME to decide on a frequency for SOME OF THE TASKS I had to rate.
   c) CHALLENGING. It took a LONG TIME to decide on a frequency for MANY OF THE TASKS I had to rate.
   d) VERY DIFFICULT. It took a LONG TIME to decide on a frequency for ALL OR NEARLY ALL THE TASKS I had to rate.

7. How easy was it to DETERMINE the IMPORTANCE rating for each task for the eLearning Instructional Designer OCAN?
   a) EASY. I could decide on an importance rating for ALL OR NEARLY ALL THE TASKS FAIRLY QUICKLY.
   b) FAIRLY EASY. It took a LONG TIME to decide on an importance rating for SOME OF THE TASKS I had to rate.
   c) CHALLENGING. It took a LONG TIME to decide on an importance rating for MANY OF THE TASKS I had to rate.
   d) VERY DIFFICULT. It took a LONG TIME to decide on an importance rating for ALL OR NEARLY ALL THE TASKS I had to rate.

8. How easy was it to DETERMINE the PERFORMANCE rating for each task for the eLearning Instructional Designer OCAN?
   a) EASY. I could decide on a performance rating for ALL OR NEARLY ALL THE TASKS FAIRLY QUICKLY.
   b) FAIRLY EASY. It took a LONG TIME to decide on a performance rating for SOME OF THE TASKS I had to rate.
   c) CHALLENGING. It took a LONG TIME to decide on a performance rating for MANY OF THE TASKS I had to rate.
   d) VERY DIFFICULT. It took a LONG TIME to decide on a performance rating for ALL OR NEARLY ALL THE TASKS I had to rate.

9. Overall, how did you find the OCAN process for the eLearning Instructional Designer's position? (OPEN)

_____

_____

_____

10. Do you have any recommendations as to how the OCAN process could be improved? (OPEN)

_____

_____

_____

11. What comments about the procedure or the project would you like to add? (OPEN)

_____

_____

_____

# Appendix G:

## Elearning Developer OCAN Chart (OCAN 1)

| | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| **F** — Frequency: How often is the task performed? | Never or less than once/year | Sometimes: 1 – 4 times/year | Often: 1 – 4 times/month | Very often: Once/week or more |
| **I** — Importance: How critical is the task to the delivery of the final product? | No or minor importance to delivery | Moderate importance to delivery | Major importance to delivery | Critical to delivery |
| **P** — Performance: What level of responsibility/supervision is expected? | Direct, continual supervision | Direct, occasional supervision | Occasional performance check | Independent performance (excludes peer-to-peer collaboration) |

| Competency Area | Mean All | Competency Area | Mean F | Competency Area | Mean I | Competency Area | Mean P |
|---|---|---|---|---|---|---|---|
| Technical Skills | 2.6 | Technical Skills | 2.6 | Technical Skills | 2.8 | Technical Skills | 2.3 |
| Quality Assurance | 2.3 | Quality Assurance | 2.2 | Project Management | 2.6 | Professional Dev | 2.1 |
| Communication | 2.3 | Communication | 2.2 | Quality Assurance | 2.5 | Quality Assurance | 2.1 |
| Creativity | 2.2 | Creativity | 2.1 | Communication | 2.5 | Communication | 2.0 |
| Problem Solving | 2.1 | Project Management | 2.1 | Customer Service | 2.5 | Problem Solving | 2.0 |
| Project Management | 2.1 | Problem Solving | 2.0 | Creativity | 2.5 | Creativity | 1.9 |
| Customer Service | 2.0 | Customer Service | 1.7 | Problem Solving | 2.5 | Customer Service | 1.8 |
| Professional Dev | 1.7 | Professional Dev | 1.5 | Professional Dev | 1.6 | Project Management | 1.6 |

**A** **Quality Assurance** **continued next page**

| A1. Discuss treatment with the instructional designer on any complex interactions, prior to completing development | | | | A2. Document course-specific standards for personal use and use by other developers/authors | | | A3. Ensure accuracy when filing artifacts, including authoring standards, in the correct folder for the development stage | | | A4. Identify and fix interactions that could be confusing or counterintuitive, or impede learning | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.3 | 2.3 | 2.3 | 2.4 | 1.6 | 1.9 | 2.0 | 2.6 | 2.0 | 1.8 | 2.0 | 2.2 | 2.3 |

| A5. Check course for WCAG compliance where applicable | | | A6. Confirm functionality on different devices (phone, iPad, etc.) | | | A7. Ensure compatibility with all commonly used browsers (Safari, IE, FireFox, etc.) | | | A8. Provide detailed QA to catch errors the IDs missed | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 1.7 | 2.4 | 2.0 | 2.0 | 2.3 | 2.2 | 2.2 | 2.7 | 2.0 | 2.4 | 2.4 | 2.1 |

