Use of Gagné's Nine Events of Instruction in Subject Matter Experts' Occasional Design of Online, Asynchronous Slideware Lessons

Cynthia A. Higgins

B.F.A., University of Kansas, 1982

M.S., University of Kansas, 1987

M.S., Emporia State University, 2015

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Doctor of Education in Educational Leadership

Wendy A. Gentry

Wendy A. Gentry, Ph.D.
Major Advisor

Regena M. Aye

Regena M. Aye, Ed.D.

Marcus Childress

Marcus Childress, Ph.D.

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Abstract

Workplaces increasingly have enlisted their subject matter experts to construct online, asynchronous slideware lessons with simplified authoring tools. However, these subject matter experts lack instructional design knowledge and often transfer in-person slide lessons to an online format with few modifications and assume learners automatically store the slide information in their memories. This study identified the application of Gagné's Nine Events of Instruction in training developed by subject matter experts who lack instructional design expertise. A qualitative design and the Nine Events Interpretation Checklist developed by the researcher from publication review guided the content analysis of seven lessons constructed by workplace subject matter experts at a state health and environment department. Findings revealed subject matter experts employed about half of the Nine Events possible and only some events rather than all the events, although every lesson included performance elicitation (Event 6) and feedback (Event 7). The study population demonstrated significant use of objectives (Event 2) and hyperlinks, the latter proved excessive in some instances. Evident was the non-stimulation of prior prerequisite learning (Event 3), non-use of opening and ending activities to facilitate learning (Event 1 and Event 9) as well as minimal use of guidance (Event 5). Events progressed in accordance to suggested Nine Events' sequencing, but each lesson had a differing event use pattern. Implications for training are sequential introduction of events with emphasis on those events found insufficient or missing in lesson analysis, possible event consolidation to make the Nine Events less daunting, and a lesson template that incorporates the Nine Events with placeholder slides. Recommendations for future research include broadening the scope of this study,

surveying workplace subject matter experts about their perceived likelihood of adopting the Nine Events; technical event interpretations, and use of the strategy as a means to revise existing slideware.

Dedication

This dissertation is dedicated to resilience—that ability to move forward through uncertainty and challenging circumstances. The scholarly inquiry process proved far more difficult than I initially anticipated and personal life setbacks added their own unexpected challenges. The dissertation is also dedicated to condensed formulas that make life and learning easier.

Ultimately, I dedicate this to my larger-than-life, exuberant little brother unexpectedly cut short in his own dissertation quest by a stopped heart that still lives on in those fortunate to have shared his merry, magic-making journey: Scott Sanders Higgins, this was, and even more so now, is, for you, too.

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Chapter 1

Introduction

Instructors who offer one-size-fits-all learning within a set spatio-temporal dimension (e.g., classroom, asynchronous online lesson) and expect learners to acquire and memorize knowledge passively use the receptive instructional approach (Cope & Kalantzis, 2017). Clark and Mayer (2011) in their three learning architectures distinguished *receptive* instruction with its minimal behavioral activities from *directive* instruction that employs sequencing of "explanation-example-question-feedback" (p. 27). The latter differs from their third architecture, *guided discovery,* in which learners perform knowledge-building activities with advice.

The receptive approach prevails because of its societal use in academic lectures, political speeches, church sermons, and other exposition forms (Bligh, 2000). For workplace training, this approach remains popular because it is relatively inexpensive; can impart a large amount of information without interruption (Broadwell, 1987; Brown & Manogue, 2001; Prichard, Sawyer, & McLaran, 1994; Sandhu, Afifi, & Amara, 2012); and can be accompanied by summative assessment to indicate learner content mastery (Kowalski, 1987). It also continues because of workplaces' reliance on employee subject matter experts tasked with constructing online lessons to enhance individual, group, or organization efficiency (Goldstein & Ford, 2002). This online instruction also known as "technology-enabled learning," "online education," "computer-assisted instruction," "electronic learning," and "e-learning" refers to training delivered and administered with computerized electronic technologies typically in the form of asynchronous slideware lessons requiring learners mostly to listen to narrated information or read text concluding with an

obligatory summative assessment (Brandt, Quake-Rapp, Shanedling, Spannaus-Martin, & Martin, 2010; Escoffery et al., 2005).

Text-heavy "shovelware" (Morrison & Anglin, 2009; Sparrow, Herrington, & Herrington, 2000); "shrinkwraps;" (Stevens-Long & Crowell, 2010); or "information dumps" (Moore, 2009) derived from slide presentations are to be expected because the knowledge mastery of workplace subject matter experts pertains to the lesson topic rather than instructional design and because of their own classroom experience (Articulate, 2015: Long, 2020). Wrote Piskurich (2006) in *Rapid Instructional Design: Learning ID Fast and Right:*

> They tend to teach it [content] the way they have been taught, or the way they are most comfortable learning (which may be wrong, or at least not effective, for the content or the audience). In other words, they are very often not practitioners of good instructional design. (p. 6)

Mindful design does not entail discarding receptive instruction in favor of other instructional approaches' emphasis on interactive, individualized learning. Receptive instruction has value, and the reality is that most online, asynchronous slideware lessons using the receptive approach will continue (Huprich, 2020) and increase (Clark & Mayer, 2016). What can change is the concept that the relative technological ease of information packaging makes additional design steps superfluous (Duarte, 2008; Reynolds, 2007) and the disregard of recommended information sequencing, structuring, and presentation that aligns with learners' cognitive processing.

To design for learning potential and to avoid online lessons that non-perform or fall short of achieving instructional goals, Clark and Mayer (2016) rightly emphasized the need for efficacious instructional design:

> The challenge in e-learning, as any learning program, is to build lessons in ways that are compatible with human learning processes. To be effective, instructional methods must support these processes. That is, they must foster the psychological events necessary for learning (p. 24).

Background

The opening decades of the 21st century have seen a burgeoning growth in workplace training often required by law or industry-specific mandates to keep employees, contractors, and others current regarding policies, procedures, actions, laws, regulations, and safety practices, and may be required for licensure maintenance (Gios, 2019). The training is commonly delivered online and takes place annually (Hockley, 2018) or in new employee orientation lessons (Pappas, 2015). While some workplaces may rely on external vendors for online lessons, an increasing number of workplaces have added online lesson construction to in-house training services, which often are workplaces operating on lean budgets and insufficient resources (Pappas, 2017; Weber & Wasieleski, 2013) and needing customized content (Biegelman, 2008; Deere, 2021).

Unlike the early years of online lessons when subject matter experts, project managers, designers, writers, artists, programmers, and others worked together to produce employee training, today subject matter experts can upload an in-person presentation slide file or transfer text to pre-built templates using rapid authoring tools regardless of their design experience level (Pappas, 2020). The relative ease of development by these "designers-by-assignment" (Merrill,

2007, p. 2) or "accidental, occasional, or temporary designers" (Pesce, 2012, p. 1) comes at the cost of pedagogy when these subject matter experts with other job tasks and without an instructional background take on online lesson construction (Boehle, 2007; Comolli & Prestera, 2007; Hopper & Waugh, 2014; Morrison, 1985;). They tend to think an in-person presentation slide file does not need modification for online lesson delivery and that presenting is the same as training (Johnson, 2005; Moore, 2010).

Wrote Pandy (2017) of "preachy and prescriptive" online lessons followed by a quiz: "Often, the information is not provided in a format that can truly help learners relate to it, internalize it, and push them to do the right thing when faced with situations that need the desired action" (paras. 8-11). Since learners need well-designed instruction to master lesson content, then a simple lesson organization prescription could help subject matter experts overcome the "tellin' ain't training" (Stolovitch & Keeps, 2002, p. xiv) practice that persists and fails to instruct (Dolezalek, 2006). Prescription of a step-by-step, lesson design formula aligns with researchers' suggestions of reliable, ready-to-use, condensed set of instructions for workplace subject matter experts in instructional roles but lacking cognitive science knowledge (Duchastel, 1990; Gardner, 2010; Hodell, 2013; Shaughnessy, Fulgham, & Reigeluth, 2009).

Problem Statement

Technological advancements have enabled subject matter experts in the workplace who lack instructional knowledge to construct online slideware lessons for employee training. It has been suggested this population needs "verified, effective predesigned instructional strategies" (Merrill, 2014, p. 26) to elevate their information presentations into useful instruction. However, proven instructional strategies, especially simple formulas do not exist (Garrison, 2011). This

study contends that instructional design research has originated an instructional strategy—Robert Gagné's Conditions of Learning Theory with its Nine Events of Instruction—that can be offered as a basic formula for online, asynchronous slideware lessons constructed by workplace subject matter experts who typically use the receptive approach (Baba, Sale, & Sierra, 2017; Belfield, 2010; Buscombe, 2013; Gagné, 1977; Johnson-Curiskis, 2006; Molenda, 2002, Richey, 2000; Wong, 2018). Before recommendation to workplace subject matter experts tasked with constructing online, asynchronous slideware lessons, this study finds it prudent to examine existing slideware lessons constructed by workplace subject matter experts for the strategy's possible existence and interpretation.

Study focus follows the recommendations of researchers, including Brinthaupt, Fisher, Gardner, Raffo, and Woodward (2011); Martin, Klein, and Sullivan (2007); and Terras (2017) who have encouraged further examination of the topics and delivery modes incorporating the instructional strategy. Researchers' recommendations, lack of literature on the topic, and Gagné's admonition to apply theory to practice in the quest to make learning more effective and efficient (Fields, 1996) justify this study examination. Not only does the study update and extend current literature, it freshly investigates use of the strategy in the under-explored, growing field of online slideware instruction construction by workplace subject matter experts.

Study Purpose

The purpose of this study was to examine an instructional strategy intervention that can be introduced in a lesson design training for subject matter experts tasked with constructing online slideware lessons but who lack instructional design expertise. Therefore, as a training prelude, the study identified the extent to which online, asynchronous slideware lessons designed

and developed by workplace subject matter experts at a state health and environment department included Gagné's Nine Events of Instruction. Study findings would reveal opportunities to better tailor training of the instructional strategy for the intended audience.

Research Question

Research Question #1: To what extent does the slideware instruction by workplace subject matter experts at a state health and environment department include Gagné's Nine Events of Instruction?

Study Significance

This investigative inquiry applied the lens of the stimuli-sequenced external conditions in Gagné's Nine Events of Instruction to examine online, asynchronous slideware lessons designed and developed by workplace subject matter experts. The study's broad significance extends Nine Events' possible use in slideware delivery, which follows researchers' recommendation to further study media and delivery modes incorporating the Nine Events (Brinthaupt, Fisher, Gardner, Raffo, & Woodward, 2011; Martin, Klein, & Sullivan, 2007; Terras, 2017) and encourages innovative expression of individual events in online slideware. Furthermore, the study addresses the empirical research gap relating to workplace subject matter expert-generated, online instruction delivered in slideware and also produced the Nine Events Interpretation Checklist, a helpful tool for anyone using the Nine Events for lesson design. Those benefitting from the study include trainers designing lesson planning instruction for workplace subject matter experts and workplace subject matter experts because they can gain more lesson design direction and confidence in their instructional role. Learners, too, will benefit because they can

receive more effective instruction delivered by subject matter experts well-versed in Nine Events.

Delimitations

Studies have parameters to keep exploration within the study's scope (Bloomberg & Volpe, 2019; Newman, Ridenour, Weis, & McNeil, 1997). Of this study's delimitations, the foremost was the restriction of the population – subject matter experts without instructional design education or job-developed expertise at a midwestern state health and environmental government agency – and the number of lessons examined. Results, therefore, may not be generalizable to other workplace environments. Additionally, the study only included lessons designed and developed with the same authoring tool and available on a learning management system with its own embedded assessment opportunity. Technical possibilities and complexities inherent to the authoring tool and learning management system may have influenced the use of the learning strategy examined. The study also only measured the Nine Events of Instruction for existence. Other measures such as the found event example quantity and quality were not measured, which may have impacted the true judgment of Nine Events of Instruction's extent. Lastly, only findings from single topic lessons rather than multi-lesson courses were included in the review.

Assumptions

This study relied on five key assumptions, starting with the notion that online slideware has been a popular instructional aid in workplace training and will continue to be so. That assumption was based on the projected growth of online slideware lessons developed with authoring tools. Second, the Conditions of Learning Theory with its Nine Events of Instruction,

considered by many to be the foundation of instructional design practice (Reiser, 2002; Richey, 2000), was assumed to retain its relevancy for online lesson instruction relating to workplace training needs. This study also recognized in-person presentation slideware research findings may apply to online, asynchronous slideware lessons developed with authoring tools. Spearheading this study and the fourth assumption based on researcher experience and literature research is that subject matter experts tasked with constructing online slideware lessons lack instructional design expertise. They may have been exposed to elements of instructional design but fall short of the skills and knowledge that experienced instructional designers possess (Blakely, 2015; Burk, 2001; Conceicao, 2006; Conrad, 2004; Cuevas, 2016; Hathaway & Norton, 2013; Rimmer, 2017; Saroyan, 1993; Walter, 2000; Winn, 2016). Finally, findings from post-secondary academic studies in a range of disciplines and delivery modes using the instructional strategy were assumed to have possible application in the examined delivery mode. Reasons contributing to that assumption were most postsecondary faculty have been educated in their own discipline but not instructional design or instructional strategies (Davidson-Shivers, Salazar, & Hamilton, 2005).

Theoretical Framework

Serving as the initial blueprint for the dissertation inquiry was a theoretical framework derived from Gagné's Conditions of Learning Theory that includes five categories of learning outcomes and nine events of instruction. By generalizing principles of learning, Gagné developed an instructional formula applicable to the teaching of any topic (Gagné, 1984). Influenced by the Assimilation Theory of Learning and aforementioned information-processing theories (Gagné, 1977) as well as classroom teachers (Driscoll, 2012), the Conditions of

Learning with its Nine Events of Instruction's flexibility can optimize both the Clark and Mayer (2011) base receptive approach as well as their directive instruction and can impact knowledge construction with their third approach, guided discovery. Its behaviorist learning theories' learnings mesh well with workplace requisite responses to pre-determined, goal-directed stimuli that measure learning outcome mastery of mandatory workplace content (i.e., facts and standardized procedures) (Karageorgakis, 2018; Keramida, 2015). Gagné's easy-to-apply formula provides a defined framework to investigate online, asynchronous slideware lessons constructed by workplace subject matter experts.

Terms Definition

1. **Authoring tool:** Also known as rapid electronic learning authoring tools, these computer programs with pre-set features enable users to assemble text, media, and interactive elements into specific file formats for custom online lessons (Martinez, 2017; Pappas, 2020; Prasad, 2021)
2. **Human performance interventions:** Possible solutions to a performance problem (Van Tiem, 2004)
3. **Human performance technology:** The organizational practice of improving employee productivity, work quality, and value (Pershing, 2006; Ployhart & Moliterno, 2011) utilizing a systematic approach and strategy for solving employee performance problems (International Society for Performance Improvement, 2011)
4. **Information:** Data processed and organized in context to be stored, changed, delivered, or received in any medium (Adriaans, 2020)

5. **Informational presentation:** The conveyance of specific information from a source to a specific audience and often containing an introduction, body, and conclusion (McLean, 2003)
6. **Instruction:** The deliberate arrangement of information and activities to reach objectives (Molenda & Russell, 2006) that Gagné, Wager, Golas, and Keller (2005) further defined as "a set of events external to the learner designed to support the internal process of learning" (p. 194)
7. **Instructional design:** A technology based on learning theories to create effective learning experiences for a specific audience to acquire specific knowledge or skill (Merrill, Drake, Lacy, & Pratt, 1996; Siemens, 2002)
8. **Instructional strategy:** An action plan for achieving learning objectives (Foshay, 1975) influenced by learning theories (Molenda & Russell, 2006), which includes sequenced content and activities that assist learners in achieving the lesson goals (Dick, Carey & Carey, 2005; Gagné, Briggs, & Waager, 1988; Reigeluth, 1999)
9. **Intervention: "**A course of action taken to improve performance" taken by organizations to change employee behavior (Pershing, 2006, p.12)
10. **Learning theory:** An explanation regarding the process of acquiring knowledge or skills (Arghode, Briefer, & McLean, 2017)
11. **Lesson:** Amount of instruction completed in one session (Smith & Ragan, 1996)
12. **Lesson content:** Selected elements of knowledge, including facts, multimedia, practice items, and assessment items learners need to master (Great Schools Partnership, 2016)

13. **Multimedia:** Words and images (i.e., static and dynamic) used in the presentation of material (Mayer, 2002)
14. **Slide:** Also known as a screen, an electronic image created with presentation applications that appears on a screen sequentially that may contain text; static images such as charts, maps, or photographs; dynamic images (e.g., video); audio; and other elements (Weverka, 2010)
15. **Slideware:** A digital slideshow developed with software and an instructional media classified as multimedia, slideware produces sequential blank canvas slides overlaid with text, images, and other multimedia (Amare, 2006; Farkas, 2006; Gries & Brooke, 2010)

Organization of Study

This dissertation is divided into five chapters. Chapter 1 presents a general overview in the introduction. The background sets up the problem statement, which is followed by the study purpose, and study significance. Study delimitations, assumptions, research questions, and terms definition conclude the first chapter.

Chapter 2 begins with a description of instruction within the workplace and then introduces the study population, their advisability for instructional assistance, and possible solutions to establish rationale for further research.

The research methodology for exploring the possible solution is explained in Chapter 3. Because this dissertation identified a problem and explored a possible intervention, the fitting research methodology proved to be a content analysis study. Results are reported in Chapter 4 and discussed in Chapter 5 along with study conclusions, practice implications, and future research suggestions.

Chapter 2

Review of Literature

Drawing inspiration from Molenda and Russell (2006) who positioned instruction as a performance technology intervention and recommended lesson frameworks for designing instruction, this thematic, four-part literature review examines subject matter experts in the workplace and a suggested instructional strategy for their online, asynchronous slideware lesson design. Beginning with an overview of workplace training, instructional definitions, and four instructional dimensions, the review then addresses subject matter experts' evolving role in workplace training and their use of instructional design. A discussion of Gagné's Condition of Learning Theory with its Nine Events follows and is examined in relation to slideware. Upon conclusion, the intricate patchwork of findings related to the research topic shows this topic to be unexplored and supports investigation of Gagné's Condition of Learning Theory with its Nine Events of Instruction for online, asynchronous slideware lessons constructed by subject matter experts in the workplace.

Workplace Training

To set a foundation for subsequent themes relating to the study focus, the review opens with a description of workplace training that includes the relation of instruction to human performance technology, the definition of instruction along with associated terms, and four relevant instructional aspects. Together these parts contextualize workplace online slideware lessons before advancing to research findings relevant to subject matter expert instructors in the next section.

Workplace training is grounded in *human performance technology* also known as *human resource development* (Ripley, 1998) and often employs *interventions,* specific actions taken to improve employee behavior and performance (Pershing, 2006). Interventions can employ *instructional design,* also termed "systems approach," "instructional development," "learning system design," "competency-based instruction," and "instructional system design." With the intent to improve a specific audience's acquisition of specific knowledge or skill, instructional design in the workplace has the ultimate goal of improving organizational performance (Foshay, Villachica, & Stepich, 2014; Merrill, Drake, Lacy, & Pratt, 1996; Siemens, 2002).

Of the possible human performance interventions intended to improve employees' knowledge and performance, *instruction* commonly addresses detected gaps in employees' knowledge or skills. Molenda and Russell (2006) defined instruction as "any effort to stimulate learning by the deliberate arrangement of conditions and experience" (p. 335) and differentiated it from informational presentations, which they viewed as offered facts not to be assessed for mastery. Gagné, Wager, Golas, and Keller (2005) further defined instruction as "a set of events external to the learner designed to support the internal process of learning" (p. 194), a concept that will be further elucidated in this review. Formal instruction in the workplace, also referred to as training (Beattie, 2006; Wilson, 2018), is predicted to increase each year by 13%, a percentage expected to rise with the growing number of rules and regulations for companies worldwide (Elearning Journal, 2020).

Instruction in the Workplace

Two workplace instructional intervention dimensions that align with the study's focus are *delivery method* "distinguished by the pattern of communication among the teacher, learner, and

different types of materials" and *media* (Molenda & Russell, 2006, p. 345) described below. Also adding to instructional intervention orientation are *location and time* together with *sources* (Jones, Beynon, Pickernell, and Packham, 2013). This latter dimension will be briefly explained before further examination in the upcoming section.

Methods. Subject matter experts in the workplace tasked with constructing online slideware employ presentations, the conveyance of organized data by the delivery of facts (Adriaans, 2020; Bligh, 2000). Online slideware presentations with text can be read and can also be narrated. Clark and Mayer (2011) labeled presentations and reading as receptive instruction approaches because learners receive information accessed by the passive skills of listening and reading. Proven useful for adding new information to learner knowledge and gauged with a summative assessment or certification of learning on completion (Colley, Hodkinson, & Malcolm, 2002), the receptive approach must account for learners' limited working memory capacity; learners only can process a certain amount of incoming information before becoming overloaded and unable to process additional information (Frommer & Stone, 1999; Gobet & Clarkson, 2004; Richey, 2000).

Media. A far-reaching term often confused with method, *media,* the communication from sources that reaches receivers (Stoltzfus, 2020; Technopedia, 2020, para. 1), includes devices that transmit messages (e.g., Internet) and instructional aids such as *slides,* sequential blank canvas slides overlaid with text and images (Farkas, 2006; Gries & Brooke, 2010; Parker, 2001). Since its introduction, slideware has been a recommended lesson presentation instructional aid (Reiser & Gagné, 1983). Further described in this literature review's last section, slideware can be delivered in its original means with a computer and projector at in-

person educational events and also online in stand-alone lessons. Online slideware popularity in workplace instruction has been projected to escalate (BusinessWire, 2020). This escalation has been attributed to training reductions in travel, printing, and other costs; increased learning accessibility (Bedwell & Salas, 2010; Combs, 2002); opportunity to learn at one's own pace (Jones, 2020; Kumar & Gulla, 2011); training standardization (Pappas, 2019; Roy & Rayond, 2008); and lesson scores and completion tracking by learning management systems (Driscoll, 1999).

Location and time. As online instruction prevails, the interconnected dimensions of location and time become more relevant regarding access. Jones, Beynon, Pickernell, and Packham (2013) differentiated workplace instruction as s*ynchronous,* in which instructor(s) and learner(s) are in the same place and same time and *asynchronous*. In the latter type, instruction delivered in online slideware lessons does not occur in the same place as the instructor, and real-time communication between the learner and instructor is unavailable (Andriotis, 2018).

Internal or external source. The final dimension relevant to online slideware instruction is source, which Jones, Beynon, Pickernell, and Packham (2013) deemed to be either in-house or external training sources. Today an increasing number of workplaces delegate instruction construction and delivery to employee subject matter experts to circumvent training specialists and pay fewer salaries (Hughes, 2019; Raluca, 2019; Spiro & Bhamidi, 2017); keep pace with rapidly-changing content (Spiro & Bhamidi, 2019); construct lessons quicker; and generate content easier (Kuhlmann, 2015a; McCain, 1999; Newberry & Logofatu, 2008; Oblinger & Hawkins, 2006; Ouellet, 2012; Pic, 2012; Trivantis, n.d.; Williams, 2001).

Encapsulating to this point, human performance technology commonly relies on instructional interventions to solve employee knowledge or skill deficit problems. Instruction for today's workforce continues to rely on the delivery methods of presentation and reading delivered by the slideware medium. At their convenience, learners can access online, asynchronous lessons often constructed by workplace subject matter experts, a source and population to which attention now will be directed.

Instruction Designed by Subject Matter Experts

The growing number of companies and organizations leveraging their subject matter experts' knowledge into online, asynchronous slideware lesson construction relates in part to the democratization of content creation that began when computer users began producing and distributing their own digital content on the Internet, skirting the content gatekeepers of the established print and broadcast media (Hall, 2020). With technological advances easing the construction of online slideware lessons, workplaces faced with the high financial and time cost of online instruction along with the exigency to continually update content latched on to the practice of tasking employee subject matter experts with the construction of online slideware lessons. Training constructed internally, delivered on time within budget, and updated quickly has obvious appeal. But are subject matter experts equipped to occasionally construct instruction with online, asynchronous slideware? Answering that question begins with defining the subject matter expert employees constructing the lessons; understanding the subject matter expert role in online, asynchronous slideware lesson design and development; and gauging subject matter expert knowledge of instructional design. After looking at these influencing factors, research recommendations for instructional guidance follow.

Defining subject matter experts. Experienced employees asked to train co-workers and workplace-related audiences attain the subject matter expert status by their content knowledge and not their position in an organization's hierarchy (Rodriguez, 1991; McCain, 1999). Because of experience or education, these employees are thought to know more about a process, policy, or subject than others at the workplace and also to keep up with industry changes and best practices in their knowledge area. Their knowledge gives them an authority status in a specific workplace (Weiss, 2019) and training credibility in knowledge transfer (Reiss, 1991).

In writing for the American Society for Training and Development, Hodell (2013) further described the subject matter expert:

> When we describe a content SME, or a technical subject matter expert, the term can accurately apply to a building trades rafts-worker with 40 years of experience hanging iron atop the world's highest buildings, or a village elder without formal education sharing centuries-old herbal treatments for common ailments. The 14-year-old next door is an SME in the latest musical genre, and a 92-year-old World War II veteran will serve as an expert on the Battle of Stalingrad, which happened in 1942. In all cases, the SME provides specific, detailed information that is not considered to be common knowledge among a general population. (p. 3)

Role of subject matter experts in instructional design. Subject matter experts long have been involved in the design of modern-day workplace instruction in a consulting role (Larmore, 2011; Brandon, 2020). They took a more active role at the 21st century start when the Internet, learning management system software that delivers and tracks learning content, and the introduction of electronic lesson authoring tools such as Lectora (1999) and Articulate (2003) led

to accelerated online slideware development that flowered in the century's second decade (Martinez, 2017). This triad of factors prompted many subject matter experts to transition from knowledge contributors in training projects to overseers and constructors of online slideware lessons, although they have other priorities, lack education in the science of instruction, and end involvement with instruction lesson upon project completion (Bartlett, 2003; Merrill, 2007; Pesce, 2012).

Fifteen years ago, Merrill (2007) estimated that 95 percent of online lessons were constructed by only a subject matter expert who had other job tasks and lacked formal instructional design training:

> Today you are an engineer but your company needs a course in their latest product, so tomorrow you are an instructional designer because you are assigned to be an instructional designer, not because you were trained as an instructional designer. You are a designer-by-assignment. (p. 2)

Merrill (2010) linked this prevalence to the commonly-held assumption that subject matter expert topic knowledge automatically equates with teaching knowledge, which it does not (Lee, 1994), and "the anybody can train" assumption (Spaid, 1986). "Everyone feels they are a designer of instruction" because of (a) their own educational experience and (b) ease of technology" (Merrill, 2016, p. 25), referring to simplified online lesson development authorware. Thus, contributing to the workplace subject matter expert inroads into online instruction has been the perception that any computer-literate employee can produce training with authoring technology, and professional instructional designers are not needed for assistance nor consultation (Pic, 2012). Fueling that perception is the idea that authoring tool skill ranks above

instruction design knowledge for online lesson construction by subject matter experts and organizational decision makers' non-comprehension regarding the complexities of learning (Gettman, McNelly, & Muraida, 1999).

Authoring companies marketing their user-friendly tools (i.e., technology with pre-programmed features that enable users to assemble text, media, and interactive elements into specific file formats for custom online lessons) (Martinez, 2017; Pappas, 2020) have prodded the subject matter expert role expansion into online slideware production by offering quick-make lessons via templates or transformation of in-person slide presentations to online lessons with an easy file upload. By touting cost savings, tailored lessons, start-to-finish time reduction, and content updating ease, they present a convincing do-it-yourself online training argument for workplaces (Agas, 2020) content with online lessons constructed by individuals with rudimentary lesson construction skills instead of training created by more skilled designers, developers, and others with more experience (Gagné, Wager, Golas & Keller, 2005).

Technological advances simplifying online lesson construction and the democratization of content creation trend, therefore, has encouraged the shifting of subject matter experts as instructional content providers to instructional content designers and developers and the bypassing of instructional designers. Authoring companies encourage this mindset with the lures of cost-savings and quick instruction construction.

Subject matter expert prior research. Knowledge about instructional design use by subject matter experts remains elusive because researchers have not sufficiently investigated this topic. Only a few studies have examined instructional design application by subject matter experts with any instructional method or instructional media. Although sparse, studies do

indicate the population has a need for instructional guidance, and such guidance would be welcomed as to be shown in this section.

Pesce (2012) in her study of librarians' approach to instruction design attributed the scarcity of scholarly empirical research focusing on the design approach of subject matter experts to instructional design's practitioner-oriented nature. Pesce (2012) also proposed four other research scarcity reasons: (a) subject matter experts' lack of formal instructional training, (b) literature searches hindered by a specific descriptor for subject matter experts who design instruction and also (c) the interchangeable terms relating to instructional design, and (d) researcher interest on expert and novice instructional designers rather than subject matter experts who on occasion instruct.

Of the studies targeting instructional design approaches by subject matter experts, each concluded the population lacked instructional design knowledge and needed instructional guidance beyond the mechanics of authoring tools. Guidance need was detected after researchers found subject matter experts (a) based their instruction on topic knowledge rather than instructional design (Saroyan, 1993; Burk, 2001); (b) voiced more concern about having information-heavy content than arranging content for learning (Blakely, 2015; Conceicao, 2006; Conrad, 2004); Rimmer (2017); (c) did not know how to organize content to meet learning goals (Hathaway & Norton, 2013; Ulrich, 2017); (d) vary in their instructional technique efficacy and lack "just-in-time" how-to assistance (Winn, 2006); (e) outline online lessons similar to lectures, mistake form for substance (i.e., online slideware transforms any content into a well-designed lesson), assign fault of non-learning to learners instead of lesson design (Cuevas, 2019); and (f) lack communication skills in general (Walter, 2000). The need for subject matter expert

guidance in instruction has been a sidenote suggestion in other studies (Choi & Park, 2006; Kebritchi, Lipschuetz, & Santiague, 2017; Lechner, Zavaleta, & Shinde, 2017; Lee, 1994; Noushad & Khurshid, 2019); Pedersen, 2005; Williams, 2001), especially when using certain media such as slideware (Farkas, 2006; Khali & Elkhider, 2015; Levinson, 2010; Young, 2004). Supporting the rationale for subject matter expert instructional guidance assistance also comes from subject matter experts themselves who have expressed discomfort from their lack of instructional training (De Gagné, Park, Hall, Woodward, Yamane, & Kim, 2019; Mason & Strike, 2003). Accordingly, despite the fact that researchers have not studied the instructional design use of subject matter experts in-depth, several studies and practitioner reports (e.g., Articulate, 2015; Nkoba, 2018) have noted the population's need for guidance on instruction as just discussed.

Now having defined workplace subject matter experts, their role in training, and needed guidance for intentionally arranged experiences for knowledge or skill proficiency, this review directs attention to a suggested instructional strategy for subject matter experts constructing online, asynchronous slideware lessons in the workplace. Examination of this strategy reveals the scant research that exists about this instructional strategy's application with online, asynchronous slideware, especially its use by workplace subject matter experts.

Gagné's Conditions of Learning Theory

Often used interchangeably with other terms (i.e., teaching technique, learning activities, formula), an *instructional strategy* derived from one or more learning theories includes sequenced experiences that support learners during lessons (Lamey & Davidson-Shivers, 2017)

and assist them in achieving lesson goals (Dick, Carey & Carey, 2005; Reigeluth, 1999). Wrote Gagné:

> By instructional strategy, we mean a plan for assisting the learners with their study efforts for each performance objective. This may take the form of a lesson plan (in the case of teacher-led instruction) or in learner-centered, learner-paced lessons, the learning objective, activities, material to be read, practice exercises, and self-check test (Gagné, 1988, p. 98).

Several of these instructional strategies include practical lesson frameworks that enable instructors to better arrange content for learner knowledge attainment (Johnson, 2019) instead of merely arranging instruction by content (e.g., chronology, order of importance, parts in relation to whole, nonlinear presentation of categories, or other information-only focus). Influenced by information-processing theories that maintain learning entails a coding process of selected information (Khalil & Elkhider, 2016; McLeod, 2003), Gagné's Conditions of Learning Theory has been successfully applied in many delivery modes, including slideware instruction (Richey, 2000; Driscoll, 2005). The Conditions of Learning also contains a step-by-step instructional strategy—Nine Events of Instruction—based on stimuli sequences that support understanding and long-term recall. Because of its longevity, ease, and factors to be elucidated in the following, the Conditions of Learning Theory' Nine Events of Instruction stands out from other instructional strategies as a condensed formula recommendation for subject matter experts who have the onus of constructing instruction in the workplace but do not have instructional design knowledge nor experience.

Continually refined by Gagné and collaborators (Smith & Ragan, 1996) and in existence for more than six decades, the Conditions of Learning Theory has three parts: Domains of Learning, Conditions of Learning, and Nine Events of Instruction. Whereas the first two are of interest—Gagné's categorization of five knowledge types (*Domains of Learning*) and recognition of internal conditions (e.g., learner capability, motivation, alertness, and knowledge or skill before instruction) and external conditions (i.e., the instruction provided to learners along with verbal communications such as prompts and directions) (*Conditions of Learning*) (Curry, Johnson, & Peacock, 2020; Gagné, 1974)—the *Nine Events of Instruction* is the focus of this study.

Nine Events of Instruction. Gagné devised the Nine Events of Instruction based on stimuli known as events, which are actions that both the instructor and learner take during a lesson. Considered an external condition, each stimuli —gain attention(Event 1), inform learner of objectives (Event 2), stimulate recall of prerequisite learning (Event 3), present stimulus material (Event 4), provide guidance (Event 5), elicit performance (Event 6), provide feedback (Event 7), assess performance (Event 8), enhance retention and transfer (Event 9)—corresponds with and supports information-processing stages (reception, expectancy and executive control activation, retrieval, selective perception, semantic encoding, response activation and organization, reinforcement, retrieval, and generalization and retrieval strategies) (Gagné, Wager, Golas &Keller, 2005; Jarvis, 1995).

EVENT STAGE	EVENT	LEARNER COGNITIVE PROCESS
Preparation	1. Gain attention	Reception (stimuli activates brain receptors)
	2. Inform learners of instructional objectives	Expectancy (creates learning expectation)
	3. Stimulate recall of prior learning	Retrieval (retrieves known information from memory
Instruction with practice	4. Present stimulus	Selective perception (processes displayed new information)
	5. Provide guidance	Semantic encoding (makes connections between memory and new information)
	6. Elicit performance	Responding (integrates encoding)
	7. Provide feedback	Reinforcement (confirms correctness)
Assessment and retention	8. Assess learning performance	Retrieval (retrieves acquired information and reinforces understanding)
	9. Enhance retention and transfer	Reinforcement (acquired information cements and applied in future

Figure 1. Nine Events of Instruction and learners' related cognitive process (adapted from Gagné, Briggs, & Wager, 1992).

The Nine Events also can be understood as a "set of communications" (Gagné, Briggs, & Wager, 1988, p. 178) and "the nature and sequence of verbal directions given to the learner" (Gagné, 1974, p. 157*)*. Instructor dialogue transitions learners from one event to the next external event. Gagné's strategy stands out from other instructional strategies with these supportive communications that ease learners through information-processing stages by adding pleasantries and often entertainment (Grisé, 2012).

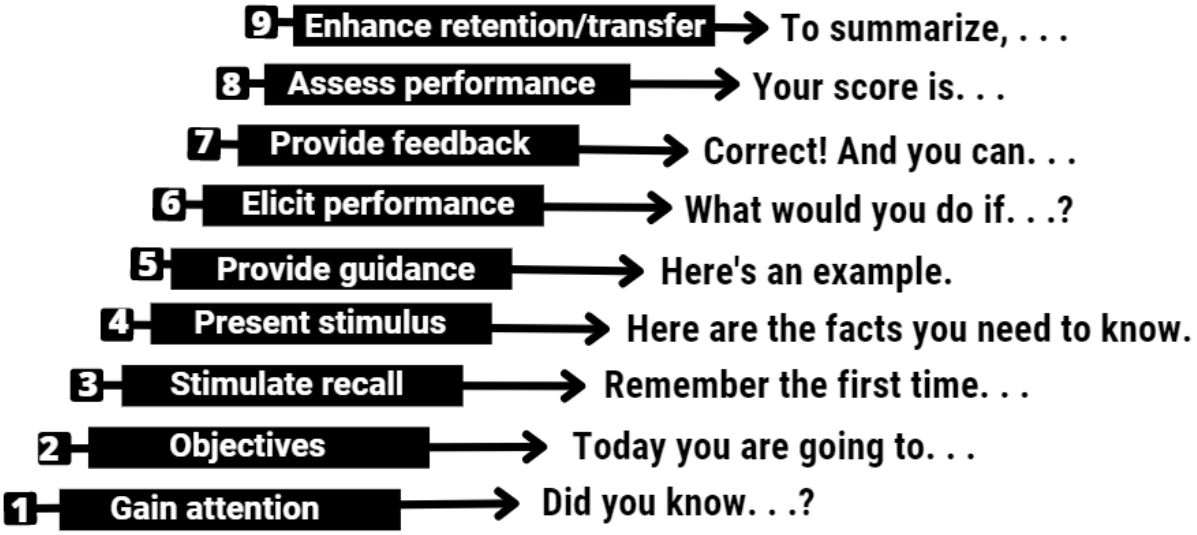


Figure 2. Sample event communications dialogue (adapted from Valparaiso Institute for Teaching and Learning, n.d.).

Tapping into the theorized internal process of cognitive processing to increase the probability of successful learning (Gagné, 1965), Gagné's Condition of Learning Theory has been "the premier conceptual framework for the design of instruction" since its introduction (Molenda, 2002, p. 6) and considered by many to be the foundation of instructional design practice (Reiser, 2001; Richey, 2000). Many point to the nine instructional events distilled from the collective knowledge of education-related disciplines as the theory's most consequential contribution because of its lesson planning steps (Connelly, 1994; Shachak, Ophir, & Rubin, 2005). The nine-part strategy's planned, systematic design process provides a pragmatic, flexible framework appropriate for different instructional methods, approaches, media, and learning styles (Baba, Sale, & Sierra, 2017; Belfield, 2010; Buscombe, 2013; Gagné, 1977; Wong, 2018) and also for its time-sensitive organization of lesson construction (Smith, Chavez, & Seaman, 2014).

Individual case studies have judged the Nine Events strategy as a positive contribution to the primary and secondary classroom teaching level for lessons of observation, comparison, classification, summarization, understanding, inference, and evaluation (D'souza, & Kasinath, 2009); mathematics (Al-Shammari, Elgazzar, & Nouby, 2015; Bidwell, 1971; Hashim & Tik, 1997; House, 2002; Tang, Tsai, & Huang, 2020); science (Geiger, 1990); social studies (Stahl, Button, & Corbett, 1975); physics (Simha, 2000); and aquatic ecosystems (Helms, 2009). The same holds true for postsecondary bioinformatics (Shachak, Ophir, & Rubin, 2005); English as a Second Language (Medina, 1990); anatomy (O'Byrne, Patry, & Carnegie, 2008); website location (Zhu & Amant, 2010); animation poses (Teoh & Neo, 2007); library instruction (Miller, 1982); literacy (Brownfield & Vik, 1983); bibliographic instruction (Johnson, 2008; Suprenant, 1982); shorthand (Laurie, 1976); phlebotomy (Woo, 2016); and athletic performance (Randall, 2018). It has been recommended as a train-the-academic instructor method in instructional design (Halpern & Hakel, 2003) and by postsecondary institutions for instructors' lesson design (e.g., Northern Illinois University, University of Florida, Virginia Tech) (Northern Illinois University Center for Innovative Teaching and Learning, 2020); University of Florida, Center for Instructional Technology and Training, 2018; Virginia Tech, School of Education, 2008).

Outside of the academic classroom, a variety of studies have pronounced the events well-suited for military training (Spector, 2000) and medical workplace instruction (Ali, Ali, Yousafzai, & Oien, 2017; Belfield, 2010; Engel, 1989; Kaliher, 2010; Ng, 2014; Qutieshat, 2018; Wong, 2018). The events also have been applied to instruction in other fields with positive results (Baba, Sale, & Zirra, 2017; Flynn, 1992; Medina, 1990; Qutieshat, 2018; Smith & Tillman, 2000; Sreelakshmi et al., 2015; Tough, 2012; Woo, 2016. Its easy-to-follow method

(Johnson-Curiskis, 2006), too, has been reported to positively impact instructor preparedness, mastery, enthusiasm, and effectiveness (Martin, Klein, & Sullivan, 2004; Miner, Mallow, Theeke, & Barnes, 2015).

Another value indicator of the Nine Events is its endorsement by practitioners for its ease and template (e.g., Dalto, 2012; Hogle, 2017; Jaiswal, 2020; LaMotte, 2015; Peck, 2020; Penfold, 2016; Rogers, 2017). For instance, two subject matter expert podcasters said they recommend Gagné's Nine Events of Instruction when asked by other subject matter experts for advice on designing instruction and lesson structuring, saying . . . "in a way, you can think of this sequence as a 'cheat code' for course development. It's a structure that helps you think through the elements of a course" (Derington & Avramescu, 2021). This instructional strategy also meets the standards for Quality Matters Continuing Education and Professional Development Rubric (Surrency & Barbie, 2018), the quality checklist most pertinent to mandatory workplace training.

Criticism of Nine Events strategy. Although admitting the advantages of this instructional strategy's design, critics have complained the strategy constricts divergent thinking and stifles creativity (Wilson, 2018). In an oft-noted comment, Clark (2006) denounced the Nine Events as ". . .an instructional ladder that leads straight to Dullsville, a straightjacket that strips away any sense of build and wonder, almost guaranteed to bore more than enlighten." (para. 3) Later, Clark (2020) tamed his exhortations. He conceded Gagné's positive influence on lesson design in online, asynchronous instruction and corralled his objections to only the clichéd ice breakers and skim-over objective listings often used for Gagné's first two events.

To rigidity reproofs, Gagné was clear the Nine Events do not have to slavishly follow each other, might overlap, and could be sequenced differently in lessons (Gagné, Briggs, & Wager, 1988). Each event also does not have to be in a lesson (Gagné & Briggs, 1974; Gagné, Wager, Golas & Keller, 2005; Wager, 1978). Describing the Nine Events as a map for designers choosing their own journeys, Gagné wrote: "The mapping of learning structures does not lead to 'routinization' or 'mechanization' of the process of learning. A map indicates starting points, destinations, and alternative routes in between; it does not tell how to make the journey" (Gagné, Briggs, & Wager, 1988, p. 70).

Dubbed passive (Shachak, Ophir, & Rubin, 2005), the Nine Events also has been questioned because of instructional design research's more recent interest in the self-directed learning of constructivism (Surrency & Barbie, 2018), a different educational path than the mandatory workplace training that tends to have the goal of awareness more than behavioral change or knowledge mastery with a performance expectation of completion (Kuhlmann, 2015b). Wrote Kuhlmann (2015c), "In most cases, the learners already know the content, but they have to be certified each year" (p. 43), and a "simple, relatively inexpensive linear course will suffice." (p. 48). Fortunately, Gagné's conversion of "abstract theories of learning into concrete guidance" (Willis, 2011, p. 4) already has been successfully tested with slideware, the subject of the next section, and with several multimedia research studies.

Nine Events Use in Slideware Lessons

Before re-visiting the use of Gagné's Nine Events instructional strategy by subject matter experts—but this time when using slideware as an instructional aid—a brief look at slideware

learning detraction, slideware organization and learning, and subject matter expert desire for slideware construction guidance is warranted.

Instructional obstacles. Much has been written about the tedious nature of information-centric slideware designed with the receptive approach (i.e., instructors think knowledge can be transferred directly from the originator to learners) (Amernic & Craig, 2004; Reddy, 1979). The assumption that "the PowerPoint presentation contains everything the audience needs to know and therefore all that's left is to fill in a few details" (Jones, 2020, para. 15) results in lectures where instructors reel off isolated facts uni-directionally (James, 2020); "deliver ever-increasing amounts of information" (Fisk, 2019, p. 92); and do not involve audiences (DuFrene, & Lehman, 2004; Parks, 1999). The online, asynchronous slideware version of these linear fact barrages lacks instructor interaction and often only offers the continual click interactions of the "Next" button, an overlook of the online medium's learning engagement opportunities (Shank & Sietz, 2004).

Because authoring tools based on slideware can import slide decks to an online learning format (Martinez, 2017), re-purposing in-person presentations to instant online lessons appeals to those wanting to reduce time and financial costs. Such re-purposing without content adaptation has been termed "shovelware" (Felder, 2012; Franklin, Hamer, Hanna, Kinsey, & Richardson, 2005; Miller, 2010; Proctor, 2002) devoid of instructional design and often followed by a post-test to assess learning (Veletsianos, Kimmons, & French, 2013). Shovelware occurs because of institutional barriers (e.g., lack of instructional guidance and training); inhibitors (lack of time or rewards) (Birch & Burnett, 2009); and the over-powering foci of lesson content information gathering seconded by the mechanics of posting information on applications designed to develop

and deliver the online lesson (Orellana, Hudgins, & Simonson, 2009). Beginners in online instruction also employ shovelware until they find better ways to instruct learners (Shaughnessy, Viner, Bonk, & Khoo, 2015).