**B** **Problem Solving** **continued from previous page**

| B5. Suggest a more effective way of presenting content | | | B6. Identify technology restrictions for current design ideas | | | B7. Meet the client's needs using the simplest design possible | | | B8. Discuss options if a client request does not translate well in reality (i.e. yellow font on a light blue background), and options should be discussed | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.1 | 2.1 | 1.9 | 2.1 | 1.8 | 2.5 | 1.9 | 2.0 | 1.9 | 1.7 | 1.8 | 2.4 | 2.2 |

| B9. Optimize authoring techniques that can shorten the amount of time spent on a task | | | B10. Communicate with vendors and convey fixes in a clear fashion | | | B11. Use the internet efficiently to aid in troubleshooting courses | | | B12. Research to determine what other developers have done in order to make an interaction function (in order to replicate it or fix it, if it breaks) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 1.8 | 2.1 | 2.0 | 1.7 | 2.3 | 1.8 | 2.4 | 1.9 | 2.5 | 1.8 | 1.8 | 2.0 |

| B13. Investigate and solve browser-related issues with SCORM packages | | | B14. Fix bugs when a course breaks | | | B15. Troubleshoot non-functional web objects or buttons | | | B16. Document fixes implemented in case the issue comes up in the future | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 1.7 | 2.6 | 2.0 | 2.4 | 2.8 | 2.0 | 2.2 | 2.6 | 2.3 | 1.6 | 1.6 | 1.8 |

| B17. Contribute willingly, especially when projects take unexpected turns | | |
|---|---|---|
| F | I | P |
| 2.6 | 2.8 | 2.3 |

**C Communication**

| C1. Use professional email etiquette | | | C2. Speak clearly and concisely | | | C3. Ask for help if needed | | | C4. Lay out expectations of vendors/contractors clearly | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| Average 2.3 | 2.4 | 2.2 | 1.9 | 2.8 | 2.5 | 2.0 | 2.6 | 2.5 | 1.9 | 1.4 | 2.7 | 1.7 |

| C5. Explain to a client how something in the course functions | | | C6. Listen to clients' needs and wants for their visual mock-ups | | | C7. Speak with confidence to persuade a client to accept a helpful idea or treatment | | | C8. Be patient and friendly respectful with other developers and IDs at all times | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 1.0 | 2.2 | 1.6 | 1.8 | 2.7 | 1.9 | 1.2 | 2.2 | 1.4 | 2.8 | 2.8 | 2.0 |

| C9. Answer IDs' questions regarding the capabilities of the authoring tools/frameworks | | | C10. Ensure team members have all the information needed to continue/complete the project | | | C11. Ask clarifying questions when necessary, either of clients or IDs | | | C12. Coordinate file access with team mates when working on projects with multiple developers | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 2.7 | 2.7 | 2.5 | 2.4 | 2.8 | 2.3 | 2.6 | 2.8 | 2.3 | 2.3 | 2.7 | 2.4 |

| C13. Take clear and detailed notes to retain information | | | C14. Relay clearly any issues or hold-ups that are affecting progress | | | C15. Provide positive and constructive feedback | | |
|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P |
| 2.5 | 2.5 | 2.4 | 2.6 | 2.8 | 2.0 | 2.6 | 2.2 | 2.3 |

**D Project Management**
**continued next page**

| D1. Identify opportunities to re-use existing ideas or existing processes | | | D2. Accurately estimate task time required to complete authoring duties | | | D3. Scope the authoring and graphic elements of proposed projects | | | D4. Estimate development hours for pro formas | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| Average 2.1 | 1.8 | 1.8 | 2.3 | 2.3 | 2.7 | 1.6 | 1.8 | 2.6 | 1.5 | 1.6 | 2.5 | 1.3 |

| D5. Check in with project managers regarding the priority level of different projects | | | D6. Execute the project by acquiring the needed resources (people and machines), manage the stakeholder engagement, manage communications, manage quality | | | D7. Specify tasks, namely creating action items and potentially assigning those to other members | | | D8. Strategically plan a development timeline under tight client deadlines | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 2.6 | 2.1 | 2.0 | 1.4 | 2.8 | 1.2 | 1.3 | 2.5 | 1.1 | 1.3 | 2.9 | 1.2 |

| D9. Identify gaps in the workflow, both personal and institutional | | | D10. Prioritize tasks, schedule them efficiently, and make effective decisions about task completion within project constraints | | | D11. Keep track of tasks that need to be completed | | | D12. Identify and negotiate project roadblocks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 1.6 | 2.1 | 1.8 | 2.4 | 2.7 | 1.6 | 2.9 | 2.9 | 2.0 | 2.0 | 2.8 | 1.7 |

| D13. Coordinate project tasks (when required) based on strengths and familiarity in large project scenarios | | | D14. Provide direction on tasks and help during team transitions | | | D15. Contribute to project documentation, including time spent working on projects, hold-ups/blocks encountered, workarounds used, lessons learned, and changes to the risk register | | | D16. Use project management and collaboration tools to communicate to team members and clients about the status of a project | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 1.3 | 2.2 | 1.1 | 1.8 | 2.4 | 1.8 | 2.5 | 2.4 | 1.6 | 2.6 | 2.7 | 1.9 |

**D Project Management**
**continued from previous page**

| D17. Manage priorities effectively | | | D18. Refer to project documentation in Teamwork or Notes to clarify client expectations | | | D19. Ensure the project is meeting the client's original expectations | | | D20. Assure the quality of the work is up to standard and requirements that are agreed upon by the stakeholders | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| Average 2.1 | 2.8 | 2.8 | 2.2 | 2.2 | 2.4 | 1.8 | 2.4 | 2.8 | 1.6 | 2.7 | 2.8 | 1.7 |

**E Professional Development**
**continued next page**

| E1. Read books, whitepapers, blogs, about eLearning development | | | E2. Examine and deconstruct existing assets | | | E3. Job shadow other members of the development team to understand what they do in a day | | | E4. Brainstorm with peers, especially as it relates to nascent projects | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| Average 1.7 | 1.3 | 1.8 | 2.3 | 1.1 | 1.5 | 1.8 | 0.6 | 1.0 | 2.2 | 2.0 | 2.3 | 2.0 |

| E5. Observe and apply best practices from other team members | | | E6. Create and follow professional development plans with managers | | | E7. Find opportunities to develop soft skills | | | E8. Follow and participate in frameworks/support forums/listservs (answering and asking) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 1.9 | 1.8 | 2.1 | 1.8 | 1.7 | 1.5 | 1.5 | 1.6 | 1.9 | 1.3 | 1.4 | 2.3 |

| E9. Participate in Take 5 presentations and monthly challenges | | | E10. Participate in workshops and lunch n' learns | | | E11. Search for and take low-cost/free online courses (, EdX professional courses, Udemy, Lynda) to expand skills and practice | | | E12. Study existing courses from competitors | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 1.6 | 1.6 | 2.5 | 1.0 | 1.4 | 2.3 | 1.1 | 1.8 | 2.0 | 1.1 | 1.6 | 2.3 |

**E Professional Development continued from previous page**

| | E13. Develop new skills through personal projects | | | E14. Research trends and best practices | | | E15. Search for and use free templates to expand skills and practice | | | E16. Research ways to push the limits of our existing tools and platforms | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 1.7 | 1.3 | 1.8 | 2.3 | 1.5 | 2.1 | 2.3 | 1.2 | 1.3 | 2.2 | 1.5 | 1.9 | 2.3 |

| E17. Become an active member of an association related to eLearning development | | | E18. Attend industry conferences and workshops | | |
|---|---|---|---|---|---|
| F | I | P | F | I | P |
| 0.8 | 1.2 | 2.3 | 0.7 | 1.3 | 2.1 |

**F Customer Service**

| | F1. Research the client to develop a feel for their brand, visual identity, and core values (to produce a design that embodies the client) | | | F2. Interpret a client's desires for their eLearning | | | F3. Provide possible treatment options or solutions for a problem | | | F4. Explain technical or visual elements clearly to help the client envision the final product | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.0 | 1.7 | 2.6 | 2.2 | 2.0 | 2.4 | 1.4 | 1.9 | 2.7 | 1.9 | 1.5 | 2.5 | 1.8 |

| F5. Communicate in such a way that every client feels that they are the most important client | | |
|---|---|---|
| F | I | P |
| 1.6 | 2.2 | 1.8 |