In response, researchers have suggested slideware-using instructors improve lessons by organizing information for comprehension and learning (Berk, 2011; Cyphert, 2004; Fisk, 2019; Garrison, 2007; Kunkel, 2004; Moore, 1989; Shwom & Keller, 2003; Song, Singleton, Hill, & Koh, 2004). Organization becomes even more crucial for online, asynchronous "sage on stage" lessons without interruption and without the real-time presence of an instructor (Terras, 2017). Hence, research once again recommends instructional assistance for subject matter experts constructing online, asynchronous slide lessons using the receptive approach, which would be welcomed because subject matter experts constructing online slideware instruction have asked for instructional guidance (Choi & Park, 2006; Kebritchi, Mansureh, Lipschuetz, & Santiague, 2017; Pedersen, 2005).

Slideware research pertaining to Nine Events strategy. Researchers reporting on instruction using the Nine Events with slideware have shown a propensity to exemplify each event through slide image or text description with Guided Approach to Instructional Design Advising being one of the first. Desirous of a way to fast-forward subject matter experts new to lesson construction toward instruction proficiency, the U.S. military sponsored GAIDA, a computer-based lesson organization system developed by the Air Force Research Laboratory with the assistance of Gagné (Gettman, McNelly, & Muraida, 1999). Once in GAIDA, novices could pick a lesson type with corresponding Nine Events examples on slideware for a model to emulate. Evaluation studies showed an improvement in lessons using the guidance than those

without. But studies also showed that subject matter experts new to lesson construction were confused by the open-ended tutorial and understood it better when it was revised with more structure (Spector & Whitehead, 1994), which suggests event clarification and additional exemplifications.

Gagné's (1992) elaboration of each event through example in GAIDA foreshadowed later online, asynchronous slideware research that mostly has come from the academic sector and has been singular case studies endorsing the strategy and exemplifying each event. One of the earliest to suggest the Nine Events could be teamed with slideware presentations, Antonacci (2003) interpreted the events with slide text-and-visual examples. Agreeing with Antonucci about visuals as effective in event expressions, Hulls (2005) also equated slideware software feature applications to event possible expressions such as "builds" that overlay one-by-one in slides when presenting new content text (e.g., a bullet series) and guidance for the first event. Visual and technological event interpretations that Hulls found beneficial for learning, Maxwell (2007) did not. Ignoring Antonucci's recommendation of the Nine Events as an organizing strategy, Maxwell derided Antonucci, writing he had "gone out of his way to use every feature in the PowerPoint arsenal: text that changes color, clip-art fireworks, 'spiral' animation, and a wide variety of annoying sound effects." (p. 30) Event expression in online slideware has continued to be of interest in academic research targeting interactivity and multimedia impact in lessons (Al-Shammari, Elgazzar, & Nouby, 2015; Becker, 2005; Brownfield & Vik, 1983; Helms, 2009; Jono, Hesamuddin, Salleh, Ibrahim, & Aziz, 2016; Leow & Neo, 2014; Neo, Neo, Teoh, & Yap, 2010; O'Byrne, Patry, & Carnegie, 2008) such as the Theng and Mai (2009) conversion of a website to interactive learning slideware module that used animated clips, animated images,

hyperlinks, instant feedback, and sequential-unfolding diagrams to represent events. Deubel (2003) also leaned toward technological expression of the events (e.g., embedded interactions in online, asynchronous slide lessons that required learners to actively process content rather than passively read text or watch video clips).

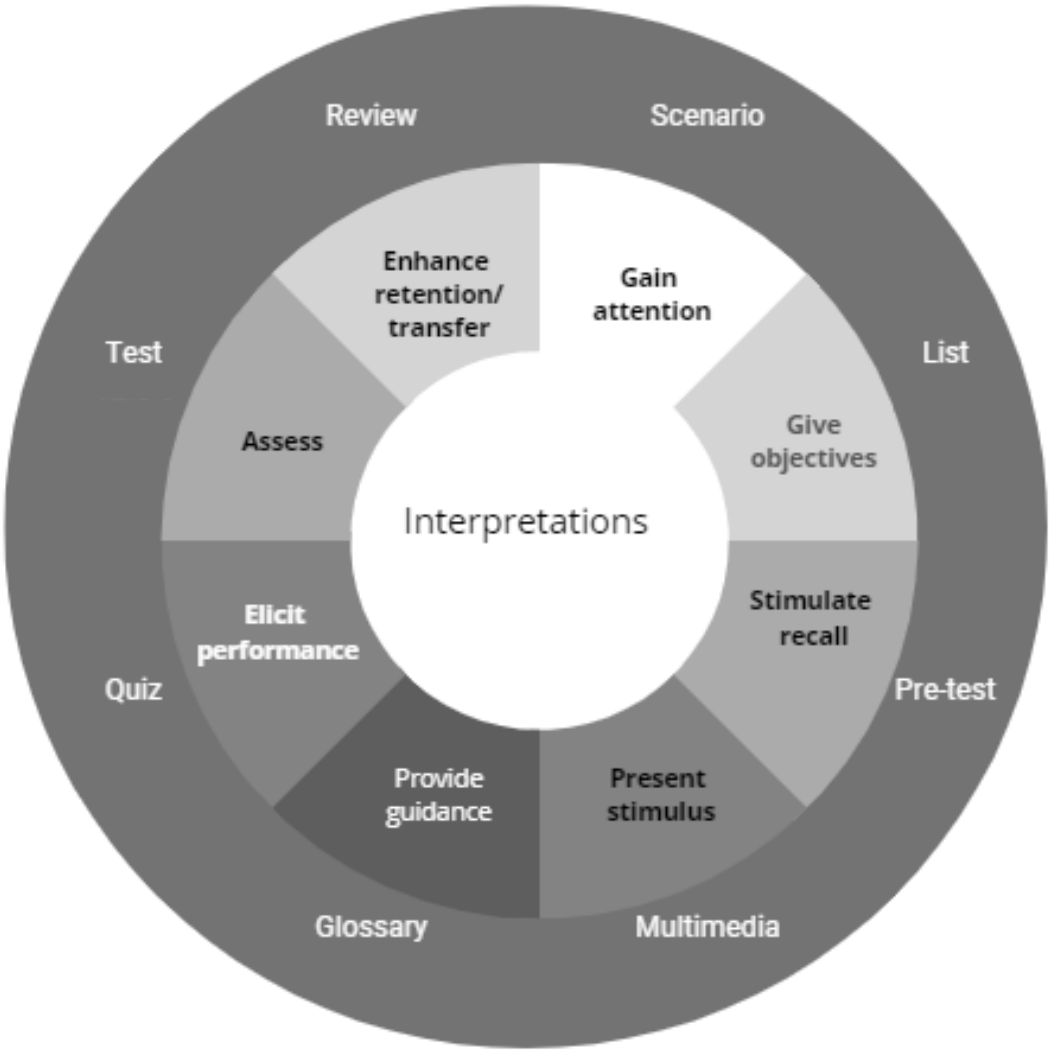


Figure 3. Ratliff et al. (2012) examples of Nine Events of Instruction.

Similar to Antonucci and others, Ratliff et al. (2012) concentrated on event use possibilities in their descriptive study of interest that examined mandatory workplace instruction

delivered online with asynchronous slideware. Along with weaving in quiz questions that could represent several events, the instruction expressed events in an online slideware format as seen in Figure 4. The researchers credited the instructional strategy as a means to produce instructionally sound training and encouraged subject matter experts "in any organization" (p. 8) when constructing online, asynchronous slideware lessons.

Therefore, if subject matter experts can skirt the pitfalls of slideware, take advantage of meaningful technological features, and organize effective expressions of the Nine Events, research shows they can better elevate information presentations to instructional lessons.

Summary

Beginning with an examination of workplace training research, this review then defined instruction, a term that Molenda and Russell (2006) described as the intentional arrangement of learning experiences, and which Gagné referred to as "a set of events" (Gagné, Briggs, & Wager, 1988, p. 177). Next, four dimensions of workplace instructional interventions were described that positioned online slideware consisting of the reading method in the media of asynchronous online slides often presented without instructional design. Such online slideware prompted Laff (2007) to warn: "At its best, rapid learning can solve the problem of training a pool of employees on a procedural issue in a consistent, cost-efficient format. At its worst, rapid learning is just repackaged training manuals presented in an online format" (p. 45). Concluding the dimensional descriptions of workplace instructional interventions was source, which increasingly has been subject matter expert employees.

Subject matter experts constructing online slideware lessons were further discussed. Reasons given for their lack of instructional design included subject matter experts' preoccupation with content creation and slideware appearance rather than content arrangement, faulting of learners for lack of knowledge garnered rather than lesson design, and insufficient instructional and communication skills. Because research has recommended instructional assistance for subject matter experts, focus then shifted toward Gagné's Nine Events of Instruction consisting of planned stimuli that encourage learners to progress from sensory registration to long-term storage and learner capability. Gagné's instructional strategy showed promise but has not been researched within the realm of subject matter experts in the workplace constructing lessons with online, asynchronous slideware apart from Ratliff et al. (2012).

Therefore, in addition to researcher recommendation, two research gaps further study of Nine Events use by subject matters experts constructing online slideware for workplace training: an empirical research gap relating to population and a theoretical framework gap (i.e., application of the Nine Events with slideware). To explore these gaps, Chapter 3 details research methodology designed to examine the strategy's use in online slideware lessons constructed by subject matter experts in the workplace.

Chapter 3

Methodology

The purpose of this study was to examine a possible instructional strategy that can be introduced in a lesson design training for subject matter experts who lack instructional design expertise but are tasked with constructing online slideware lessons. Setting forth the steps taken to answer the research question, this chapter begins with explanation of the qualitative research design, content analysis, and purposive sampling based on researcher employment knowledge. Next, the research instrument, a checklist of specific criteria (i.e., event interpretations), and content analysis judgments are described. Further detailing ensues with ethical considerations, specifically explanation of the public data source, permission to collect information for scientific purposes, and lack of any conflicting interests. Following this ethical discussion is an explanation of the study's reliability, trustworthiness, and validity before the researcher's role and study expertise background are described. Study limitations related to the research question close the chapter.

Research Design

Organizing the design of research starts with a worldview paradigm (De Vaus, 2006). For this study, the pragmatic paradigm was chosen because it recognizes a plurality of approaches that can answer a research question and encourages use of the most practical (Feilzer, 2009; Frey, 2018; Kaushik & Walsh, 2019). The research approach stemmed from the study's purpose of recommending Gagné's Nine Events of Instruction and tailoring its training to workplace subject matter experts and also the research question: To what extent does the slideware instruction by subject matter experts include Gagné's Nine Events of Instruction?

Answering that question started with a qualitative design per research guidelines (Creswell & Creswell, 2018; Hammarberg, Kirkman, & de Lacey, 2016). For design rigor and research technique, content analysis proved to be a practical technique for data choice, sorting, and comparison. Specifically, latent projective analysis was used for initial analysis because of text meaning interpretation (Bengtsson, 2016; Kleinheksel, Rockich-Winston, Tawfik, & Wyatt, 2020); manifest coding for pertinent actual words such as "objectives;" and summative content analysis for results. Further methodology description continues in the procedural explanation.

Setting

Data gathering took place within an online learning management system environment. Known as Kansas TRAIN (https://ks.train.org/ks/), an affiliate of the Public Health Foundation Training Finder Real-time Affiliate Integrated Network (TRAIN), this learning resource contains more than 400 online lessons free for the public health community and public. Its sponsor, a midwestern state health and environment department, also uses TRAIN for its own employee instruction.

Sampling Procedure

A purposive, criterion-based sampling strategy was employed to best answer the research question because of the researcher's employment at the state health and environment department as an instructional designer with knowledge of online lessons in the Kansas TRAIN inventory. The seven lessons examined included an overview of specific employment policies; specific federal legislation in the workplace; public health concepts; quality improvement methods; and workplace behavior. Their primary audience was new employees in a state health and

environment department. Each lesson chosen for study was designed and developed by different workplace subject matter experts who lacked an instructional design background and primarily used the instructional method of reading. Besides researcher knowledge of lesson provenance and convenience of access, inclusion criteria included lessons that were:

- Available in 2022 and developed within the last five years
- Had an estimated duration between 20-60 minutes
- Mandatory and did not require pre-requisite lessons nor additional lessons
- Rated at least a 4 on a 5-point Likert-type scale completed by learners
- Constructed with the Lectora authoring tool, an ELB Learning software product

The five-year development period criterion was set because that period coincides with the researcher's employment at the state health and environment department and familiarity with lesson construction. Lesson length was established to provide enough slides for analysis and to be within recommended online lesson lengths (Winstead, 2022). The other three criteria were chosen for homogeneity and to provide appropriate data for the study purpose. For further homogeneity, chosen lessons also were in the department's new employee orientation lesson grouping with two exclusions because they were designed and developed by external industry professionals.

Online, asynchronous slideware lessons that met the preceding criteria included:

- Employee FMLA [Family and Medical Leave Act] Training (#1089973)
- Fair Labor Standards Act Training (#1058371)
- Introduction to Quality Improvement in Public Health (#1059243)

- Fundamentals of Kansas Public Health: Overview of the Kansas System (#1066241)
- New Employment Orientation (#1053739)
- Harassment Prevention Training (#1089063)
- Respecting Others (#1056108)

Instrument

The means by which investigators attempt to measure variables and items of interest in data collection rely on an instrument (Salkind, 2010). For this study, a performance evaluation checklist (i.e., a set of codes) that indicated whether an event was present or not and its type (Given, 2008) served as the instrument. This Nine Events Interpretation Checklist listed each of the Nine Events with a total of 43 examples derived from a review of 89 researcher and practitioner publications. Examples were compared to Gagné's definition and intent and discarded if they did not fall within Gagné's definitional parameters. See additional instrument procedural preparation in Appendix C Nine Events Interpretation Checklist.

Data Collection Procedure

An Institutional Review Board request to Baker University was submitted March 3, 2022 (see Appendix A) and approved March 13, 2022 (see Appendix B). Data collection consisted of first digitally copying each of the pre-screened lessons in their Lectora format and in a PDF form. A paper copy also was obtained to ensure continued access to data. Each unit of analysis (i.e., slideware lesson) then was read for lesson component familiarity and to obtain a sense of the whole lesson.

Data Analysis and Synthesis

A total of 447 slides within the seven lessons were examined and compared in relation to the Nine Events of Instruction defined by Gagné and his co-authors. First, each of the seven units of analysis were inspected to identify existence of Gagné's Nine Events of Instruction. Data that represented each sequential event were counted for frequency with relevant observations. Each event existence was then compared to the researcher and practitioner interpretations in the checklist and also with Gagné's definitions. Example quality and possible event overlap also were considered. To further detail use of Event 4, stimulus multimedia (i.e., images, videos, audios, and visuals) and hyperlinks were counted. The number of assessment questions for Event 8 also were counted. For descriptive purposes, screen appearance was examined for commonalities and the number of total slides in each lesson counted. Nine Events of Instruction pattern sequences in individual lessons also were compiled. Each lesson was reviewed several times for counting purposes, illustrative examples, commonalities, and table creation. This subsequent review also refined the checklist. Throughout analysis of each lesson, event examples, questions, determinations with support, and rival explanations were recorded before examination of findings from the lesson analysis as a whole. Findings for each event then were analyzed from the seven lessons' review (Bengtsson, 2016; Hsieh & Shannon, 2005; Kleinheksel, Rockich-Winston, Tawfik, & Wyatt, 2020; Kolbe & Burnett; 1991; Saldana, 2016). After the completion of lessons' analyses, findings were compared to existing literature for inference and interpretation.

Ethical Considerations

Data was obtained from an online site accessible to the public and did not display individual identification; therefore, informed consent was not required because analyses and findings did not risk employability and confidentiality. In addition, the learning management system hosting the lessons required registration states information can be collected for scientific research or statistical purposes. Data collection, analysis, and findings were done only for the study purposes and not to harm any individual in any way. Avoiding internal and external conflicts of interest, the study design also complied with ethical and legal requirements for confidentiality and anonymity. Bias, which is unavoidable in qualitative research, can occur in any of the research phases, and may influence study outcomes (Pannucci, & Wilkins, 2010), also was addressed. Specifically, the researcher designed a study without personal preconceived beliefs or expectancies, had a non-relationship with those constructing the reviewed lesson, and crafted a research question dependent on a research-based, binary evaluation checklist. The checklist's forced choice method mitigated reviewer bias and misinterpretation of data results by standardizing review items and contributed to construct validity (Gibbert, Ruigrok, & Wicki, 2008). Thought process documentation contributed to bias negation.

Reliability, Validity, and Trustworthiness

Because content analysis involves subjective interpretation that impacts reliability and validity (Guerra-Lopez, 2008) and analysis was done only by the researcher, an effort was made to be as objective as realistically possible with rationale provided for reasoning to be seen in Chapter 4 and Chapter 5. Methodology rigor was strengthened with the checklist instrument derived from literature synthesis and empirically observed patterns established in different contexts as encouraged by Denzin and Lincoln (1994). Publications were reviewed on three

different occasions to produce a checklist that was then compared to its predecessor for checklist strengthening. Cross-lesson analysis with a nested approach (i.e., different lessons within the same organization) and individual lesson examination contributed to external validity as did multiple counts to assure accuracy. Personal observation and researcher bias clarification were provided for verification. Checklist publication sources and public lesson review allowed for replication. Trustworthiness was achieved with a consistent process, accessibility of data, note-taking, and review by research advisors.

Researcher Role

Researcher competence to select and analyze data derived from on-site employment. The researcher also had decades of instructional design employment including design and development of online, asynchronous slideware lessons; an undergraduate degree in visual communication; graduate degrees in both journalism and instructional design; and instruction experience teaching editing and design classes to university students. The researcher became part of the study when interpreting data by using self-knowledge of the data sources, and, therefore, was a research instrument per qualitative research design (Emerson, Fretz, & Shaw, 1995; Rew, Bechtel, & Sapp, 1993; Xu & Storr, 2012). Knowing this involvement in advance helped the researcher maintain a neutral stance during the study and strive to avoid bringing personal preconceptions into inferences. Data collection, too, was done without direct involvement of participants, so researcher presence did not influence collection results. Because the researcher did not have any relationship with the individual employees who contributed to lesson construction, there were not biases, expectations, or assumptions relating to sources. A review of personal notes documenting evolving comprehension further added to objective

viewing and lack of bias. Findings from this research did not present a conflict of interest because findings did not impact the researcher.

Limitations

Limitations can influence study results (Price & Murnan, 2004). Possible constraints may have been the impact of others besides the subject matter expert constructing or updating a lesson and the researcher's lack of knowledge regarding subject matter expert exposure to Conditions of Learning Theory's Nine Events of Instruction or other instructional strategies. Another limitation was the sampling bias of the researcher's selection of data, which could limit generalization of findings.

Summary

Answering the research question required a qualitative design and content analysis of seven online, asynchronous slideware lessons constructed by subject matter experts. The Nine Events Interpretation Checklist was developed from a literature review and used to detect event presence. During data analysis, the checklist was further refined. Results are presented and explained in Chapter 4.

Chapter 4

Results

The purpose of the study was to examine Gagné's Nine Events of Instruction as an instructional strategy that can be introduced in a lesson design formula training for subject matter experts who lack instructional design expertise but are tasked with constructing online slideware lessons. To better tailor training of the strategy for the intended audience, this study examined the use of Gagné's Nine Events of Instruction in seven online, asynchronous slideware lessons constructed by workplace subject matter experts and then numerated the extent of events' inclusion in the lessons. Findings from events' identification are reported in this chapter that begins with a general description of the lessons studied. Each of the Nine Events then are described with details regarding their evidence and use in the seven lessons. The chapter concludes with a summary of themes found in results.

Lesson Description

The seven online, asynchronous slideware lessons contained an average of 63 slides. Findings through instrument analysis showed evidence of varying event use in the seven lessons constructed by workplace subject matter experts. The individual event combinations used in each lesson also varied. Only Fair Labor Standards Act Training and Harassment Prevention Training used the same events: Events 2, 4, 6, 7. The six event patterns as seen in Table 1 were Events 4, 6, 7; Events 2, 4, 6, 7; Events 2, 4, 5, 6, 7, 8; Events 1, 4, 5, 6, 7, 8; and Events 4, 6, 7, 8; and Events 2, 4, 6, 7, 8.

Table 1

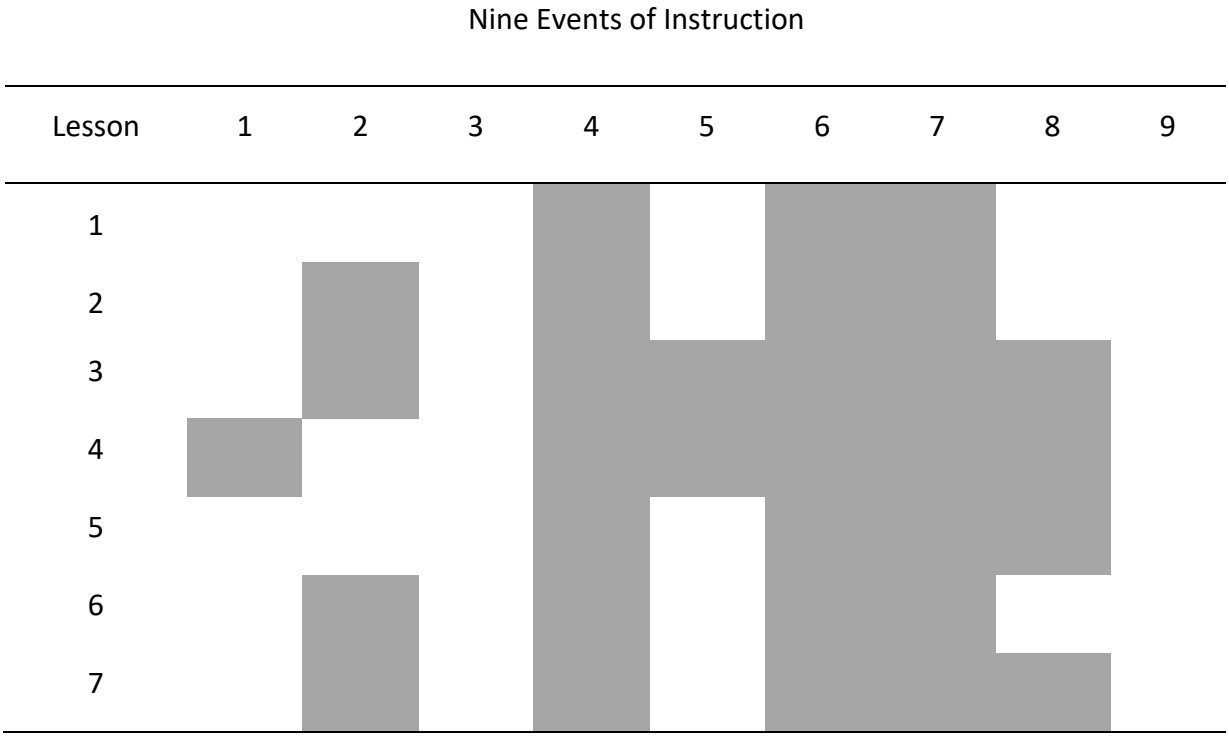
Nine Events of Instruction Pattern Sequences in Individual Lessons

Lesson	Data	Event Pattern
1	Employee FMLA Training	Events 4, 6, 7
2	Fair Labor Standards Act Training	Events 2, 4, 6,
3	Introduction to Quality Improvement in Public Health	Events 2, 4, 5, 6, 7, 8
4	Fundamentals of Kansas Public Health	Events 1, 4, 5, 6, 7, 8
5	New Employment Orientation	Events 4, 6, 7, 8
6	Harassment Prevention Training	Events 2, 4, 6, 7
7	Respecting Others	Events 2, 4, 6, 7, 8

The two lessons that used the most (i.e., six) of the nine events were Introduction to Quality Improvement in Public Health and Fundamentals of Kansas Public Health: Overview of the Kansas System. Employee FMLA Training used the least events (i.e., three). Lesson events all sequenced to the event ordering in the Nine Events instructional strategy. Lesson event examples also matched event examples on the checklist instrument.

Table 2

Nine Events of Instruction Presence in Individual Lessons



Note. Gain attention(Event 1), inform learner of objectives (Event 2), stimulate recall of prerequisite learning (Event 3), present stimulus material (Event 4), provide guidance (Event 5), elicit performance (Event 6), provide feedback (Event 7), assess performance (Event 8), enhance retention and transfer (Event 9).

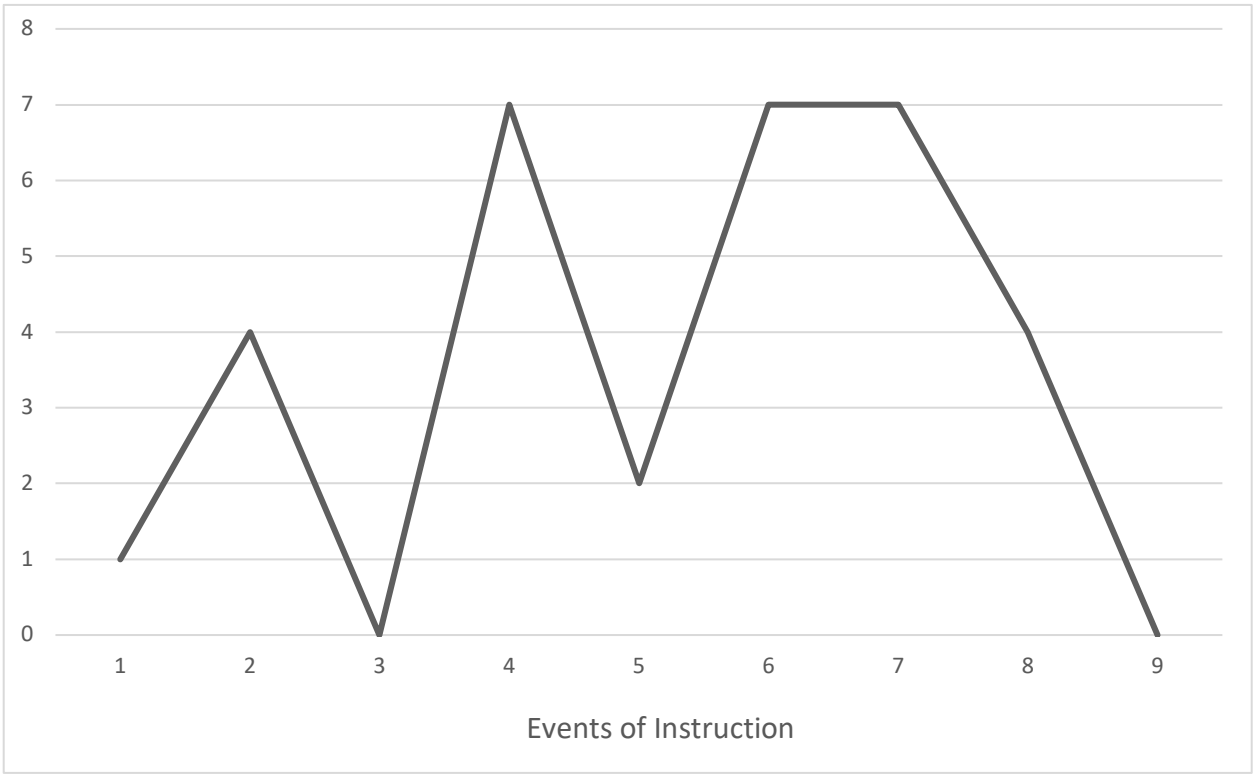


Figure 4. Total number of Nine Events of Instruction present in all lessons

Extent of Event Use

Lesson event use in comparison to the total of possible event uses (n=63) showed subject matter experts used half of all possible events (50.79%) (Figure 4 and Figure 5). However, that percentage may be misleading. One reason is that the presentation stimulus material (Event 4) is always present in lessons because it is the lesson content. Without this event, there is not a lesson. Discounting Event 4 from possible event uses (n=56; 8 events) resulted in 44.64% usage (Figure 6). That percentage is probably even less because some event expressions qualified with one or few instances when there should have been more to qualify as event presence. Guidance provision (Event 5) illustrates this situation. It was recorded as present in the Introduction to Quality Improvement in Public Health lesson because of two examples but needed more examples throughout to offer learner support. That same lesson was credited with performance

elicitation (Event 6) even though the performance was responding to two multiple-choice questions, unlike other lessons that had substantially more (See Figure 8). The following reports on individual event use in the examined lessons.

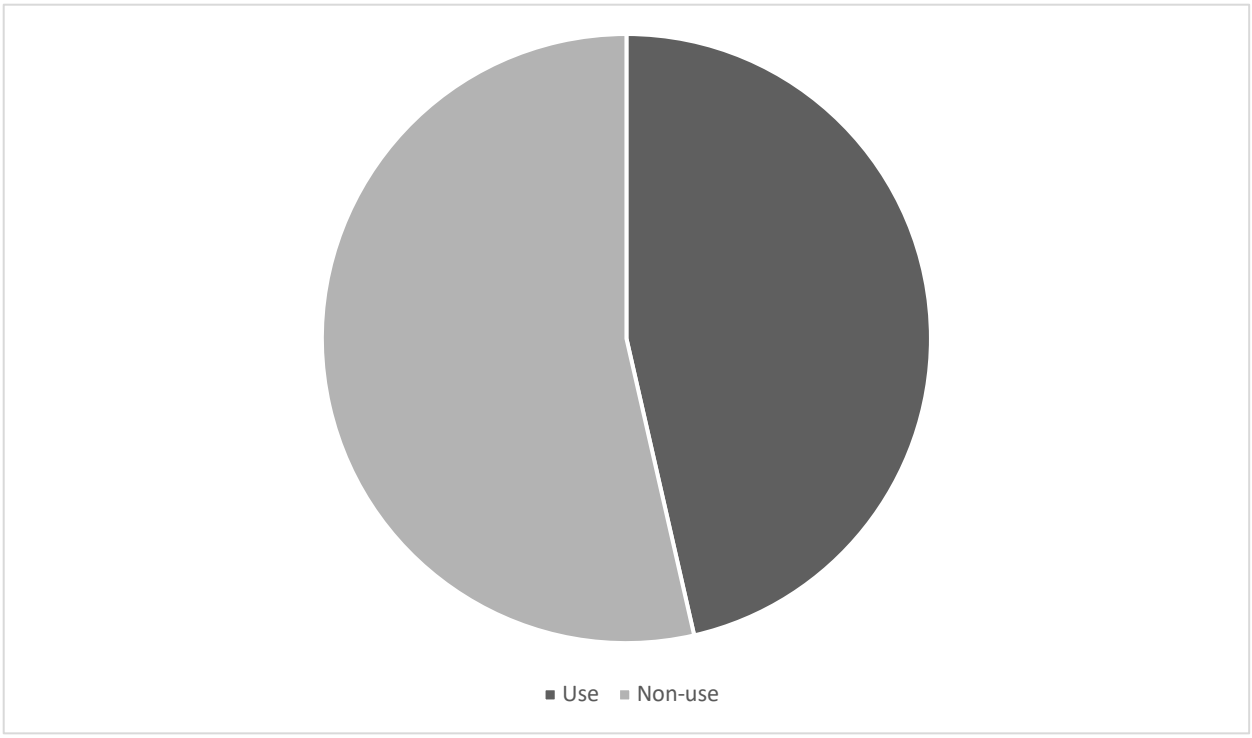


Figure 5. Nine Events of Instruction extent excluding Event 4.

Gain attention (Event 1). To encourage reception to lesson content, the first event, an abrupt stimulus change, signals the lesson start, engages learners, and appeals to learners' interest (Connelly, 1994; Gagné, Briggs, & Wager, 1988). Wrote Connelly (1994), "It is more than simply attracting attention; it is a deliberate act designed to put the learner (viewer) in a receptive of mind for what is to follow (p. 768)." Visual, auditory, and verbal techniques to gain attention can be a knowledge check or pretest (Sweeters, 1994); embedded video clip (Deubel, 2003; Dowling, 2011; LaMotte, 2015); compelling statistic (Al-Shammari, Elgazzar, & Nouby, 2015; Brooks, 2021; Miner, Mallow, Theeke, & Barnes, 2015); intriguing question (Jaiswal,

2020; Peck, 2020); or other unexpectation. No evidence of this event was found in the seven lessons' opening slides except for Fundamentals of Kansas Public Health for Overview of the Kansas System did have a pre-assessment, which is considered a means of gaining attention (Al-Eraky, 2012).

Inform learner of objectives (Event 2). Objectives, knowledge- or skill-based outcomes learners are expected to achieve upon lesson completion, map the lesson's educational destination (DeSilets, 2007). Two lessons did not contain objectives (Employee FMLA Overview and Fundamentals of Kansas Public Health for Overview of the Kansas System). Four listed objectives with action verbs indicating a change in functional knowledge and comprehension upon lesson completion. An additional lesson (Harassment Prevention Training) had a slide titled "Objectives" that was not counted as present because the listing (i.e., "gained a general understanding of harassment, harassing behavior, and why it is wrong; reviewed why an inclusive workplace is important; received instructional on what to do it they feel they are a victim of harassment") lacked measurable, observable learning outcome behaviors. Gagné's definition of Event 2 stated that objectives need to be measurable and observable, especially when assessment is based on objectives (Gagné, Wager, Golas, & Keller, 2005).

Stimulate recall of prerequisite learning (Event 3). Encouraging the accessibility of existing knowledge for scaffolding of upcoming instruction can be done with questions about previous experiences or knowledge (Medina, 1990; Soo-Phing & Kian, 2007; Surrency & Barbie, 2018); refresher summaries (Brooks, 2021;); knowledge checks (Colman, 2020; LaMotte, 2015); or other connections to pre-existing knowledge that learners probably possess.

No evidence was found of this event in front slides of any lesson nor throughout the entire seven lessons.

Present stimulus material (Event 4). All seven lessons included this event that presents new informational content to learners. Sequences of verbal information facts were displayed in sans serif black type on a white background except one lesson with a light blue background. Features emphasizing selective perception included boldface, italicizing, and underlining of text; headlines; and white space. Of the lessons' 157 images, 93% were clip art with the majority depicting employees at work; 11 depicted a specific person or site mentioned in text. Twenty-five information visualizations (e.g., charts, graphs, or maps) also provided information. The only lesson with audio files, New Employee Orientation, also offered information in three short videos as did the lesson Fundamentals of Kansas Public Health for Overview of the Kansas System, with its two videos.

Each of the seven lessons did offer ample additional information and original sources through hyperlinks. These digital references to data could be clicked to open PDF documents, websites, or pop-up content boxes. For instance, the New Employment Orientation lesson's 49 click-to-learn-more hyperlinks provided a concise way to cover state employee leave benefits on one slide with hypertext links leading to lengthy text on vacations, sickness, holidays, military service, shared leave, funerals, inclement weather, and a reporting directive. Usually a means to offer additional information and connections to documents outside of the lesson with the exception of the Help feature hyperlink or email address hypertexts, the 249 hyperlink interactives in the seven lessons also were used to display examples and academic origin sources. Percentages of hyperlinks per pages ranged from 7% to 208% (54% median). As seen in Table

3, more than half of the lessons incorporated a large number of hyperlinks (i.e., Introduction to Quality Improvement in Public Health, Fundamentals of Kansas Public Health: Overview of the Kansas System, New Employment Orientation, and Harassment Prevention Training).

Table 3

Stimulus Multimedia and Hyperlinks (Event 4) Evidence in Seven Lessons

Lesson	#Slides	Images	Video	Audio	Data	Hyperlinks
1	42	17	0	0	1	3
2	40	17	0	0	0	4
3	23	1	0	0	3	48
4	116	3	2	0	8	74
5	106	42	3	9	11	89
6	68	20	0	0	0	36
7	52	17	0	0	2	4

Note. Data denotes data visualizations.

Provide guidance (Event 5). The goal of this event is to give learners' instructional support that may be needed to organize and connect their new information with similar stored information (Menenti, Petersson, & Hagoort, 2012). This event can be expressed as examples (Ratliff, Masen, Sullivan, Fleming, & Carney, 2012); analogies and metaphors (Dalto, 2012); case studies (Cheung, 2016; Mei, Ramli, & Ajhirtani, 2015); pop-up explanations (Brooks, 2021); mnemonic devices (Cheung, 2016); and other support. Five lessons did not contain any lesson guidance. New Employee Orientation and Fundamentals of Kansas Public Health for Overview of the Kansas System, did with 10 offered examples. The first contained three

examples, each of which was a hyperlink for an external document or website. The second lesson had seven examples to further explain general principles. Each example was a resource entity. For instance, to elaborate about a public health's mission to enforce laws that protect public health safety, the lesson displayed a hyperlink for a state advocacy organization. Fundamentals of Kansas Public Health for Overview of the Kansas System also included 18 click-to-see definitions and a short summary at one of the 10 section's endings.

Elicit performance (Event 6). Applying newly acquired knowledge in practice opportunities allows learners to access and reinforce encoding. Performance practice without penalties can be done with quiz questions (Bonner, 1982; Brooks, 2021) and decision-making scenarios (Al-Shammari, Elgazzar, & Nouby, 2015).

Table 4

Event 6 Performance Elicitation Quiz Activities

Lesson	MC	T-F	Y-N	Other	Total
1	4	3	2	9	18
2	3	4	1	0	8
3	2	0	0	0	2
4	4	0	0	1	5
5	18	31	0	0	49
6	1	3	12	0	16
7	6	4	0	0	10

Note: MC (multiple choice question), T-F (true-false question), Y-N (yes-no question)

All the lessons elicited performance with a total of 108 performance activities with 38 multiple choice and 60 alternative response review questions spaced fairly evenly throughout the lesson. Of those lessons, Employee FMLA Overview also incorporated drag-and-drops and a sequencing activity, and Fundamentals of Kansas Public Health for Overview of the Kansas System had a prompt to write a communications plan.

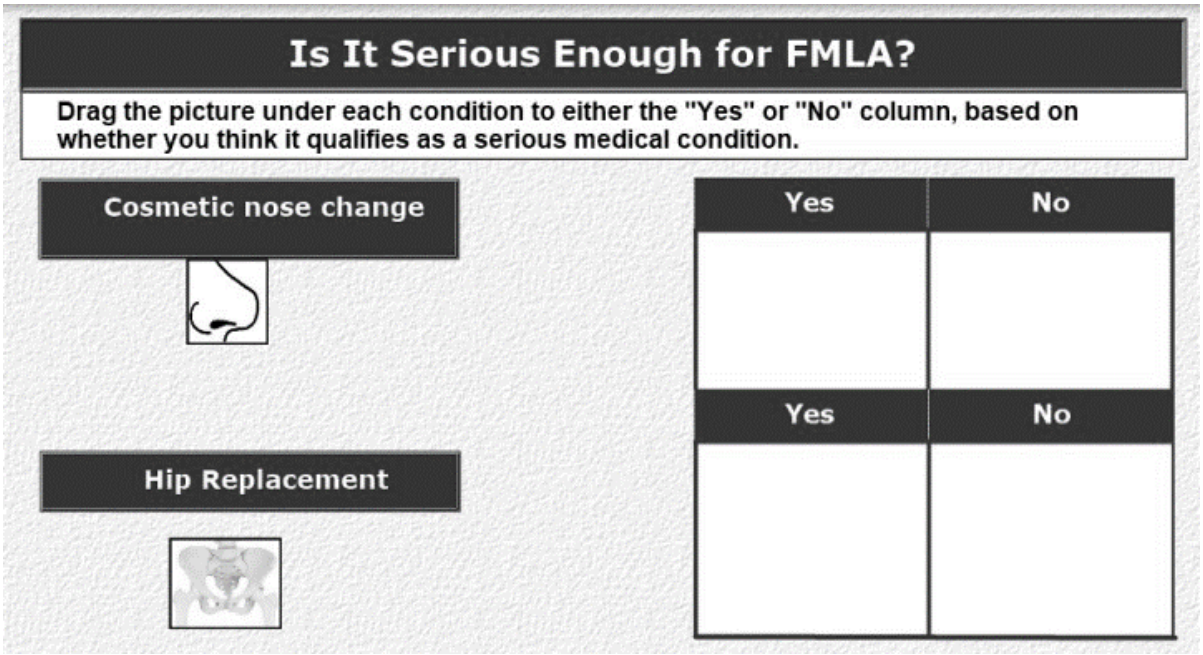


Figure 6. Drag-and-drop example from employee FMLA Overview lesson.

Two lessons, Respecting Others and New Employment Orientation, had "reviews" at the lesson closures that could be considered performance assessments. Yet these two reviews were internal to the lesson rather than external post-assessments, did not count toward a final score, and did not have a score penalty (non-completion of lesson), which positions the reviews as knowledge check performance activities rather than assessments (Anderson, 2015).

Provide feedback (Event 7). Reinforcement of learning occurs in Event 7 when performance activities receive corrections or evaluations. Additional layers to corrective feedback that inform learners of accuracy are informative feedback and analytical feedback, which provide suggestions to assure more accuracy (Gagné, Briggs, & Wager, 1992). With the exception of two checklists and a communication plan, the performance activities (Event 6) in all lessons had immediate, corrective feedback.

Assess performance (Event 8). Assessments indicate whether intended knowledge has been mastered and is best measured several times to ensure learners know answers and are not guessing (Gagné, Briggs, & Wager, 1988). Three lessons (Fair Labor Standards Act, Employee FMLA Overview, and Online Harassment Prevention Training) did not incorporate assessments. One (Respecting Others) had an assessment that also could be considered eliciting performance (Event 6), but it concluded the lesson and was stated as necessary to complete for lesson certification. At the other two lessons' closures, learners had to exit the lesson and click "post-assessment" to begin testing. One of these post-assessments had six test items, and the other had 12 test items matching the lesson pre-assessment test items.

Enhance retention and transfer (Event 9). Slated at lesson completion, Event 9 has two separate components: (1) cementing the lesson knowledge in memory (retention) and (2) using the lesson knowledge in different contexts at spaced intervals to generalize the acquired knowledge (transfer). Researchers and practitioners have interpreted the first component in combinations of key lesson point summaries, "what-if scenarios," and other means that solidify knowledge of lesson information (Baba, Sale, & Zirra, 2017; Ratliff, Masen, Sullivan, Fleming, & Carney, 2012; Woo, 2016). In the second component, demonstration of the lesson knowledge

in different contexts can be enabled with job aids and further learning opportunities (LaMotte, 2015; Peck, 2020; Penfold, 2016). The lessons did not contain any evidence of either component at lesson completion. Although the Nine Events places this event at lesson completion, Driscoll (2005) as well as Zhu and St. Amant (2010) have written that practice activities throughout a lesson can be construed as enhancing retention (Event 9). This study viewed practice activities only as Event 6 but recognized that practice does bolster Event 9.

Overall Event Use and Non-Use

Analysis answered the research question regarding the extent of which Gagné's Nine Events of Instruction were incorporated by the study population. It also revealed how the subject matter experts exemplified these events. Analysis findings also showed which events the study population used and did not use (with the exclusion of stimulus material, Event 4), as discussed in the following.

Use of objectives (Event 2) and use of eliciting performance (Events 6 and 8) with accompanying corrective feedback (Event 7). Five of the seven lessons used objectives and all of the lessons elicited performance accompanied by feedback. Stated objectives in lessons ranged from three to six objectives, with four the median number of objectives. A total of seven action verbs prefaced the objectives. Four (*identify, define, list, describe*) were examples of the initial "remember" level of Bloom's Taxonomy, and three (*explain, summarize, demonstrate*) exemplified the higher level of "understand" that has four levels above it (Anderson & Krathwohl, 2001). For example, one lesson stated learners at lesson completion would be able to:

- Define quality improvement

- Identify the role quality improvement plays in public health
- Explain the Plan-Do-Check-Act (PDCA) cycle

As for testing, although Lectora offers 12 different question types such as matching and hot spots, subject matter experts primarily used multiple choice and alternate choice questions to gauge acquired knowledge. No performance activities offered "second attempt" feedback that directs learners toward the right answer but does not provide it. Question responses generated immediate, corrective feedback. A few also gave informative feedback evidenced in these examples:

> Absolutely! No matter the individual size of an agency or any field offices, the State of Kansas in and of itself is regarded as one employer.

> The answer is Yes. He would be eligible. As long as he maintained continual state employment, he would meet the 12 months criteria. As long as he actually worked 1250 hours in those previous 12 months with the state, that fulfills his eligibility.

However, lessons with assessments (Introduction to Quality Improvement in Public Health and Fundamentals of Kansas Public Health for Overview of the Kansas System) that took place through the learning management system assessment feature at lesson completion offered only scores but did not individual answer feedback. Learner online comments expressed irritation with the lack of feedback. One wrote:

> You know I really wanted to ace the assessment. It is difficult to know where you went wrong when you don't even know the question you missed.

Non-use of open and closing activities to facilitate learning, non-stimulation of prior learning recall, and minimal use of learner guidance provision. Subject matter experts did not use initial attention-getting (Event 1) in any lesson except for the pre-assessment already mentioned, which diminishes the learning facilitation of subsequent events. Although their opening matter differed, the lessons began with title pages displaying the lesson title in 18-24 points in the same color and font as the remaining lesson, had the same background as the remainder slides, and did not contain images. Navigation directions that explained arrow buttons, expected completion time, and exit-re-entry navigation immediately followed the title pages and, with those that had them, objectives without any abrupt changes or attraction techniques to attain learner interest. Fundamentals of Kansas Public Health for Overview of the Kansas System featured three slides of acknowledgments, and four lessons had a one-slide, abbreviated introduction, including this example:

> As an employee, it is your responsibility to ensure you accurately record time worked and leave taken on your timesheet. This training will help you understand how time should be recorded to comply with FLSA.