**G Creativity**

| | G1. Create and explain screen designs for eLearning courses | | | G2. Create graphics and media, including images, video, and audio, using time-saving methods as appropriate | | | G3. Create logos, icons, and diagrams | | | G4. Recreate diagrams and graphics that we may not have legal access to accurately, but uniquely | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.2 | 2.1 | 2.8 | 1.6 | 2.7 | 2.9 | 1.8 | 2.2 | 2.7 | 1.9 | 2.1 | 2.4 | 1.7 |

| G5. Create animations for courses or videos | | | G6. Determine the best position and placement of screen elements on a page-to-page basis | | | G7. Create exciting and memorable learner experiences for the client | | | G8. Plan and storyboard videos and animations | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 2.1 | 2.8 | 1.7 | 2.8 | 2.6 | 2.1 | 2.6 | 2.5 | 1.9 | 1.7 | 2.4 | 1.6 |

| G9. Determine the best way to present content | | | G10. Choose creative elements or novel features that are useful for both client and ID | | | G11. Work around authoring tool limitations to achieve instructional goals | | | G12. Experiment with novel ways to implement features | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 2.5 | 2.8 | 2.1 | 1.9 | 2.3 | 2.0 | 2.5 | 2.6 | 2.3 | 1.3 | 1.5 | 2.2 |

| G13. Create optimization tools to save time and resources | | |
|---|---|---|
| F | I | P |
| 1.2 | 1.9 | 2.1 |

**H Technical Skills**

| | H1. Determine the best software for creating specific graphics/treatments (e.g., Illustrator, Photoshop, PPT, etc.) | | | H2. Develop, modify, and fix, JavaScript components within the Adapt framework | | | H3. Create buttons, triggers, and other common eLearning components and functions | | | H4. Format text in an organized manner | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.6 | 2.2 | 2.6 | 2.2 | 2.5 | 2.8 | 2.3 | 2.8 | 3.0 | 2.6 | 2.8 | 2.6 | 2.4 |

| H5. Clip and combine narration for slides | | | H6. Slice and compile videos for use in courses | | | H7. Develop professional graphics, tables, charts, etc. | | | H8. Crop, modify, recolour, mask, paint-over, and overlay images | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 2.7 | 2.9 | 2.3 | 2.1 | 2.9 | 2.3 | 2.7 | 2.8 | 2.3 | 2.8 | 2.7 | 2.3 |

# Appendix H:

## Elearning Instructional Designer OCAN Chart (OCAN 2)

| | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| **F** — Frequency: How often is the task performed? | Never or less than once/year | Sometimes: 1 – 4 times/year | Often: 1 – 4 times/month | Very often: Once/week or more |
| **I** — Importance: How critical is the task to the delivery of the final product? | No or minor importance to delivery | Moderate importance to delivery | Major importance to delivery | Critical to delivery |
| **P** — Performance: What level of responsibility/supervision is expected? | Direct, continual supervision | Direct, occasional supervision | Occasional performance check | Independent performance (includes peer-to-peer collaboration) |

| Competency Area | Mean FIP |
|---|---|
| Instructional Design | 2.6 |
| Writing | 2.4 |
| Research | 2.4 |
| Quality Assurance | 2.4 |
| Scripting | 2.3 |
| Project Management | 2.3 |
| Communication | 2.2 |
| Technical Skills | 2.2 |
| Media | 2.0 |
| Professional Dev | 2.0 |

| Competency Area | Mean F |
|---|---|
| Writing | 2.40 |
| Instructional Design | 2.38 |
| Project Management | 2.28 |
| Technical Skills | 2.22 |
| Scripting | 2.15 |
| Research | 2.08 |
| Quality Assurance | 2.06 |
| Communication | 1.98 |
| Media | 1.84 |
| Professional Dev | 1.40 |

| Competency Area | Mean I |
|---|---|
| Instructional Design | 2.75 |
| Quality Assurance | 2.59 |
| Research | 2.54 |
| Project Management | 2.53 |
| Scripting | 2.49 |
| Writing | 2.26 |
| Communication | 2.14 |
| Media | 2.00 |
| Technical Skills | 1.88 |
| Professional Dev | 1.77 |

| Competency Area | Mean P |
|---|---|
| Professional Dev | 2.70 |
| Quality Assurance | 2.59 |
| Research | 2.56 |
| Instructional Design | 2.55 |
| Scripting | 2.53 |
| Technical Skills | 2.50 |
| Writing | 2.43 |
| Communication | 2.34 |
| Media | 2.20 |
| Project Management | 2.13 |