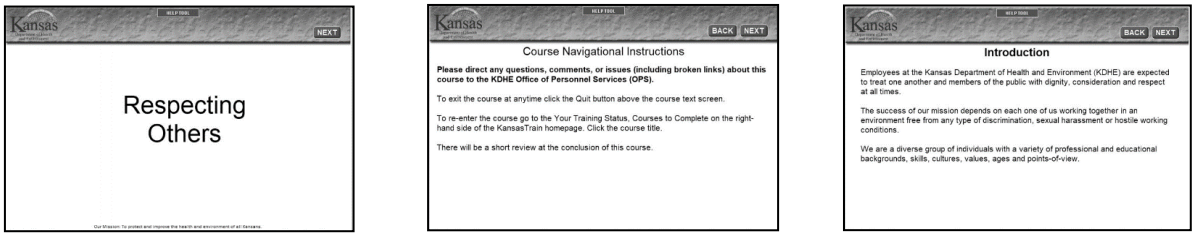


Figure 7. Typical front matter in study lessons.

Besides lacking an abrupt stimulus change (Event 1) in the opening, subject matter experts did not enhance retention in any way (Event 9). Retention, which could have been done

with a summary of lesson points (Al-Shalabi, Andraws, Alrabea, & Kumar, 2012; Jaiswal, 2020; Ratliff et al., 2012; Woo, 2016), was not done in concluding slides. Nor was summarization done anywhere else except in one lesson section of Fundamentals of Kansas Public Health for Overview of the Kansas System and also not in non-text formats such as infographics (Colman, 2020); flowcharts (Omer, 2019); checklists (G-Cube, 2017; Penfold, 2016); or other symbolic representations of information using visualization techniques (Penfold, 2016). A possible transfer aspect could have been argued for the few lessons that made additional resources available throughout the lesson with hyperlinks. However, hyperlinks introduced new information rather than cemented what was learned and were offered at the lesson completions. In fact, transfer might be unrealistic in online slideware lessons because transfer consists of reviewing and applying the lesson content multiple times at different intervals and these lessons were one-time learning experiences not designed to be continued.

Non-use also applied to the non-stimulation of prerequisite learning (Event 3). Although these were stand-alone, one-time lessons, the lessons were offered in a training package. So, not only was a reference to another of these lessons absent, but also lacking were questions about learners' personal experiences, pre-tests, or other previous learning (Event 3).

Although evident in two lessons, guidance (Event 5) was minimal. This lack of support for scaffolding could have related to the inclusion of online lesson orientation and interface navigation instructions. Subject matter experts new to online learning may have been fixated on these instructions at the expense of lesson comprehension guidance.

Summary

This chapter deduced the extent of the Nine Events and highlighted use examples in seven online slideware lessons constructed by various subject matter experts in the workplace. Qualitative content analysis results indicated that subject matter experts incorporated about half of the Nine Events possible and in different event combinations. Besides Event 4, analysis revealed subject matter experts' significant use of objectives (Event 2), performance elicitation (Event 6), feedback (Event 7), and hyperlinks for second-level lesson content in stimulus material (Event 4), guidance (Event 5), and retention and transfer (Event 9). Also evident was the non-use of opening and ending activities to facilitate learning (Event 1 and Event 9) as well as non-stimulation of prior prerequisite learning (Event 3) and minimal use of guidance (Event 5). Interpretation of these findings and recommendations for future research are presented in Chapter 5.

Chapter 5

Interpretation and Recommendations

Study Summary

This chapter concludes the dissertation. The section begins with the problem overview and is followed by the purpose statement and research question. Next, the research methodology is reviewed. Study findings subsequently are discussed and interpreted with implications for professional practices. The chapter ends with a discussion of future research recommendations.

Problem overview. Advances in authoring tools have resulted in workplaces enlisting their subject matter experts to construct online slideware lessons for employee training (Huettner, 2010; Spiro, 2019). These subject matter experts lacking instructional design expertise, "a cognitively complex skill that takes many years to master" (Gettman, McNelly, & Muraida, 1999, p. 176), often transfer an in-person slide lesson to an online slideware lesson with few modifications (Jarvis, 1995; Sennett and Vasquez, 2020); reel off continual facts (Fisk, 2019; James, 2020); and assume learners automatically store the information on slides in their memories (Reddy, 1979). The resulting information presentations could better facilitate learning if subject matter experts incorporated an instructional strategy (Johnson, 2019). Researchers have endorsed Gagné's Nine Events of Instruction strategy in academic settings, but its use by workplace subject matter experts remains unexplored.

Purpose statement and research question. The purpose of this study was to examine the instructional strategy intervention of Gagné's Nine Events of Instruction that can be introduced in a lesson design training for subject matter experts who lack instructional design expertise but are tasked with constructing online slideware lessons. To better tailor training of

the instructional strategy for the intended audience, the study identified the extent to which online, asynchronous slideware lessons designed and developed by workplace subject matter experts included Gagné's Nine Events of Instruction. At the core of this study's systematic investigation was Research Question #1: To what extent does the slideware instruction by workplace subject matter experts at a state health and environment department include Gagné's Nine Events of Instruction?

Methodology review. The Conditions of Learning Theory's Nine Events of Instruction served as the study's theoretical framework. A qualitative design guided analysis of the archival data that incorporated data choice, sorting, and comparison. The Nine Events Interpretation Checklist was developed by the researcher from publication review to analyze the 447 slides in seven, purposively-selected online slideware lessons constructed by workplace subject matter experts. Evidence of individual event existence from each of the seven lessons was organized and analyzed into groupings characterized by similarity. Emerging results, determinations with support, and rival explanations were recorded and then examined with findings from the lesson analysis and existing literature before making conclusions. A consistent, corroborative process contributed to the study's reliability and trustworthiness.

Major findings. Study results found workplace subject matter experts incorporated the Nine Events to a lesser extent than possible and only some events rather than all the events in online slideware lessons. Besides the stimulus material, which by definition is instruction itself, the most-used event was the non-penalized practice opportunity (Event 6) accompanied by corrective feedback (Event 7). Subject matter experts incorporated assessment to a slightly lesser extent than practice opportunity and to the same extent as objectives (Event 2) with both

appearing in more than half of the lessons. Examination showed while all lessons contained the stimulus material (Event 4) except for one Event 1 pre-assessment the lessons did not have evidence of opening and ending events that facilitate learning (Event 1 and Event 9). Also non-existent was stimulation of prior prerequisite learning (Event 3). An emerging theme was the use of hyperlinks in all lessons and preponderance in more than half of the lessons, especially to add further information to the stimulus material (Event 4) along with guidance (Event 5) and content retention purposes (Event 9).

Findings Related to the Literature

Subject matter experts used events as prescribed without the deviations Gagné and his associates considered permissible. Specifically, unlike the case study of Ratliff et al. (2012) in which one event also served as another, events found in subject matter experts' lessons in this study did not overlap nor consolidate events. In addition, although Gagné wrote the Nine Events did not have to appear sequentially or could be sequenced differently (Gagné, Briggs, & Wager, 1988), events present in all seven lessons followed each other in prescribed order, therefore, built on each other to mold incoming information into knowledge during cognitive processing (O'Byrne, Patry, & Carnegie, 2008; Driscoll, 2000). Lastly, although physical interaction events were possible with the authoring tool and online environment, with the exceptions of hyperlinks, instant feedback, and one lessons' drag-and-drop answers and sequencing, events were not interpreted technologically as Deubel (2003) and Theng and Mai (2009) have suggested could and should be. After examination of event existence in each of the seven lessons, the following event usages surfaced that warranted further interpretation.

Use of objectives (Event 2) and eliciting and assessing performance (Events 6 and 8) with accompanying corrective feedback (Event 7). Gauging the extent of events' use involves examining how they were used and also why they may be present. Several subject matter experts did list objectives that explained what learners would know at lesson completion per the definition of Gagné, Briggs, & Wager (1988) with only a few exceptions (e.g., "Demonstrate workplace diversity and inclusiveness," which alludes to non-measurable behavior after the lesson and needs an observer). It is questionable if any of these outcomes related to learner interest, the requisite of Gagné & Driscoll (1988). Question is warranted because the subject matter experts produced the same type of bullet point objective slides Clark (2020) claimed Nine Step adherents tend to do—"a behaviourist approach at odds with what we know about motivation, engagement and attention"—more for the designer's plan than learners. Workplaces teach would-be instructors to list objectives in bullet points (Kuhlmann, 2014), so the study's subject matter experts may have been told to list objectives, had learned to include objectives in any project, or emulated others' online slideware lessons. Moreover, as a health organization with many positions dependent on grant awards, the subject matter expert employees may be accustomed to listing objectives in funding requests.

Also prevalent, the non-penalized knowledge practices, which Martin, Klein, and Sullivan (2007) found to be the most crucial event for performance improvement, may relate to the authoring tool's knowledge question insertion features. Because the authoring tool's knowledge items require corrective feedback insertion, Event 7 (provide feedback) appears with the practice and assessment events (Event 6 and Event 8). This concurrence supports the suggestion by Antonacci (2003) to consolidate the two events of performance elicitation and

feedback provision (Event 6 and Event 7). Hannon et al. (2002) also combined those two events in their online lesson recommendations as did Wager (1978) who added learning guidance for a three-part combination.

Performance assessments (Event 8) in this study's results might be construed as non-use or partial use by Gagné adherents. They would disagree with the lessons' post-assessment as fulfilling Event 8 because Gagné's optimal performance assessment requires measurement several times in varying ways to make sure of learned capability (i.e., learners' responses are not guesses or memorized answers). Post-assessments in these lessons might categorize several lessons as the "shovelware" discussed in Chapter 2 because the lessons consisted of stimulus material of slides followed by a post-test (Event 8) and non-use of other events (Martinez, 2017; Veletsianos, Kimmons, & French, 2013).

Non-use of open and closing activities to facilitate learning (Events 1 and 9). Gauging events' use also means trying to understand why subject matter experts did not use events and what they did instead. The subject matter experts' familiarity with lecture and publication structuring may have caused them to focus on front matter (i.e., slides for title, navigation instruction, purpose, content listing, acknowledgments, objectives) rather than "art in the start" (Smith, 2015); "BOOM!"; (DeBell, n.d.), or other engagement (Blakely, 2015; Conceicao, 2006; Conrad, 2004; Cuevas, 2019; Rimmer, 2017; Saroyan, 1993). Their missed opportunity to get attention also supports research that states non-instructional designers lack skills in writing, media development, and graphic production that professional instructional designers have (Martin & Ritzhaupt, 2020; Munzenmaier, 2014; Newberry & Logofatu, 2008; Oblinger & Hawkins, 2006); Pic, 2012) and may not know how to accentuate information.

They also may not realize learners tend to click through slideware in 10 seconds or less unless engaged (DiGiovanna, 2017) and the other stimuli competing for learners' attention besides the onscreen lesson.

The lessons' ending also revealed the missed opportunity of enhancing knowledge retention and transferring it to the workplace (Event 9). Summaries, recommended by Gagné, Briggs, & Wager (1988), that capitalize on the recency effect—the likelihood of remembering the information learned last (Murre & Dros, 2015)—were not done at lesson completion. Sweeters (1994) and Clark (2015) would have advocated for summaries throughout the lesson at spaced intervals along with practice to improve retention. Their suggestion addresses complaints of slideware delivering information barrages that overload learners' processing capabilities (Fisk, 2019; James, 2020; Shank & Sietz, 2004) and agrees with the recommendation of Driscoll (2005) to build in elements such as activities to apply acquired knowledge that enhance retention throughout instruction.

Lack of transfer, the second part of Event 9, could be expected because of the event's difficulty to achieve (Bonner, 1982; Brooks, 2021). One reason is that transfer ideally takes place at spaced intervals after a lesson concludes (Gagné, Briggs, & Wager, 1988; Gagné & Driscoll, 1988; & Gagné, Wager, Golas, & Keller, 2005). Online slideware lessons are self-contained sessions with finite time allotments, and the learning process beyond an online lesson is not controlled by the subject matter experts constructing the online slideware. Nor are the subject matter experts likely to be having repeated interactions with the lesson audience after lesson completion. Hence, retention and transfer of the new knowledge requires long-term

observation of learners and assessment, which makes transfer evidence absent in these short, self-contained, asynchronous online lessons (McNeill & Fitch, 2022).

Four of the seven lessons, including one lesson that listed 16 online tools, resources, and supports, had hyperlinked resources considered by some to be an Event 9 expression when used at lesson completion (Colman, 2020; Peck, 2020; LaMotte, 2016) and as an added tenth event by Mohamed (2012). However, as stated earlier, these hyperlinks added new information rather than ways to apply the knowledge learned in the lesson, and the adult workplace audience is unlikely to delve into the hyperlinked extra information when their focus is on completion and possible post-assessment (McIntyre, 2020). Even if they did, once again, these lessons were one-time learning experiences not designed to be continued and the acquired knowledge can be forgotten over time unless reviewed and reinforced. In fact, the Ebbinghaus' Forgetting Curve, produced in the nineteenth century and affirmed by research (Murre & Dross, 2015), has projected up to 90% of new knowledge can be forgotten in 30 days, a finding that underlines the need for spaced interval learning for successful learning and also invalidates the use of hyperlinked resources to interpret Event 9 in online slideware lessons.

Non-stimulation of prior prerequisite learning (Event 3). On a superficial level, non-inclusion of recall makes sense when the study lessons were stand-alone sessions that did not connect to each other or any other lessons. Still, prior learning recall (Event 3) could have been incorporated by one or more questions about the learners' personal experiences, understanding, or observations related to the topic (Baba, Sale, & Zirra, 2017; Wong, 2018; Woo, 2016). Learners also could have been asked what they expect might happen or for opinions after reading an example to encourage learners' interest in the topic (Sajid & Shaikh, 2015). The presumption

that adult learners lack pre-existing knowledge or that their experience and prior knowledge is irrelevant was one that Knowles (1980) cautioned against when designing instruction for adults and a research finding that subject matter experts might not be aware because of their lack of instructional knowledge (Choi & Park, 2006; Davidson-Shivers, Salazar, & Hamilton, 2005; Farkas, 2006; Kebritchi, Mansureh, Lipschuetz, & Santiague, 2017; Khali & Elkhider, 2015; Lechner, Zavaleta, & Shinde, 2017; Lee, 1994; Levinson, 2010; Noushad & Khurshid, 2019); Pedersen, 2005; Perrin, 2004; Williams, 2001; Young, 2004). In his audio podcast study, Jeong (2019) also found less use of recall stimulation in comparison to the other events and also of guidance (Event 5), which he attributed to learner knowledge that they could return to the podcasts at any time so did not need these two events for long-term memory and recall. His stance prompts the question: How likely do learners return to a digital lesson?

Minimal use of learner guidance provision (Event 5). Guidance, which makes the "stimulus as meaningful as possible" (Khadjooi, Rostrami, & Ishaq, 2011, p. 118) for information encoding, might not have been thought of because the subject matter experts expected learners to absorb the transmitted knowledge without any extra effort on the learners' or instructor's part (Saunders & Wong, 2020). However, exposure to stimulus materials is not generally sufficient for learning to because learners need assistance that leads their thoughts in the proper direction (Gagné et al., 1992).

When subject matter experts did think of learner support, their attention went to hyperlink insertion for additional information. Three lessons contained three or four hyperlinks termed "linear" by Oliver, Herrington, and Omari (2000) and in keeping with the nature of the linear lessons provided facts for initial knowledge. However, the other four lessons—Introduction to

Quality Improvement in Public Health (48 hyperlinks for 23 slides), Fundamentals of Kansas Public Health: Overview of the Kansas System (74 hyperlinks for 116 slides), New Employment Orientation (80 hyperlinks for 106 slides), and Harassment Prevention Training (36 hyperlinks for 68 slides) provided an over-excessive bounty of hyperlinks more suited for exploration and a readiness to learn more (Jonassen, Mayes, & McAleese, 1993) than effective learning in a timely fashion. In other instances, hyperlinks provided learners with information for use in the foreseeable future (i.e., to enhance retention and transfer, Event 9) even though these lessons were not intended to be resource repositories viewed after lesson completion, and, in two lessons, provided guidance (Event 5) in the form of examples. Thus, subject matter experts showed a tendency to rely on hyperlinks for second-level lesson content in stimulus material (Event 4), guidance (Event 5), and retention and transfer (Event 9). To avoid layers of information that can distract learners from lesson completion, Wilson (2016) suggested incorporating the information from the hyperlink into the lesson or placing additional learning hyperlinks at the lesson end. Another practitioner's suggestion was to question the hyperlink's need for the learner. Vasmane (2020) cautioned any designer to consider if the hyperlink resource was to be seen immediately, printed, or downloaded. The answer can help guide hyperlink placement within the lesson or elsewhere. Hogle (2016) noted that online content of any type introduces the need to continually update hyperlinks that may no longer function because of content renaming, move, or deletion. These broken links can be problematic if the subject matter expert's lesson involvement ends when online lesson is published, and a link monitoring system is not in place. A further downside to excessive hyperlinks is the difficulty

they present to screen readers that causes navigation difficulties (Bureau of Internet Accessibility, 2022).

In addition to hyperlinks as a possible attempt to provide guidance, subject matter experts supplied an individual's contact information at the lesson completion for questions that may have been construed as learner support, which it is but still is not guidance. Another possibility is that subject matter experts followed recommendations that have equated Event 5 with technical advice such as orientation or navigation instructions (Deubel, 2003) as one online practitioner did when listing Event 5 recommendations:

> Write clear and concise instructions.
>
> Provide an accessible 'next' button for online learning experiences.
>
> Include tips on how best to navigate the course (DeBell, n.d.).

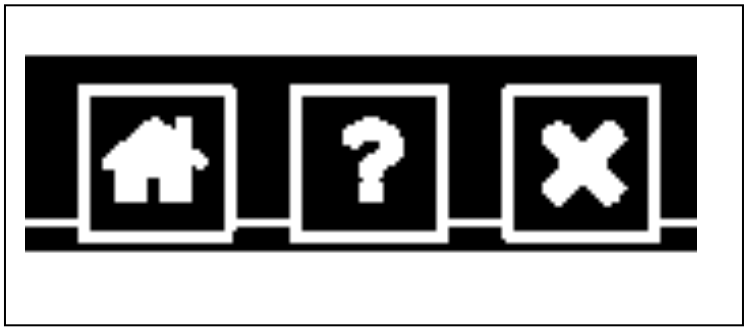


Figure 8. Help function commonly embedded on lesson templates.

Conclusion

Authoring tools continue to evolve and enable subject matter experts easily to develop online training. As a prelude to recommending a possible instructional strategy for subject matter experts lacking instructional design expertise but tasked with constructing online

slideware lessons, this study examined the use of Gagné's Nine Events of Instruction and its non-use in online slideware lessons. The study's findings have implications for the instruction of subject matter experts cast in the designer role for future research. This section suggests specific actions regarding practice and research before offering final words.

Implications for action. When promoting the Nine Events as an instructional strategy in subject matter expert training, it may be advantageous to first discuss with the target audience how learning is a step-by-step experience and more than merely reading slides of information. Three approaches then may be considered to introduce this instructional strategy. One is to discuss each event sequentially and how each event maximizes learning. Emphasis can be given to event examples for the opening and closing of lessons (Event 1 and Event 9) because this study found these absent in lessons, and information presented at the beginning and at the end of a lesson is more easily remembered than information in the middle as demonstrated in primacy and recency effect studies (Atkinson & Shiffrin, 1968; Murdock, 1962; Webster, Richter, & Kruglanski, 1996). At lessons' ends, at minimum, focus could be on enhancing retention with a summary of key points. Recognizing the unlikelihood of learners saving or exploring resources while focused on clicking each slide for lesson completion and also the unlikelihood of revisiting the lesson in the online learning management system, knowledge transfer could be enabled by additional varied practice within the lesson and emailing learners resources along with the summary of key points upon lesson completion. Because subject matter experts already may employ objectives and feedback in lessons, suggestions might elevate the usage of both (e.g., offer informative feedback in addition to corrective feedback). Elaboration in the case of guidance (Event 5) may be necessary. Guidance suggestions could be to anticipate questions

that might be asked and have answers ready for learner support, feature examples, indicate the most crucial information, have a glossary available at any time during the lesson, and state contact availability for any content lesson questions.

A second approach is to consolidate some events to shorten the Nine Events, thus, make them less daunting to subject matter experts who have other job tasks besides designing online slideware lessons. For instance, rather than offering bulleted objectives (Event 2), present objectives as learner benefits with real-world examples or questions that also gain attention (Event 1) or in a way that explains what is to be learned in the lesson and reminds them what they already should know (Events 1, 2, and 3; Brooks, 2021). A pre-assessment, too, can gain learners' attention and be an opportunity to recall (Event 3), a guidance alert for important information (Event 5), and a measurement of a learner's knowledge gain in comparison to a final assessment (Event 9. Another consolidation is to present a study guide at the lesson beginning to gain attention (Event 1) and provide guidance throughout the lesson (Event 5).

The third approach is to create a lesson template that incorporates the Nine Events with placeholder slides. This template might include:

- Title slide with visual elements such as larger type, illustration, and color to gain attention (Event 1)
- Navigation and instructions slide
- Objectives slide written as learner benefits (Event 2)
- Question slide connecting pre-existing knowledge to lesson topic (Event 3)
- Re-occurring slide pattern of summary of key points to segue into next section (Event 3); content (Event 4); knowledge check with feedback (Event 5 and Event 6); and tips and examples (Event 7)
- [If within the lesson] Assessment slides based on objectives (Event 8)
- Summary and suggested articles, additional lessons, job aids, etc. (Event 9) [This also can follow Event 8 if assessment takes place in a learning management system]
- Exit instructions

Recommendations for future research. The scope of this study could be broadened by examining additional online slideware lessons constructed by subject matter experts in other workplaces for Nine Events evidence and by surveying workplace subject matter experts' attitudes toward using the Nine Events. Individual events in online slideware lessons can be examined for various measures, for example, the quantity or the effectiveness of online reference resources as a retention and transfer usage (Event 9). Exploration of the Nine Events' technical examples such as hyperlinks and their reasons for use or non-use in an online slideware lesson has research potential. Physical interactions (e.g., click, hover, drag, scroll, or swipe), too, can further expand the instructional potential of online slideware lessons when used as events.

Proposed as a prescription for online slideware lesson construction, the Nine Events could be studied to revise existing slideware lessons constructed by workplace subject matter experts and the resulting learner satisfaction, engagement, or content mastery after revised lesson completion.

Final remarks. While research has supported this time-tested methodology for successful instruction (Martin, Klein, & Sullivan, 2007; Reiser, 2002), use of the Nine Events is not a guarantee of desired learning outcomes. Instruction has multiple influences that cannot be controlled by instructors, and learners have to be motivated, put forth effort, and have inherent abilities for instructional success (Foshay, Silber, & Stelnicki, 2003; Molenda and Russell, 2006). Design, too, of any type is a difficult skill to learn, and historically learned in years of education and practical experience. Today workplace subject matter experts asked to construct online slideware have other job duties besides the occasional, tacked-on responsibility of constructing online lessons and varying instructional knowledge and design skill levels. Their lack of design expertise, coupled with researchers' long-recognized need for slideware to be structured in a way that resonates with learners' cognitive processes (Garrison, 2007; Moore, 1989; Song, Singleton, Hill, & Koh, 2004), remains a workplace instructional issue that may be solved with the Nine Events, a viable solution encapsulating instructional research in a concise formula that optimizes learning. This study showed workplace subject matter experts already are using several events that can be improved and also could add events to make sure they are offering instruction and not merely information presentations. Further research of the Gagné's nine instructional events as an instructional formula for subject matter experts who lack instructional design expertise but are

tasked with constructing online slideware lessons shows promise for more intentional design and more impactful training in the workplace.

References

Adriaans, P. (2020). Information. In Edward N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy.* Retrieved from https://plato.stanford.edu/archives/fall2020/entries/information/

Agas, D. (2020). How to switch to an employee-generated learning mindset. Retrieved from https://www.easygenerator.com/en/blog/employee-generated-learning/how-to-switch-to-an-employee-generated-learning-mindset/

Al-Eraky, M. M. (2012, May). Last page. *Academic Medicine, 87*(5), 677.

Ali, A., Ali, Z., Yousafzai, Y., & Oien, K. (2017). Teaching microscopy effectively through a combine Peyton's Four-Step Approach and Gagné's instructional model. *Pakistan Armed vmj,kkForces Medical Journal, 67*(6), 1030–1037.

Al-Shalabi, H., Andraws, S., Alrabea, A. A., & Kumar, A. V. S. (2012). V Model of e-learning using Gagné's nine steps of education. *Journal of Software Engineering and Applications, 5*(11), 850–854. https://doi: 10.4236/jsea.2012.511098.

Al-Shammari, S. K. S., Elgazzar, A. E., & Nouby, A. M. (2015). Designing an E-game program in mathematics for 5th grade Saudi female pupils: Does Gagné's theory have any effectiveness in developing their achievement of mathematics? *Open Journal of Social Sciences, 3,* 40–48.

Amare, N. (2006). To slideware or not to slideware: Students' experiences with PowerPoint vs. lecture. *Journal of Technical Writing and Communication, 36*(3), 297–308.

Amernic, J., & Craig, R. (2004). Reform of accounting education in the post-Enron era: Moving accounting 'out of the shadows.' *Abacus, 40*(3), 342–378.

Anderson, D. (2015). Basic elements of an e-learning course. Retrieved from https://community.articulate.com/series/getting-started/articles/basic-elements-of-an-e-learning-course

Anderson, L.W., & Krathwohl, D. R. (2001). *A taxonomy for teaching, learning, and assessing: A revision of Bloom's taxonomy of educational objectives.* New York, NY: Longman.

Antonacci, D. (2003, November 4–7). Effective teaching with PowerPoint: A learning theory approach. Southwest Regional Educause Conference, Anaheim, California. https://slideplayer.com/slide/2323329/

Arghode, V., Briefer, E. W., & McLean, G. N. (2017). Adult learning theories: Implications for online instruction. *European Journal of Training and Development, 41*(7), 593–609.

Arshavskiy, M. (2016, December 28). How Gagné's Nine Events of Instruction can make your online courses better. Retrieved from https://www.coursearc.com/how-gagnes-nine-events-of-instruction-can-make-your-online-courses-better/

Articulate Global, Inc. (2015). *The essential guide to working with subject matter experts.* [Electronic book]. https://community.articulate.com/e-books/the-essential-guide-to-working-with-subject-matter-experts

Atkinson, R. C., & Shiffrin, R. M. (1968). Human memory: A proposed system and its control processes. In Spence, K. W., & Spence, J. T. *The psychology of learning and motivation* (Volume 2, pp. 89–195). New York, NY: Academic Press.

Baba, J., Sale, P., & Zirra, B. (2017). Applying Gagné's Nine Events in designing a multimedia programme for teaching elements and principles of design in secondary school. *Art and Design Studies, 54,* 1–8.

Bartlett, K. R. (2003, Summer). Accidental trainers versus HRD professionals. *Human Resource Development Quarterly, 14*(2), 231–234.

Beattie, R. (2006). Line managers and workplace learning: Learning from the voluntary sector. *Human Resource Development International, 9,* 99–119.

Becker, K. (2005, June 16–20). How are games educational? Learning Theories Embodied in Games. Proceedings of the 2005 DiGRA International Conference: Changing Views: Worlds in Play, Vancouver, B.C. https://hdl.handle.net/1880/46704

Bedwell, W. L., & Salas, E. (2010). Computer-based training: capitalizing on lessons learned. *International Journal on Training Development, 14,* 239–249.

Belfield, J. (2000). Using Gagné's theory to teach chest X-ray interpretation. *Clinical Teacher, 7*(1), 5–8.

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis, *Nursing Plus Open, 2*, 8–14.

Berk, R. A. (2011). Research on PowerPoint®: From basic features to multimedia. *International Journal of Technology in Teaching and Learning*, *7*(1), 24–35.

Bidwell, J. K. (1971). Some consequences of learning theory applied to division of fractions. *School Science and Mathematics, 71*(5), 426–434.

Biegelman, M. T. (2008). *Building a world-class compliance program: Best practices and strategies for success.* Hoboken, NJ: John Wiley & Sons.

Birch, D., & Burnett, B. (2009). Bringing academics on board: Encouraging institution-wide diffusion of e-learning environments. *Australasian Journal of Educational Technology, 25*(1), 117–134.

Blakely, D. (2015, September 30). 3 challenges faced by subject matter experts creating e-learning. Retrieved from https://www.litmos.com/blog/instructional-design/3-challenges-faced-by-subject-matter-experts-creating-e-learning

Bligh, D. A. (2000). *What's the use of lectures?* San Francisco, CA: Jossey-Bass.

Bloomberg, L. D., & Volpe, M. (2019). *Completing your qualitative dissertation: A road map from beginning to end* (4th ed.). Thousand Oaks, CA: SAGE Publications.

Boehle, S. (2007, April 3). Solutions to entice subject matter experts to deliver training at your organization." *Training Magazine, 3,* 30.

Bonner, J. (1982). Systematic lesson design for adult learners. *Journal of Instructional Development, 6(1),* 34–42.

Boogaard, K. (2022). 9 instructional design principles to optimize your learning initiatives. Retrieved from https://www.goskills.com/Resources/Instructional-design-principles

Brandon, B. (2020, January 16). The instructional development team: Subject matter experts. Retrieved from https://learningsolutionsmag.com/articles/the-instructional-development-team-subject-matter-experts

Brandt, B. F., Quake-Rapp, C., Shanedling, J., Spannaus-Martin, D., & Martin, P. (2010). Blended learning: Emerging best practices in allied health workforce. *Development Journal of Allied Health, 39*(4), 167–172.

Brinthaupt, T., Fisher, L. S., Gardner, J. G., Raffo, D. M., & Woodward, J. (2011). What the best online teachers should do. *Journal of Online Learning and Teaching, 7*(4), 515–524.

Broadwell, M. M. (1987). *The lecture method of instruction educational technology.* Englewood Cliffs, NJ: Educational Technology.

Brooks, R. H. (2021, July). Transposing Gagné to the Online Realm Paper presented at 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference. https://peer.asee.org/37940

Brown, G., & Manogue, M. (2001). AMEE Medical Education Guide No 22: Refreshing lecturing: A guide for lecturers. *Medical Teacher, 23*(3), 231–244.

Brownfield, S., & Vik, G. (1983). Teaching basic skills with computer games. *Training and Development Journal, 37*(12), 52–56.

Bureau of Internet Accessibility. (2022, March 2). How many hyperlinks are too many for accessibility? Retrieved from https://www.boia.org/blog/how-many-hyperlinks-are-too-many-for-accessibility

Burk, J. E. (2001). Preparing the professoriate: Instructional design training for GTAs. *Journal of Graduate Teaching Assistant Development, 8*(1), 21–26.

Buscombe C. (2013). Using Gagné's theory to teach procedural skills. *Clinical Teacher, 10*(5), 302–307.

BusinessWire. (2020, March 19). Global corporate compliance training market 2020-2024: Growing popularity of mobile-based compliance training to boost market growth. Retrieved from https://www.businesswire.com/news/home/20200319005253/en/

Cheung, L. (2016). Using an instructional design model to teach medical procedures. *Medical Science Educator, 26,* 175–180. https://doi.org/10.1007/s40670-016-0228-9 20

Choi, H. J., & Park, J. (2006). Difficulties that a novice online instructor faced: A case study. *The Quarterly Review of Distance Education, 7*(3), 317–322.

Clark, D. (2006, September 20). Gagné's nine dull commandments. Retrieved from https://donaldclarkplanb.blogspot.com/2006/09/Gagnés-nine-dull-commandments.html

Clark, D. (2020, March 2). Gagné (1916–2002): Nine instructional steps but formulaic? Retrieved from https://donaldclarkplanb.blogspot.com/2020/03/Gagné-1916-2002-nine-instructional.html

Clark, R. C., & Mayer, R. E. (2011). *e-Learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning.* Hoboken, NJ: John Wiley & Sons.

Clark, R. C., & Mayer, R. E. (2016). *Learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning.* Hoboken, NJ. John Wiley & Sons.

Colman, H. (2020, March 12). Instructional design principles: Keys to authoring eLearning content. Retrieved from https://www.ispringsolutions.com/blog/instructional-design-principles

Combs, L. (2002). Current state of technology-enabled learning programs in selected federal government organizations: A case study of ten organizations (ED474223). Education Resources Information Center.

Comolli, S., & Prestera, G. E. (2007). Managing the unmanageable subject matter expert. *Learning Solutions eMagazine.* Retrieved from https://learningsolutionsmag.com/articles/194/managing-the-unmanageable-subject-matter-expert

Conceicao, S. (2006). Faculty lived experiences in the online environment. *Adult Education Quarterly, 57*(1), 26–45.

Connelly, J. O. (1994). Lesson design: Nine steps to knowledge. *Technical Communication, 41*(4), 766–774.

Conrad, D. (2004). University instructors' reflections on their first online teaching experience. *Journal of the Asynchronous Learning Network 8*(2), 31–44.

Cope, B., & Kalantzis, M. (2017). *e-Learning ecologies: Principles for new learning and assessment.* Boca Raton, FL: Taylor & Francis.

Corley, D. (n.d.). School Nursing Professional Learning: Section 001 [Department of Defense Education]. Retrieved from https://content.dodea.edu/teach_learn/ids/product_showcase/docs/ID_Best_Practices/Maximizing_Online_Learning_Exemplar.pdf

Creswell, J. W. & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed method approaches* (5th ed.). London: SAGE Publications.

Cuevas, R. F. (2019). *Course design formula: How to teach anything to anyone online.* Riverside, CA: Learn and Get Smarter, Inc.

Curry, J. H., Johnson, S., & Peacock, R. (2020). Robert Gagné and the systematic design of instruction. In J. K. McDonald & R. E. West (Eds.), *Design for learning: Principles, processes, and praxis*. London, UK: EdTech Books. Retrieved from https://edtechbooks.org/id/robert_gagn_and_systematic_design

Cyphert, D. (2004). The problem of PowerPoint: Visual aid or visual rhetoric? *Business Communication Quarterly, 67*(1), 80–84.

Dalto, J. (2012, November 15). Essential steps on the way to teaching something: Robert Gagné's Nine Events of Instruction. Retrieved from https://www.convergencetraining.com/blog/essential-steps-on-the-way-to-teaching-something-robert-gagnes-nine-events-of-instruction

Davidson-Shivers, G. V., Rasmussen, K., & Lowenthal, P. (2006). *Web-based learning: Design, implementation, and evaluation.* New York, NY: Springer International Publishing.

DeBell, A. (n.d.) How to use Gagné's Nine Events of Instruction. Retrieved from https://waterbearlearning.com/how-to-use-gagnes-nine-events/

Deeree, M. (2021, August 24). Why you should be creating your e-learning content in-house and how to do it effectively. Retrieved from https://www.easygenerator.com/en/webinars/create-e-learning-content-in-house-2/

De Gagne, J. C., Park, H. K., Hall, K., Woodward, A., Yamane, S., & Kim, S. S. (2019). Microlearning in health professions education: Scoping review. *JMIR Medical Education, 5*(2): e13997.

Denzin, N. K., & Lincoln, Y. S. (1994). *Handbook of qualitative research.* Thousand Oaks, CA: SAGE Publications.

Derington, D., & Avramescu, A. (Hosts) (2021, April 29). We Episode 60: Gagné's Nine Events of Instruction. [Audio podcast]. https://customer.education/podcast/episode-60-gagnes-nine-events-of-instruction/

DeSilets, L. D. (2007). Using objectives as a road map. *Journal of Continuing Education in Nursing, 38*(5), 196–197.

Deubel, P. (2003). An investigation of behaviorist and cognitive approaches to instructional multimedia design. *Journal of Educational Multimedia and Hypermedia, 12*(1), 63–90.

De Vaus, D. A. (2006). *Research design in social research.* London: SAGE Publications.

Dick, W., Carey, L., & Carey, J. O. (2005). *The systematic design of instruction*. Boston, MA: Pearson/Allyn and Bacon.

DiGiovanna, J. M. (2017, December 6). The 10-second rule in e-learning. Retrieved from https://www.linkedin.com/pulse/10-second-rule-e-learning-jean-marie-digiovanna-2/

Dolezalek, H. (2006, January). Who has time to design? Retrieved from https://www.cedma-europe.org/newsletter%20articles/Training%20Magazine/Who%20Has%20Time%20to%20Design%20(Jan%2006).pdf

Dowling, S. (2011). Using rapid prototyping for online learning materials design. *UAE Journal of Educational Technology and eLearning, 2*(1), 1–16.

Driscoll, M. P. (2012). Psychological foundations of instructional design. *Trends and issues in instructional design and technology* (3rd ed.). R. Reiser and John Dempsey (eds.). Boston, MA: Pearson.

Driscoll, M. P. (2005). *Psychology of learning for instruction (3rd ed).* Needham Heights, MA: Pearson Education.

Driscoll, M. P. (1999). Web-based training in the workplace. *Adult Learning, 10*(4), 21–25.

Driscoll, M. P. (2000). *Psychology of learning for instruction.* Boston, MA: Allyn and Bacon.

D'souza, F. C. R., & Kasinath, H. M. (2009). Effectiveness of instructional strategies based on Gagné's instructional design (ID) in improving thinking skills of secondary school students. *Journal on Educational Psychology, 3*(3), 44–54.

Duarte, N. (2008). slide:ology: *The art and science of creating great presentations.* Newton, MA: O'Reilly Media.

Duchastel, P. C. (1990). Cognitive designs for instructional design. *Instructional Science, 19*(6), 437–444.

DuFrene, D. D., & Lehman, C. M. (2004). Concept, content, construction, and contingencies: Getting the horse before the PowerPoint cart. *Business Communication Quarterly, 67*(1), 84–88.

Elearning Journal. (2019). Blooming prospects for the eLearning corporate compliance training market. Retrieved from https://www.elearning-journal.com/en/2019/03/19/blooming-prospects-for-the-elearning-corporate-compliance-training-market/

Emerson, R., Fretz, R., & Shaw, L. (1995). *Writing ethnographic fieldnotes.* Chicago, IL: University of Chicago Press.

Engel, L. J. (1989). A radiological assessment skills training program for the radiation worker at Shoreham Nuclear Power Station (Number: ED310244). [Doctoral dissertation]. Education Resources Information Center.

Escoffery, C., Leppke, A. M., Robinson, K. B., Mettler, E. P., Miner, K. R., & Smith, I. (2005). Planning and implementing a public health professional distance learning program. *Online Journal of Distance Learning Administration, 8*(1).

Farkas, D. A. (2006). Toward a better understanding of PowerPoint deck design. *Information Design Journal + Document Design 14*(2), 162–171.

Feilzer, M. Y. (2009). Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research, 4*(1), 6–16.

Felder, L. (2012). *Writing for the Web: Creating compelling Web content using words, pictures, and sound.* Indianapolis, IN: New Riders.

Fields, D. C. (1996). The impact of Gagné's Theory on instructional design practice. In Fisk, G. D. (Ed.), *Slides for students: The effective use of PowerPoint in education.* Dahlonega, GA: University of North Georgia Press.

Fisk, G. D. (2019). *Slides for students: The effective use of PowerPoint in education.* Dahlonega, GA: University of North Georgia Press.

Flynn, J. L. (1992). Cooperative learning and Gagné 's events of instruction: A syncretic view. *Educational Technology, 33*(10), 53–60.

Foshay, A. W. (1975). Teaching tactics and teaching strategy. *Educational Leadership, 32*(6), 373–375.

Foshay, W. R., Silber, K. H., & Stelnicki, M. B. (2003). Writing training materials that work: How to train anyone to do anything. San Francisco, CA: Jossey-Bass Pfeiffer/Wiley.

Foshay, W. R., Villachica S. W., & Stepich, D. A. (2014). Cousins but not twins: Instructional design and human performance technology in the workplace. In J. Michael Spector, M. David Merrill, Jan Elen, and M J. Bishop (eds.), *Handbook of research on educational communications and technology* (pp. 39–49). Berlin/Heidelberg, Germany: Springer Science & Business Media.

Franklin, B., Hamer, M., Hanna, M., Kinsey, M., & Richardson, J. E. (2005). *Key concepts in journalism studies.* Thousand Oaks, CA: SAGE Publications.

Frey, B. B. (ed). (2018). The SAGE encyclopedia of educational research, measurement, and evaluation. Thousand Oaks, CA: SAGE Publications.

Gagné, R. M. (1965). The conditions of learning. New York, NY: Holt, Rinehart and Winston.

Gagné, R. M. (1974). Instruction and the conditions of learning. In W. M. Bart and M. R. Wong (Eds.), *Psychology of school learning: Views of the learners* (pp. 153–175). New York, NY: MSS Information Corporation.

Gagné, R. M. (1984, April). Learning outcomes and their effects: Useful categories of human performance. *American Psychologist, 39*(4), 377–385

Gagné, R. M. (1977). *The conditions of learning.* New York, NY: Holt, Rinehart and Winston.

Gagné, R. M. (1992). Tryout of an organizing strategy for lesson design: Maintenance procedure with checklist. Brooks AFB, TX: Air Force Research Laboratory [AL-TP-1992-00 16].

Gagné, R. M., & Briggs, L. J. (1974). *Principles of instructional design* (1st ed.). New York, NY Holt, Rinehart, and Winston.

Gagné, R. M., & Driscoll, M. P. (1988). *Essentials of learning for instruction.* Englewood Cliffs, NJ: Prentice Hall.

Gagné, R. M., Briggs, L. J., & Wager, W. W. (1988). *Principles of instructional design* (3rd ed.). New York, NY: Holt, Rinehart, and Winston.

Gagné, R. M., Briggs, L. J., & Wager, W. W. (1992). *Principles of instructional design*. Fort Worth, TX: Harcourt Brace Jovanovich.

Gagné, R. M., Wager, W. W., Golas, K. C., & Keller, J. M. (2005). *Principles of instructional design (*5th ed.). Wadsworth, CA: South-Western.

Gardner, J. (2010). Applying Merrill's First Principles of Instruction: Practical methods based on a review of the literature. *Educational Technology, 50*(2), 20–25.

Garrison, D. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks, 11*(1), 61–72.

Garrison, D. R. (2011). *E-learning in the 21st century: A framework for research and practice.* Milton Park, Abingdon-on-Thames, Oxfordshire United Kingdom: Taylor & Francis.

G-Cube. (2017, April 9). Applying Gagné's 9 Events of Instruction in eLearning. Retrieved from https://elearningindustry.com/9-events-of-instruction-in-elearning-applying-gagnes

Geiger, E. (1990). 4 independent learning activities in science for students at-risk. (Number: ED328457). [Master's thesis, New York Institute of Technology.] Education Resources Information Center.

Gettman, D., McNelly T., & Muraida, D. (1999). The guided approach to instructional design advising (GAIDA): A case-based approach to developing instructional design expertise. In J. van den Akker, R. M. Branch, K. Gustafson, N. Nieveen and T. Plomp (Eds.), *Design approaches and tools in education and training* (pp. 175–182). Dordrecht, Netherlands: Springer Dordrecht.

Gibbert, M., Ruigrok, W., & Wicki, B. (2008). What passes as a rigorous case study? *Strategic Management Journal, 29*(13), 1465–1474.

Gios, J. (2019, November 20). The eternal question: What type of training should I provide my staff? *Forbes.* Retrieved from https://www.forbes.com/sites/forbeseq/2021/12/22/forging-a-path-beyond-the-plate/?sh=674f74ac69e8.

Given, L. M. (2008) Checklists*. The SAGE encyclopedea of qualitative research methods.* Retrieved from https://methods.sagepub.com/reference/sage-encyc-qualitative-research-methods/n44.xml#:~:text=Checklists%20are%20used%20to%20encourage,of%20either%20writing%20or%20review

Goel, A. (2019). Follow Gagné's Nine Events of Instruction to improve your e-learning experience. Retrieved from https://www.gc-solutions.net/resources/articles/follow-gagnes-nine-events-of-instruction-to-improve-your-elearning-experience

Goldstein, I. L., & Ford, J. K. (2002). *Training in organizations: Needs assessment, development, and evaluation* (4th ed.). Belmont, CA: Wadsworth.

Great Schools Partnership. (2016). Content knowledge. The glossary of educational reform. Retrieved from https://www.edglossary.org/content-knowledge/

Gries, L. E., & Brooke, C. G. (2010). An inconvenient tool: Rethinking the role of slideware in the writing classroom. *Composition Studies, 38*(1), 11–28.

Grisé, P. (2012). Communication and learning in the context of instructional design. In N. M. Seels (ed.) *Encyclopedia of the Sciences of Learning.* Boston, MA: Springer.

Growth Engineering. (2019, December 5). What are Gagné's nine levels of learning and why are they so important? Retrieved from https://www.growthengineering.co.uk/gagnes-nine-levels-of-learning/

Guerra-Lopez, I. J. (2008). *Performance evaluation.* Hoboken, NJ*:* John Wiley & Sons.

Hall, G. (2020, August 4). The people have the power: A case for the democratization of content. Retrieved from https://www.allego.com/blog/the-people-have-the-power-a-case-for-the-democratization-of-content/

Halpern, D. F., & Hakel, M. D. (2003). Applying the science of learning to the university and beyond: Teaching for long-term retention and transfer. *Change, 35*(4), 36–41.

Hammarberg, K., Kirkman, M., & de Lacey, S. (2016, March). Qualitative research methods: when to use them and how to judge them. *Human Reproduction, 31*(3), 498–501.