**A Communication**

| | A1 Educate on and advocate for instructional design best practices | | | A2 Advise on instructional design approaches and treatments | | | A3 Consult with clients to determine project goals and needs from an instructional design perspective | | | A4 Clarify client requests and needs to ensure mutual understanding | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.16 | 1.90 | 1.90 | 2.60 | 2.10 | 2.20 | 2.40 | 2.00 | 2.60 | 2.00 | 2.00 | 2.70 | 2.30 |

| | A5 Correspond with clients in person, over the phone and over email in a professional manner | | | A6 Communicate with clients through writing effectively and politely | | | A7 Inform clients of technical limitations and abilities in various development tools | | | A8 Communicate project's technical, accessible, visual needs and expectations with developers | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | I | P | F | I | P | F | I | P | F | I | P |
| | 2.50 | 2.00 | 2.60 | 2.70 | 2.00 | 2.70 | 1.50 | 2.20 | 1.80 | 2.00 | 2.30 | 2.40 |

| A9 Provide insight for purpose of role to actors, including back story and images of role | | |
|---|---|---|
| F | I | P |
| 1.10 | 1.40 | 2.30 |

**B Instructional Design**

| | B1 Identify learning outcomes and objectives in collaboration with clients | | | B2 Write learning objectives following best practices and guidelines | | | B3 Apply learning theory and instructional design practices to develop course treatments and scripts | | | B4 Use a variety of instructional strategies to provide content and engage learners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.56 | 2.20 | 2.90 | 2.50 | 2.30 | 2.90 | 2.40 | 2.50 | 2.90 | 2.70 | 2.50 | 2.30 | 2.60 |

**C Technical Skills**

| | C1 Manage file storage using Windows and Mac/OSX operating systems | | | C2 Use Microsoft Word, Excel, PowerPoint, and Outlook at an intermediate/proficient level | | | C3 Use web/phone conferencing to communicate with clients, SMEs, and team members | | | C4 Track project timelines and tasks and log hours in project management software | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.2 | 2.70 | 1.90 | 2.40 | 2.90 | 2.10 | 2.80 | 2.50 | 1.90 | 2.60 | 3.00 | 2.30 | 2.30 |

| | C5 Update software and troubleshoot basic computer issues | | | C6 Access the network and VPN | | | C7 Follow network structure and document management processes | | | C8 Upload and manage courses on review tools such as RME | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | I | P | F | I | P | F | I | P | F | I | P |
| | 1.50 | 1.40 | 2.70 | 2.90 | 2.00 | 2.50 | 2.80 | 2.00 | 2.30 | 1.50 | 1.80 | 2.70 |

| | C9 Update Wiki as needed | | | C10 Print documents and create PDFs | | | C11 Recognize technical limitations and requirements of various accessibility tools | | | C12 Generate narration reports from Storyline or Word scripts | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | I | P | F | I | P | F | I | P | F | I | P |
| | 1.00 | 0.80 | 2.50 | 1.80 | 1.30 | 2.70 | 2.10 | 2.10 | 2.30 | 2.10 | 2.60 | 2.50 |

| C13 Make simple edits to Articulate Storyline files | | |
|---|---|---|
| F | I | P |
| 2.00 | 2.20 | 2.20 |

**D Scripting**

| | D1 Create storyboards/scripts in Articulate Storyline | | | D2 Create scripts for the Adapt framework in Microsoft Word | | | D3 Design and write flowcharts and branching scenarios | | | D4 Write video scripts from Word or Storyline scripts | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.3 | 2.30 | 2.40 | 2.20 | 2.60 | 2.60 | 2.20 | 1.70 | 2.20 | 2.40 | 1.40 | 2.30 | 2.40 |

| D5 Write test questions based on content and learning objectives | | | D6 Write relevant thought-provoking questions and scenarios to challenge the learner | | | D7 Write content for different age groups | | | D8 Write content for different industries | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 2.50 | 2.90 | 2.50 | 2.80 | 2.70 | 2.40 | 1.70 | 2.40 | 2.30 | 2.10 | 2.50 | 2.20 |

| D9 Write detailed production notes that give developers enough instruction to create the desired interaction/treatment | | | D10 Identify interactions that may need modification to meet accessibility requirements | | | D11 Incorporate and comply with branding requirements and style guides | | |
|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P |
| 2.60 | 2.60 | 2.30 | 1.80 | 2.20 | 2.40 | 2.20 | 2.60 | 2.10 |