Hannon, P., Umble, K. E., Alexander, L., Francisco, D., Steckler, A., Tudor, G., & Upshaw, V. (2002). Gagné's and Laurillard's models of instruction applied to distance education: A theoretically driven evaluation of an online curriculum in public health. *The International Review of Research in Open and Distributed Learning, 3*(2). https://doi.org/10.19173/irrodl.v3i2.105

Hashim, Y., & Tik, C. C. (1997). Use of instructional design with mastery learning. *Educational Technology, 37*(2), 61–63.

Hathaway, D., & Norton, P. (2013, March-April). Designing an online course content structure using a design patterns approach. *Educational Technology, 53*(2), 3–15.

Helms, S. T. (2009). Punk Rock Fish: Applying a conceptual framework of simulations in a high school science classroom. *Tech Trends, 53*(3), 49–53.

Hockley, D. (2018, August). Compliance training: Making a case for elearning. Retrieved from https://www.trainingjournal.com/articles/opinion/compliance-training-making-case-elearning

Hodell, C. (2013). *SMEs from the ground up: A no-nonsense approach to trainer-expert collaboration.* Alexandria, VA: American Society for Training and Development.

Hogle, P. (2017, March 15). Gagné's Nine Events of Instruction offer a blueprint for eLearning design. Retrieved from https://learningsolutionsmag.com/articles/2254/gagns-nine-events-of-instruction-offer-a-blueprint-for-elearning-design

Hogle, P. (2016, September 6). Ten ways to create useful hyperlinks. Retrieved from https://learningsolutionsmag.com/articles/2034/ten-ways-to-create-useful-hyperlinks

Hopper, K., & Waugh, J., & (2014). PowerPoint: An overused technology deserving of criticism, but indispensable. *Educational Technology, 54*(5), 29–34.

House, J. D. (2002). The use of computers in a mathematical lesson in Japan: A case analysis from the TIMSS Videotape Classroom Study. *International Journal of Instructional Media, 29*(1), 113–124.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288.

Huettner, B. (2010). *Adobe Captivate 3: The definitive guide.* Jones & Bartlett Learning. Plano, TX: Wordware Publishing.

Hughes, A. (2019, November 6). eLearning development and the role of SMEs. Retrieved from https://elearningindustry.com/role-of-smes-elearning-development

Hulls, C. C. W. (2005). Using a tablet PC for classroom instruction. Proceedings Frontiers in Education 35th Annual Conference, pp. T2G-T2G. https://doi: 10.1109/FIE.2005.1611911

Huprich, J. (2020). Competencies for customer education professionals in software-as-a-service organizations: A multi-phase analysis. [Dissertation, Georgia State University]. ScholarWorks@Georgia State University.

International Society for Performance Improvement. (2011). What is HPT? Retrieved from http://www.ispi.org/content.aspx?id=54

Jaiswal, A. (2020, January 21). Effective eLearning design: Applying Gagné's 9 Events of Instruction. Retrieved from https://blog.commlabindia.com/elearning-design/effective-elearning-design-gagne-events

James, G. (2020, January 21). It's 2020: Why are you still using PowerPoint? Inc. Retrieved from https://www.inc.com/geoffrey-james/its-2020-why-are-you-still-using-powerpoint.html

Jarvis, P. (1995). *Adult and continuing education: Theory and practice.* London: Routledge.

Jeong, A. (2019). Comparing instructional event sequences in audio podcasts with low versus high user satisfaction. *TechTrends, 63*(5), 559-563.

Johnson, A. (2019). *Essential learning theories: Applications to authentic teaching situations.* Lanham, MD: Rowman & Littlefield Publishers.

Johnson, T. (2005, May). The nine too-often-neglected principles of e-learning design. *The eLearning Developers Journal.* Retrieved from https://www.learningguild.com/pdf/2/052305des-h.pdf

Johnson, W. G. (2008). Robert Gagné's educational theory and bibliographic instruction. *Community & Junior College Libraries, 14*(3), 211–222.

Johnson-Curiskis, N. (2006). Online course planning. *Journal of Online Learning and Teaching, 2*(1), 42–48.

Jones, P., Beynon, M. J., Pickernell, D., & Packham, G. (2013). Evaluating the impact of different training methods on SME business performance. *Environment and Planning C: Government and Policy, 31*(1), 56–81.

Jones, S. (2020, July 22). How standards compliance is making the shift to virtual. Retrieved from https://www.forbes.com/sites/forbesbusinesscouncil/2020/07/22/how-standards-compliance-is-making-the-shift-to-virtual/?sh=4434d3ff4455

Jonassen, D., Mayes, T., & McAleese, R. (1993). A manifesto for a constructionist approach to uses of technology in higher education. In T. Duffy, J. Lowyck, & D. Jonassen (Eds.), *Web-based instruction.* Englewood Cliffs, NJ: Educational Technology Publications.

Jono, M. N. H. H., Hasanordin, R., Salleh, S., Ibrahim M., & Aziz A. (2016). Effectiveness of courseware presentation using learning theory for a programming subject. 7th International Conference on University Learning and Teaching (InCULT 2014) Proceedings (pp. 767–776).

Kaliher, L. B. (2010). Applying multimedia learning theories to the design of residence life online training modules. [Dissertation, University of Delaware]. ProQuest LLC.

Karageorgakis, T. (2018, May 27). Constructivism and behaviorism in designing online learning programs. Retrieved from https://elearningindustry.com/designing-online-learning-programs-constructivism-behaviorism

Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implications for social work research. *Social Sciences*, *8*(9), 255.

Kebritchi, M., Lipschuetz, A., & Santiague, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *Journal of Educational Technology Systems, 46*(1), 4–29. https://doi.org/10.1177/0047239516661713

Keramida, M. (2015, May 28). Behaviorism in instructional design for eLearning: When and how to use it. Retrieved from https://elearningindustry.com/behaviorism-in-instructional-design-for-elearning-when-and-how-to-use

Khadjooi, K., Rostami, K., & Ishaq, S. (2011). How to use Gagné's model of instructional design in teaching psychomotor skills. *Gastroenterology and Hepatology,*4(3), 116–119.

Khalil, M. K., & Elkhider, I. A. (2016, June). Applying learning theories and instructional design models for effective instruction. *Advances in Physiology Education, 40*(2), 147–156.

Kleinheksel, A. J., Rockich-Winston, N., Tawfik, H. & Wyatt, R. R. (2020). Demystifying content analysis. *American Journal of Pharmaceutical Education, 84*(1), 127–137.

Knowles, M. (1980). *The modern practice of adult education: From pedagogy to andragogy.* New York, NY: Cambridge.

Kolbe, R. H., & Burnett, M. S. (1991). Content-analysis research: An examination of applications with directives for improving research reliability and objectivity. *Journal of Consumer Research, 18*(2), 243–250.

Kowalski, R. (1987). Teaching less and learning more?: A personal experience. *Programmed Learning & Educational Technology, 24*(3), 174-186.

Kuhlmann, T. (2008, February 5). These 3 tips can change your compliance E-learning forever. Retrieved from https://blogs.articulate.com/rapid-elearning/

Kuhlmann, T. (2014, May 20). Dump that bullet point list and build learning objectives that matter. Retrieved from https://blogs.articulate.com/rapid-elearning/dump-bullet-point-list-build-learning-objectives-matter/

Kuhlmann, T. (2015a, January 13). What's the best job title for those who build e-learning courses? Retrieved from https://blogs.articulate.com/rapid-elearning/e-learning-job-title/

Kuhlmann, T. (2015b, April 21). How to build a single course that satisfies many online learners. Retrieved from https://blogs.articulate.com/rapid-elearning/build-course-many-online-learners/

Kuhlmann, T. (2015c). *The insiders' guide to becoming a rapid elearning pro.* New York, NY: Articulate Global, Inc.

Kumar, P., & Gulla, U. (2011). *Journal of Library and Information Technology, 31*(3), 179-188.

Kunkel, K. (2004). A research note assessing the benefit of PowerPoint software in different lecture courses. *Teaching Sociology, 32*(2), 188–196.

Laff, M. (2007, February). The need for speed: Rapid learning alters training design and delivery *Training & Development,* 45–47.

Lamey, T. W., & Davidson-Shivers, G. V. (2017). Instructional strategies and sequencing. In J. E. Stefaniak (Ed.), *Advancing medical education through strategic instructional design* (pp. 30-52). Hershey, PA: IGI Global. https://doi: 10.4018/978-1-5225-2098-6.ch002

LaMotte, A. (2015). How to design your e-learning course using Gagné's 9 Events of Instruction. Retrieved from https://community.articulate.com/articles/how-to-design-your-e-learning-course-using-gagne-s-9-events-of-instruction

Larmore, S. (2011). Subject matter expert: Working toward ensuring the value in a project organization. [Master's thesis, University of Pennsylvania]. ResearchGate.

Laurie, C. T. (1976). Shorthand instruction in light of recent theories of learning and instruction. *Delta Pi Epsilon Journal, 18*(3), 1–9.

Lechner, H. G., Zavaleta, K. W., & Shinde, A. S. (2017, June). Preparing subject experts to teach. *TD: Training and Development,* 68–69.

Lee, W. W. (1994). Subject matter experts and instructional designers: Making distinctions *Performance and Instruction, 33*(8), 23–25.

Leow, F. L., & Neo, M. (2014). Interactive multimedia learning: Innovating classroom education in a Malaysian university. *Turkish Online Journal of Educational Technology 13*(2), 99–110.

Levinson, A. J. (2010). Where is evidence-based instructional design in medical education curriculum development? *Medical Education, 44*(6), 536–537.

Long, K. (2020, March 16). The coronavirus is forcing many colleges to go online only. But will it work for everyone? Seattle Times. [Linda Nilson interview]

McCain, D. (1999). *Creating training courses (when you're not a trainer): Quick course design, development, and delivery for subject matter experts, managers, and other nontrainers.* Alexandria, VA: American Society for Training and Development.

McIntyre, M. (2020). Clicking for completion: How to overcome the hyper-active e-learner. Retrieved from: https://trainingindustry.com/magazine/jan-feb-2020/clicking-for-completion-how-to-overcome-the-hyperactive-e-learner/

McLean, S. (2003). *The basics of speech communication*. Boston, MA: Allyn & Bacon.

McLeod, G. (2003). Learning theory and instructional design. *Learning Matters, 2,* 35–43.

McNeill, L., & Fitch, D. (2022, November). Microlearning through the lens of Gagne's Nine Events of Instruction: A qualitative study. *TechTrends.* https://doi.org/10.1007/s11528-022-00805-x

Mansbach, J. (2016, May 20). Nine events of learning. Retrieved from https://dl.sps.northwestern.edu/blog/2016/05/nine-events-learning/

Martin, F., Klein, J., & Sullivan, H. (2007). The impact of instructional elements in computer-based instruction. *British Journal of Educational Technology, 38*(4), 623–636.

Martin, F., & Ritzhaupt, A. D. (2020). Standards and competencies: For instructional design and technology professionals. In J. K. McDonald & R. E. West (Eds.), *Design for learning: Principles, processes, and praxis* (pp. 22). London, UK: EdTech Books. Retrieved from https://edtechbooks.org/id/standards_and_competencies

Martinez, J. (2017). The best e-learning authoring tools of 2017. Retrieved from https://uk.pcmag.

Mason, W. T., & Strike, P. W. (2003). See one, do one, teach one—is this still how it works? A comparison of the medical and nursing professions in the teaching of practical procedures. *Medical Teacher, 25*(6), 664–666.

Maxwell, A. (2007, November). Ban the bullet-point! Content-based PowerPoint for historians. *The History Teacher, 41*(1), 39–54.

Mayer, R. E. (2002). Multimedia learning. *Psychology of Learning and Motivation. 41,* 85–139.

Medina, S. (1990). An application of Gagné's theory of instruction to the instruction of English as a second language. Syracuse, NY: ERIC Clearinghouse of Information and Technology.

Mei, F. S. Y., Ramli, S. B., & Ajhirtani, N. A. K. (2015). Application of Gagné's nine approaches to teach Arabic language for non-native speakers: Experimental study at Sultan Idris Education University Malaysia. *European Journal of Language and Literature Studies, 3*(1), 33–38.

Menenti, L., Petersson, K. M., & Hagoort, P. (2012). From reference to sense: How the brain encodes meaning for speaking. *Frontiers in Psychology, 2.* https://doi:10.3389/fpsyg.2011.00384

Merrill, D. M. (2007). The proper study of instructional design. In Robert A. Reiser and John V. Dempsey (Eds.). *Trends and issues in instructional design and technology* (2nd ed., pp. 336-341). Hoboken, NJ: Pearson Prentice Hall.

Merrill, M. D. (2014). My hopes for the future of instructional technology. *Educational Technology, 54*(4), 22–26.

Merrill, M. D. (2010, December 4). Cited in Pesce, S. V. (2012). The designer-by-assignment in practice: Instructional design thinking of subject matter experts. [Dissertation, Capella University]. ProQuest LLC.

Merrill, M. D., Drake, L., Lacy, M. J., & Pratt, J. (1996). Reclaiming instructional design. *Educational Technology, 36,*(5) 5–7.

Miller, B. (2010, June 14). Overcoming obstacles to avoid “shovelware.” Retrieved from https://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=EDC33007F80A32299D965080137A444F?doi=10.1.1.461.343&rep=rep1&type=pdf

Miller, C. (1982). Scientific literature as hierarchy: Library instruction and Robert M. Gagné. *College & Research Libraries, 43*(5), 385–392.

Miner, A., Mallow, J., Theeke, L., & Barnes, E. (2015). Using Gagné's 9 Events of Instruction to enhance student performance and course evaluations in undergraduate nursing course. *Nurse Educator, 40*(3), 152–154.

Molenda, M. (2002). *A new framework for teaching in the cognitive domain* (Number ED470983). Syracuse, NY: ERIC Clearinghouse on Information and Technology.

Molenda, M., & Russell, J. D. (2006). Instruction as an intervention. In J. A. Pershing (ed.), *Handbook of human performance technology: Principles, practices and potential.* San Francisco, CA: Pfeiffer.

Moore, C. (2009). How to steer your client away from an information dump. Retrieved from https://blog.cathy-moore.com/2009/10/how-to-steer-your-client-away-from-an-information-dump/?doing_wp_cron=1616846356.7603640556335449218750

Moore, C. (2010, March 30). How to convert the toughest SME. Retrieved from http://blog.cathy-moore.com/2010/03/how-to-convert-the-toughest-sme/.

Moore, M. G. (1989). Three types of interaction. *The American Journal of Distance Education, 3*(2), 1–6.

Morrison, G. R. (1985). Nonviolent instructional development: Working with the subject matter expert. *Performance and Management, 24*(5), 25–27.

Morrison, G. R., & Anglin, G. J. (2009). An instructional design approach for effective shovelware: Modifying materials for distance education. In Anymir Orellana, Terry Hudgins, & Michal Simonson (Eds.), *The perfect online course: Best practices for designing and teaching* (pp. 359–375). Charlotte, NC: Information Age Publishing.

Munzenmaier, C. (2014). *Today's instructional designer: Competencies and careers.* Santa Rosa, CA: elearning Guild.

Murdock, B. B. (1962). The serial position effect of free recall. *Journal of Experimental Psychology, 64*(5), 482–488.

Murre, J. M., & Dros, J. (2015). Replication and analysis of Ebbinghaus' Forgetting Curve. *PLoS ONE, 10*(7), e0120644.

Neo, T., Neo, M., Teoh, B., & Yap, W. (2010). Using multimedia and Gagné's instructional design to enhance teaching and learning in a student-centered environment: A Malaysian experience. *International Journal of Instructional Media, 37*(4), 365–374.

Newberry, B., & Logofatu, C. (2008). An online degree program course template design process. *Journal of Online Learning and Teaching, 4*(4), 583–595.

Newman, I., Ridenour, C., Weis, D. M., & McNeil, K. (1997). Theses and dissertations: A guide to writing in social and physical sciences. *Educational Leadership Faculty Publications*, *82,* 13–22.

Ng, J. Y. (2014). Combining Peyton's four-step approach and Gagné's instructional model in teaching slit-lamp examination. *Perspectives on Medical Education, 3*(6), 480–485.

Nkoba, S. (2018, March 1). New faculty assimilation Orientation. Presentation at I-Trac [Innovative Teaching to Recharge and Connect] (Wichita, KS).

Northern Illinois University Center for Innovative Teaching and Learning. (2020). Gagné's nine events of instruction. [Instructional guide for university faculty and teaching assistants]. Retrieved from https://www.niu.edu/citl/resources/guides/instructional-guide

Noushad, B., & Khurshid, F. (2019). Facilitating student learning: An instructional design perspective for health professions educators. *Research and Development in Medical Education, 8*(2), 69–74.

Oblinger, D. G., & Hawkins, B. L. (2006). The myth about online course development: A faculty member can individually develop and deliver an effective online course. *Educause Review, 41*(1), 14–15.

O'Byrne, P. J., Patry, A., & Carnegie, J. A. (2008). The development of interactive online learning tools for the study of anatomy. *Medical Teacher, 30*(8), e260–e271.

Oliver, R., Herrington, J., & Omari, A. (2000). Creating effective instructional materials for the World Wide Web. Retrieved from https://www.researchgate.net/publication/2351787_Creating_Effective_Instructional_Materials_for_the_World_Wide_Web

Omer, A. H. (2019, July 12). 9 challenges in designing training interventions solved by letting form follow function. Retrieved from https://elearningindustry.com/designing-training-interventions-challenges-solved-form-follow-function

Orellana, A., Hudgins, T. L., & Simonson, M. (2009). *The perfect online course: Best practices for designing and teaching.* Charlotte, NC: Information Age Publishing.

Ouellet, S. (2012). Workplace training: How context impacts on instructors' activities. *Industrial Relations, 67*(2), 222–241.

Pandy, A. (2017, August 8). Tips and examples to create highly engaging online compliance training. Retrieved from https://elearningindustry.com/engaging-online-compliance-training-tips-examples-create

Pannucci, C.J., & Wilkins, E. G. (2010). Identifying and avoiding bias in research. *Plastic Reconstruction Surgery, 6*(2), 619–625.

Pappas, C. (2015, June 14). 8 tips to create a successful employee online training orientation program. Retrieved from https://elearningindustry.com/8-tips-to-create-a-successful-employee-online-training-orientation-program

Pappas, C. (2017, February 4). 9 best practices for developing online training in-house. Retrieved from https://elearningindustry.com/best-practices-developing-online-training-in-house

Pappas, C. (2020, July 22). The best eLearning authoring tools to deliver top-notch training content. Retrieved from https://elearningindustry.com/best-elearning-authoring-tools-for-top-training-content-creation

Parks, R. (1999). Macro principles, PowerPoint, and the Internet: Four years of the good, the bad, and the ugly. *Journal of Economic Education, 30*(3), 200–209.

Peck, D. (2020, December 23). Applying Gagné's 9 Events to eLearning. Retrieved from https://www.devlinpeck.com/posts/gagnes-events-elearning

Pedersen, S. (2005). Designing and researching enhancements for online learning: A commentary on Veal and Zulli. *Contemporary Issues in Technology and Teacher Education, 13*(3), 283–306.

Penfold, S. (2016, June 13). Instructional design principles for building an eLearning course. Retrieved from https://www.learnupon.com/blog/instructional-design-principles-building-elearning-course/

Perrin, C. (2004). *An introduction to classical education: A guide for parents.* Camp Hill, PA: Classical Academic Press.

Pershing, J. A. (Ed.). (2006). *Handbook of human performance technology: Principles, practices and potential.* San Francisco, CA: Pfeiffer.

Pesce, S. V. (2012). The designer-by-assignment in practice: Instructional design thinking of subject matter experts. [Dissertation, Capella University]. ProQuest LLC.

Pic, J. N. (2012). Investigating the design approach of designers-by-assignment: A learner analysis of workshop facilitators. [Dissertation, George Mason University].

Piskurich, G. M. (2006). *Rapid instructional design: Learning ID fast and right.* San Francisco, CA: John Wiley and Sons.

Ployhart, R. E., & Moliterno, T. P. (2011). Emergence of the human capital resource: A multilevel model. *Academy of Management Review, 36,* 127–150.

Potter, K. (n.d.). ID review: Instructional strategy. Retrieved from https://www.itma.vt.edu/courses/appliedid/lesson7review.php

Prasad, R. K. (2021, June 21). The huge role of authoring tools in rapid eLearning. Retrieved from https://elearningindustry.com/huge-role-of-authoring-tools-in-rapid-elearning-development

Price, J. H., & Murnan, J. (2004). Research limitations and the necessity of reporting them. *American Journal of Health Education, 35*(2), 66–67.

Prichard, K. W., Sawyer, R. M., & McLaran, R. (1994). *Handbook of college teaching: Theory and applications.* Westport, CT: Sawyer Greenwood Publishing Group.

Proctor, C. (2002). Proportion, pedagogy, and processes: The three P's of e-learning. Syracuse, NY: ERIC Clearinghouse on Information and Technology.

Qutieshat, A. (2018). Using Gagné's theory and Peyton's four-step approach to teach inferior alveolar nerve block injection. *Journal of Dental Research & Review, 5*(3), 75–79.

Raluca, C. (2019). Employee-generated learning: What you need to know. Retrieved from https://blog.matrixlms.com/employee-generated-learning-what-you-need-to-know/

Randall, A. V. (2018). *Guidelines for psychomotor skill instruction for athletic performance: A design and development study*. [Dissertation, Virginia Polytechnic Institute and State University]. VTechWorks.

Ratliff, M., Masen, N., Sullivan, S., Fleming, M. F., & Carney, P. (2012). RCR online course: Build an online course to augment RCR training using evidenced-based learning theory. *Accountability in Research, 19(*4), 247–266.

Reddy, M. J. (1979). The conduit metaphor: A case of frame conflict in our language about language. In A. Ortony (Ed.), *Metaphor and Thought* (pp. 284–310). Cambridge, UK: Cambridge University Press.

Reigeluth, C. M. (1999). *Instructional-design theories and models: A new paradigm of instructional theory (Vol. 2).* Mahwah, NJ: Lawrence Erlbaum Associates.

Reiser, R. A. (2001). History of instructional technology design and technology: Part 1: A history of instructional media. *Education Technology Research and Development, 49*(1), 53–64.

Reiser, R. A. (2002). History of instructional design and technology. In R. A. Reiser & J. A. Dempsey (Eds.), *Trends and issues in instructional design and technology.* Saddle River, NJ: Merrill/Prentice-Hall.

Reiser, R. A., & Gagné, R. M. (1983). *Selecting media for instruction.* Englewood Cliffs, NJ: Educational Technology Publications.

Reiss, C. J. (1991). Turning technicians into trainers. *Training, 28*(4), 47–50.

Rew, L., Bechtel, D., & Sapp, A. (1993). AIDA self-as-instrument in qualitative research. *Nursing Research, 42*(5), 300–301.

Reynolds, G. (2007). *Presentation zen: Simple ideas on presentation design and delivery.* Indianapolis, IN: New Riders.