**E Writing**

| | E1 Write content that is clear, concise, and complete | | | E2 Write content for audiences at different literacy levels | | | E3 Use proper grammar and correct spelling in course content and client emails | | | E4 Create custom treatments for proposals | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.4 | 3.00 | 2.80 | 2.60 | 2.10 | 2.50 | 2.60 | 3.00 | 2.40 | 2.60 | 1.70 | 1.90 | 2.30 |

| E5 Create engaging narratives and scenarios | | | E6 Write project descriptions for future marketing | | | E7 Translate existing content into plain language | | | E8 Write narration that flows smoothly and is easy to listen to | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P | F | I | P |
| 2.70 | 2.40 | 2.40 | 1.40 | 1.20 | 2.10 | 2.80 | 2.40 | 2.40 | 2.50 | 2.50 | 2.40 |

**F Research**

| | F1 Use search engines and databases to research course content or advances in instructional design practice | | | F2 Reference and source regulatory content | | | F3 Meet with SMEs to discuss content and ask questions | | | F4 Read and interpret complex content | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.4 | 2.40 | 2.40 | 2.80 | 2.50 | 2.90 | 2.40 | 2.10 | 2.70 | 2.60 | 2.50 | 2.80 | 2.60 |

| F5 Attend existing workshops or classroom training on course topic | | |
|---|---|---|
| F | I | P |
| 0.90 | 1.90 | 2.40 |

**G Media**

| | G1 Create needs lists for graphics/photo shoots | | | G2 Search, reference, and download appropriate licensed images from online databases | | | G3 Assist/direct studio sessions | | | G4 Catalogue footage from photo/video shoots | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.0 | 1.80 | 2.30 | 1.80 | 2.30 | 2.00 | 2.20 | 1.60 | 1.80 | 2.20 | 1.11 | 2.00 | 2.22 |

| G5 Provide input on graphics and mockups | | | G6 Provide input during photo/video shoots | | | G7 Recommend narrators to clients | | |
|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P |
| 2.60 | 2.20 | 2.40 | 1.60 | 2.00 | 2.10 | 1.80 | 1.70 | 2.50 |

**H Quality Assurance**

| | H1 Proofread/edit proposals | | | H2 Create tables and guidelines to ensure consistency | | | H3 Review scripts thoroughly to ensure they meet requirements for client review and development | | | H4 QA narration reports | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average | F | I | P | F | I | P | F | I | P | F | I | P |
| 2.4 | 2.00 | 2.50 | 2.70 | 1.40 | 2.30 | 2.50 | 2.60 | 2.90 | 2.80 | 2.10 | 2.80 | 2.80 |

| H5 Attend handoff meeting to ensure relevant information is communicated to developers | | | H6 Review betas and give feedback to developers on any changes required | | | H7 Conduct media test and give feedback to developers on any changes required | | |
|---|---|---|---|---|---|---|---|---|
| F | I | P | F | I | P | F | I | P |
| 1.80 | 2.50 | 2.30 | 2.40 | 2.60 | 2.50 | 2.10 | 2.50 | 2.50 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I | **Professional Development** | I1 Attend webinars, online conferences, and complete online courses relevant to instructional design | | | I2 Read relevant papers, blogs, and articles | | | I3 Present findings to the team | | | |
| | Average | F | I | P | F | I | P | F | I | P | |
| | 2.0 | 0.90 | 1.60 | 2.70 | 1.90 | 1.90 | 2.80 | 1.40 | 1.80 | 2.60 | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | **Project Management** | J1 Collaborate with clients/SMEs to identify project needs | | | J2 Communicate effectively with clients about processes, timelines, and needs | | | J3 Collaborate with project manager to ensure project is on time and particular tasks and client requests are met | | | J4 Problem solve project setbacks and manage difficult relationships (in collaboration with PM) | | |
| | Average | F | I | P | F | I | P | F | I | P | F | I | P |
| | 2.3 | 2.10 | 2.70 | 2.30 | 2.50 | 2.80 | 2.00 | 2.60 | 2.70 | 2.40 | 1.60 | 2.70 | 1.80 |

| J5 Document and summarize meeting outcomes | | | J6 Prioritize and organize tasks for multiple projects to meet deadlines | | |
|---|---|---|---|---|---|
| F | I | P | F | I | P |
| 2.20 | 1.80 | 2.10 | 2.70 | 2.50 | 2.20 |