Richey, R. C. (2005). Validating instructional design and development models. In J. M. Spector, C. Ohrazda, A Van Schaak, & D. Wiley (Eds.), *Innovation in instructional technology: Essays in honor of M. David Merrill* (pp. 171–185). Mahwah, NJ: Lawrence Erlbaum Associates.

Richey, R. C. (2000). The legacy of Gagné's work. Syracuse, NY: ERIC Clearinghouse on Information and Technology, 183–210.

Rimmer, T. (2017) Empower your SMEs to create better e-learning with these 4 tips. Retrieved from https://community.articulate.com/series/everything-you-need-to-know-about-working-with-smes/articles/empower-your-smes-to-create-better-e-learning-with-these-4-tips

Ripley, D. E. (1998). The HR system: A critical foundation for human performance interventions. In P. J. Dean, and D. E. Ripley, (Eds.). *Performance improvement*

interventions series, performance technologies in the workplace (Vol. 3, pp. 20–36). Silver Spring, MD: International Society for Performance Improvement.

Rodriguez, S., Stephens, R., & Arena, S. (1991). Interviewing subject-matter experts: Strategies for instructional-design success. *Educational Technology, 31*(12), 27–32.

Rogers, S. A. (2017, October 10). Gagné's instructional sequence for podcast learning module. Retrieved from https://teacherrogers.wordpress.com/2017/10/10/gagnes-instructional-sequence-for-podcast-learning-module/

Sajid, M. R., & Shaikh, A. A. (2015). Using Gagné's model in hematology residency. *Journal of Health Specialties, 5*(3), 47–49.

Saldana, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). London, UK: SAGE Publications.

Salkind, N. J. (2010). Instrumentation. *Encyclopedia of research design.* Retrieved from https://dx.doi.org/10.4135/9781412961288.n189

Sandhu, S., Afifi, T., & Amara, F. M. (2012). Theories and practical steps for delivering effective lectures. *Journal of Community Medicine and Health Education,* 2(6). https://doi:10.4172/2161-0711.1000158

Saunders, L., & Wong, M. A. (2020). *Instruction in libraries and information centers: An introduction.* Urbana, IL: Windsor & Downs Press [Illinois Open Publishing Network].

Sennett, C., & Vasquez, D. (2020). An instructional design perspective. Retrieved from https://www.vanderbilt.edu/cdr/module1/an-instructional-design-perspective/

Shachak, A., Ophir, R., & Rubin, E. (2005). Applying instructional design theories to bioinformatics education in microarray analysis and primer design workshops. *Cell Biology Education, 4*(3), 199–206.

Shank, P., & Sitze, A. (2004). *Making sense of online learning: A guide for beginners and the truly skeptical.* San Francisco, CA: John Wiley & Sons.

Shaughnessy, M. F., Viner, M., Bonk, C., & Khoo, E. (2015). Interview with Curt Bonk and Elaine Khoo. *Educational Technology, 55*(5), 48–51.

Shaughnessy, M., Fulgham, S., & Reigeluth, C. (2009). Interview with Charles M. Reigeluth. *Educational Technology, 49*(3), 37–42.

Shwom, B. L., & Keller, K. P. (2003). The great man has spoken. Now what do I do? A response to Edward R. Tufte's "The cognitive style of PowerPoint." *Communication Insight, 1*, 1–15. Retrieved from www.communipartners.com

Siemens, G. (2002, July 9). Instructional design in E-learning. Retrieved from http:// eeeele-ranspace.org/articles/InstructionalDesign.htm

Simha, S. K. S. (2000). Development of an instructional model in physics based on Robert Gagné's theory of learning for the promotion of problem solving skills among students of secondary schools. [Dissertation, Bangalore University].

Smith, J. (2015, July 2). 7 brilliant ways successful leaders start presentations. Retrieved from https://www.weforum.org/agenda/2015/07/7-brilliant-ways-to-start-a-presentation/

Smith, P. L., & Ragan, T. J. (1996). Impact of R. M. Gagné's work on instructional theory. Proceedings of Selected Research and Development Presentations at the 1996 National Convention of the Association for Educational Communications and Technology (Indianapolis, IN).

Smith, S. K., Chavez, A. M., & Seaman, G. W. (2014). *Teacher as architect.* Denver, CO: Modern Teacher Press.

Smith, P. L., & Tillman, T. J. (2000). *Instructional design.* Hoboken, NJ: John Wiley & Sons.

Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics. *Internet and Higher Education, 7*(1), 59–70.

Soo-Phing, B., & Kian, T. (2007). Interactive multimedia learning: Students' attitudes and learning impact in an animation course. *The Turkish Online Journal of Educational Technology, 6*(4). Retrieved from https://files.eric.ed.gov/fulltext/ED499660.pdf

Spaid, O. A. (1986). *The consummate trainer.* Englewood Cliffs, NJ: Prentice Hall.

Sparrow, H., Herrington, J., & Herrington, A. (2000). 'Shovelware' as staff development: A useful introduction to moving online. In Moving Online: A conference to explore the challenges for workplaces colleges and universities, 18–19 August 2000, Gold Coast, Qld, 236–246.

Spector, J. M. (2000). Gagné's influence on military training research and development. In R. C. Richey (Ed.), *The legacy of Robert M. Gagné* (pp. 211–227). Syracuse, NY: ERIC Clearinghouse on Information and Technology.

Spector, J. M., & Whitehead, L. K. (1994). A guided approach to instructional design advising. In M. Orey (Ed.), *Proceedings of the Thirty-Fifth Association for the Development of Computer-Based Instructional Systems*, Nashville, TN, pp. 215–220.

Spiro, K., & Bhamidi, V. (2017). 3 steps subject matter experts creating eLearning courses should follow. Retrieved from https://elearningindustry.com/subject-matter-experts-creating-elearning-3-steps-follow

Spiro, K., & Bhamidi, V. (2019, January 4). How to embrace the shift to employee-generated learning. Retrieved from https://trainingindustry.com/articles/content-development/how-to-embrace-the-shift-to-employee-generated-learning/

Sreelakshmi, R., McLain, M., Rajeshwaran, A., Rao, B., Jayakrishnan, R., & Bijlani, K. (2015). Gamification to enhance learning using Gagné's learning model. Presentation at 6th International Conference on Computing, Communication and Networking Technologies, Dallas, TX. https://doi:10.1109/ICCCNT.2015.7395197

Stahl, R. J., Button, C. B., & Corbett, W. T. Jr. (1975). A model to create instructional activities intended to develop student concept learning and problem solving skills: A modification of Gagné's "Conditions of Learning" for social studies instruction. Paper presented at American Educational Research Association Annual Meeting, Washington, D. C. https://files.eric.ed.gov/fulltext/ED168942.pdf

Stevens-Long, J., & Crowell, C. (2010). Revisiting the design and delivery of an interactive online graduate program. In K. Rudestam & J. Schoenhotz-Read (Eds.), *Handbook of online learning* (2nd ed., pp. 252–266). Thousand Oaks, CA: SAGE Publications.

Stolovitch, H. S., & Keeps, E. J. (2002). *Telling ain't training.* Alexandria, VA: American Society for Training and Development.

Stoltzfus, J. (2020, December 23). What does media mean? Retrieved from https://www.techopedia.com/definition/1098/media, roles, and collaboration.

Suprenant, T. T. (1982). Learning, lecture, and programmed instruction text: An experiment in bibliographic instruction. *College and Research Libraries, 43*(1), 31–37.

Surrency, M., & Barbie, D. (2018). Still relevant? Gagné's Nine Events of Instruction in the online world. In T. Bastiaens, J. Van Braak, M. Brown, L. Cantoni, M. Castro, R. Christensen, G. Davidson-Shivers, K. DePryck, M. Ebner, M. Fominykh, C. Fulford, S. Hatzipanagos, G. Knezek, K. Kreijns, G. Marks, E. Sointu, E. Korsgaard Sorensen, J. Viteli, J. Voogt, P. Weber, E. Weippl & O. Zawacki-Richter (Eds.), *Proceedings of EdMedia: World Conference on Educational Media and Technology* (pp. 835–840). Amsterdam, Netherlands: Association for the Advancement of Computing in Education.

Sweeters, W. (1994). Multimedia electronic tools for learning. *Educational Technology, 34*(5), 47–52.

Tang, W., Tsai, J., & Huang, C. (2020). Inheritance coding with Gagné-based learning hierarchy approach to developing mathematics skills assessment systems. *Applied Sciences, 10*(4), 1465. https://doi.org/10.3390/app10041465

Teoh, B. S., & Neo, T. (2007). Interactive multimedia learning: Students' attitudes and learning impact in an animation course. *Turkish Online Journal of Educational Technology, 6*(4), 28–37.

Terras, K. L. (2017). Transforming the teacher: Examining personal transformations of faculty redesigning courses. *Journal of Transformative Learning, 4*(1), 33–49.

Theng, L. F., & Mai, N. (2009). Effect of incorporating Gagné's Nine instructional events in the context of multimedia-mediated student-centered learning: Study on diploma student academic performance and attitudinal feedback. *Proceedings of the Second International Conference of Teaching and Learning,* INTI University College, Malaysia, 1-8.

Tough, D. (2012). A focus on Robert Gagné's instructional theories: Application to teaching audio engineering. *Journal of Music and Entertainment Industry Educators Association, 12,* 209–220.

Trivantis, (2019, May 9). What is rapid eLearning? Retrieved from https://www.trivantis.com/what-is-rapid-e-learning

Ulrich, R. C. (2017). Creating online training courses for the corporate environment: What have been the experiences of instructional designers? [Dissertation, Drexel University]. ProQuest LLC

University of Florida, Center for Instructional Technology and Training. (2018). Gagné's 9 events of instruction. Retrieved from https://citt.ufl.edu/tools/gagnes-9-events-of-instruction/

Valparaiso Institute for Teaching and Learning (VITAL). (n.d.). Gagné's Nine Events of Instruction [infographic]. https://www.valpo.edu/vital/files/2015/12/gagne_nine_events.pdf

Van Tiem, D. M. (2004). Interventions (solutions) usage and expertise in performance technology practice: An empirical investigation. *Performance Improvement Quarterly, 17*(3), 23–45.

Vasmane, I. (2020, May 18). Including external resources in your elearning course. Retrieved from https://fastercourse.com/including-external-resources-in-your-e-learning-course/

Veletsianos, G., Kimmons, R., & French, K. (2013). Instructor experiences with a social networking site in a higher education setting: Expectations, frustrations, appropriation,

and compartmentalization. *Educational Technology, Research and Development, 61*(2), 255–278.

Virginia Tech, School of Education. (2008). Instructional planning sheet based on Gagné's nine events of instruction [Doc File]. Retrieved from https://www.itma.vt.edu/courses/currip/lesson2/currip2.doc

WBT Systems. (n.d.). Learning science made easy: Improve the effectiveness of education programs with Gagné's 9 Events of Instruction. Retrieved from https://www.wbtsystems.com/learning-hub/blogs/gagnes-9-events-of-instruction

Wager, W. (1978). Using Gagné's Events of Instruction as a guide for producing stimulus material. *Journal of Instructional Development, 2*(1), 6–8.

Walter, D. (2000). Competency-based on-the-job training for aviation maintenance and inspection: A human factors approach. *International Journal of Industrial Ergonomics, 26*(2), 249–259.

Weber, J., & Wasieleski, D. M. (2013). Corporate ethics and compliance programs: A report, analysis and critique. *Journal of Business Ethics 112,* 609–626.

Webster, D. M., Richter, L., & Kruglanski, A. W. (1996). On leaping to conclusions when feeling tired: Mental fatigue effects on impressional primacy. *Journal of Experimental Social Psychology, 32*(2), 181–195. https://doi:10.1006/jesp.1996.0009

Weiss, M. (2019, September 4). Subject matter experts vs. instructional designers: Which is better? Retrieved from https://www.td.org/insights/subject-matter-experts-vs-instructional-designers-which-is-better

Weverka, P. (2010). *PowerPoint 2010: All-in-one for dummies.* Hoboken, NJ: Wiley Publishing.

Williams, S.W. (2001). The effectiveness of subject matter experts as technical trainers. Human *Resource Development Quarterly, 12*(1), 91–97.

Willis, J. (2011). The cultures of contemporary instructional design scholarship, part one: Developments based on behavioral and cognitive science foundations. *Educational Technology, 51*(1), 3–20.

Wilson, M. (2018, June). Online instructional design in the new world: Beyond Gagné, Briggs and Wager. Paper presented at Adult Education Research Conference, Victoria, B. C., Canada.

Wilson, P. (2016, December 29). Linking to external content in eLearning. Retrieved from https://elearning.adobe.com/2016/12/linking-to-external-content-in-elearning/

Winn, G. N. (2006). Design and development of train-the-trainer instruction for subject matter experts using Intranet- based interactive multimedia. [Dissertation, Illinois State University]. ProQuest Dissertations Publishing.

Winstead, S. (2022, April 4). How long should an online course be? What you should know. https://myelearningworld.com/whats-the-optimal-length-of-an-e-learning-course/#:~:text=The%20Optimal%20Online%20Course%20Length&text=Most%20experts%20confirm%20that%20a,somewhere%20between%2015%2D30%20minutes.

Wong, Y. L. (2018). Utilizing the principles of Gagné's nine events of instruction in the teaching of Goldmann Applanation Tonometry. *Advances in Medical Education and Practice,* 9, 45–51. https://doi: 10.2147/AMEP.S145498

Woo, W. H. (2016). Using Gagné's instructional model in phlebotomy education. *Advances in Medical Education and Practice,* (7), 511–516. https://doi: 10.2147/AMEP.S110357.

Xu, M. A., & Storr, G. B. (2012). Learning the concept of researcher as instrument in qualitative research. *The Qualitative Report, 17*(42), 1–18.

Young, J. R. (2004, November 12). When good technology means bad teaching: Giving professors gadgets without training can do more harm than good in the classroom, students say. *Chronicle of Higher Education, 51*(12), A31.

Your eLearning World. (n.d). Gagné's Nine Events of Instruction: How to create eLearning experiences that will blow your learners' minds. Retrieved from https://yourelearningworld.com/gagnes-nine-events-of-instruction-how-to-create-elearning-experiences-that-will-blow-your-learners-minds/

Zhu, P., & St. Amant, K. (2010). An application of Robert Gagné's nine events of instruction to the teaching of website localization. *Journal of Technical Writing and Communication, 40*(3), 337–362.

Appendices

Appendix A

Baker University Institutional Review Board Request

BAKER UNIVERSITY

IRB Request

Date 2-23-2022

IRB Protocol Number _____ (IRB use only)

I. Research Investigator(s) (students must list faculty sponsor)

Department(s) Instructional Design and Human Performance Technology

	Name	Signature	
1.	Cynthia Higgins	C.A. Higgins	Principal Investigator
2.	Dr. Wendy Gentry	Wendy Gentry Digitally signed by Wendy Gentry Date: 2022.03.01 12:14:27 -05'00'	☐ Check if faculty sponsor
3.	Dr. Cho Kyunghwa	Digitally signed by Kyunghwa Cho Date: 2022.03.01 06:56:07 -06'00'	☐ Check if faculty sponsor
4.			☐ Check if faculty sponsor

Principal investigator contact information

Phone 785-542-2606

Email CynthiaAHiggins@stu.bakeru.edu

Address 1023 Elm Street
Eudora, KS 66025

Note: When submitting your finalized, signed form to the IRB, please ensure that you cc all investigators and faculty sponsors using their official Baker University (or respective organization's) email addresses.

Faculty sponsor contact information

Phone _____

Email _____

Expected Category of Review: ☑ Exempt ☐ Expedited ☐ Full ☐ Renewal

II. Protocol Title

Use of Gagnes Instructional Strategy in Occasional Design of Online, Asynchronous, Slide-Based Lessons

III. Summary:

The following questions must be answered. Be specific about exactly what participants will experience and about the protections that have been included to safeguard participants from harm.

A. In a sentence or two, please describe the background and purpose of the research.

The purpose of this qualitative study is to identify the extent to which seven online, slide-based lessons include elements of Gagne's Nine Events of Instruction. This is done as a prelude to recommending a possible instructional strategy intervention that can be introduced in a lesson design formula training for subject matter experts who lack instructional design expertise but are tasked with constructing online slideware lessons.

B. Briefly describe each condition, manipulation, or archival data set to be included within the study.

The online, asynchronous slideware lessons chosen to best answer the research question are located on an online site (https://ks.train.org/ks/home), an affiliate of the Public Health Foundation Training Finders RealTime Affiliate Intergrated Network (TRAIN), which contains online lessons that can be accessed by the public after account creation. The data being used do not have information identifying human subjects.

IV. Protocol Details

A. What measures or observations will be taken in the study? If any questionnaire or other instruments are used, provide a brief description and attach a copy.

The Nine Events Interpretation Checklist developed by Cindy Higgins, the researcher, lists each of the Nine Events with possible interpretations for binary evaluation and use with each lesson. Units of analysis will be examined individually with the checklist to identify existence of Gagne's nine-step instructional process and event interpretation. Data from the seven lessons' results will be organized and analyzed into groupings characterized by similarity and sequence to discern patterns.

B. Will the subjects encounter the risk of psychological, social, physical, or legal risk? If so, please describe the nature of the risk and any measures designed to mitigate that risk.

They will not encounter any psychological, social, physical, or legal risk.

C. Will any stress to subjects be involved? If so, please describe.

Any sort of stress to human subjects is not anticipated.

D. Will the subjects be deceived or misled in any way? If so, include an outline or script of the debriefing.

Any deception or misleading possibilities to human subjects does not exist.

E. Will there be a request for information which subjects might consider to be personal or sensitive? If so, please include a description.

No information is being requested from human subjects.

F. Will the subjects be presented with materials which might be considered to be offensive, threatening, or degrading? If so, please describe.

Human subjects are not part of this study, thus, human subjects will not be presented with materials that might be considered to be offensive, threatening, or degrading.

G. Approximately how much time will be demanded of each subject?

Human subjects are not part of this study, thus, time is not being requested from human subjects.

H. Who will be the subjects in this study? How will they be solicited or contacted? Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.

Human subjects are not part of this study, thus, they will not be solicited or contacted.

I. What steps will be taken to insure that each subject's participation is voluntary? What if any inducements will be offered to the subjects for their participation?

Human subjects are not part of this study.

J. How will you insure that the subjects give their consent prior to participating? Will a written consent form be used? If so, include the form. If not, explain why not.

Human subjects are not part of this study. The study is using public documents without an identifiable designer.

K. Will any aspect of the data be made a part of any permanent record that can be identified with the subject? If so, please explain the necessity.

Human subjects are not part of this study. The study is using documents without an identifiable designer and will not be part of any permanent records.

L. Will the fact that a subject did or did not participate in a specific experiment or study be made part of any permanent record available to a supervisor, teacher, or employer? If so, explain.

Human subjects are not part of this study.

M. What steps will be taken to insure the confidentiality of the data? Where will it be stored? How long will it be stored? What will be done with the data after the study is completed?

The documents being reviewed are on a public online database (https://ks.train.org/ks/home). Printouts can be placed in the dissertation appendix, and digital files will be saved by the researcher.

N. If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subjects or society?

No risk is involved. Future quality improvement of employee training and employee slide-based lessons is an expected study outcome.

O. Will any data from files or archival data be used? If so, please describe.

Yes. Public-available documents are the primary source. Research does not involve merging any data in such a way that individuals might be identified nor are there potentially identifiable data.

Appendix B

Baker University Institutional Review Board Approval

BAKER UNIVERSITY
Own Confidence

Baker University Institutional Review Board

March 7th, 2022

Dear Cynthia Higgins and Wendy Gentry,

The Baker University IRB has reviewed your project application and approved this project under Exempt Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.
6. If this project is not completed within a year, you must renew IRB approval.

If you have any questions, please contact me at npoell@bakeru.edu or 785.594.4582.

Sincerely,

Nathan Poell, MLS
Chair, Baker University IRB

Baker University IRB Committee
Sara Crump, PhD
Nick Harris, MS
Christa Hughes, PhD
Susan Rogers, PhD

Appendix C

Nine Events of Instruction Interpretation Checklist

Table C1.

	Researcher and Practitioner Interpretations		**Gagné Definitions***
Event 1 *Gain attention*	• Animation • Audio • Interactive activity • Interesting fact/statistic • Introductory screen • Poll • Pre-test/Quiz • Quote • Story/Anecdote • Thought-provoking question • Video • Visual		Introduce an unexpected stimulus change that appeals to learners' curiousity such as video clip, question, or animation.
Event 2 *Inform learner of objectives*	• Benefits objective • Bullet objective • Question objective • Title		Answer learners' question about expected knowledge to be acquired by the lesson outcome
Event 3 *Stimulate recall of prior prerequisite learning*	• Data visualization • Open-ended questions • Pre-test with answers • Refresher knowledge		Tap into previous knowledge such as question about recognition or recall and remind of needed knowledge
Event 4 *Present stimulus material*	Text, image, audio, video, and animation		Display information in different media
Event 5 *Provide guidance*	• Checklist • Data visualization • Examples/demonstration/analogies/case studies • Hints/clues • Mnemonics • Summary • Visual indicators		Help store and recall information with hints, prompts, scaffolding, and other means

Event 6 *Elicit performance*	• Branching scenario • Quiz questions • Simulation	Prompt recall of presented information and provide opportunity for feedback
Event 7 *Provide feedback*	• Corrective feedback • Informative feedback • Rubric • Second-attempt feedback • Self-assessment/rubric	Give information about performance correctness
Event 8 *Assess performance*	• Branching scenario • Self-assessment/Checklist • Summative test	Test for knowledge to be attained ideally a number of times in different ways
Event 9 *Enhance retention and transfer*	• Checklist • Data visualization • FAQ (Frequently asked questions) • Resources and learning opportunities • Summary provision	Have learners apply knowledge in variety of tasks and at spaced intervals

Note. Source citations for above right column include Gagné & Driscoll (1988); Gagné, Briggs, & Wager (1988); and Gagné, Wager, Golas, & Keller (2005).

Appendix D

Compilation of Nine Events Interpretation Checklist

A total of 89 publications were examined. Publications were eliminated if they did not offer concrete interpretations or focused on aspects outside the study scope. Interpretations were discarded for being too specific for generalization; non-applicability (e.g., use of discussion boards, assignments, in-person classroom strategy) to the stand-alone, online, asynchronous slideware lesson in the workplace; and outside Nine Events' definitional parameters. Researcher interpretations interpreted the events similarly to practitioners. For further information and research replication, source publication information was indicated by each interpretation listing.

Three events, Event 2 (objectives); Event 4 (stimulus material, the overall lesson); and Event 7 (feedback) do not list interpretations because each event is self-definitional and varies primarily in format and degree.

Researcher-Designated Nine Event Interpretations

Gain attention

- Video clip (1, 6, 8, 9, 10, 11, 12, 13, 16, 19, 22, 23)
- Animation (4, 6, 18, 21)
- Audio (4, 17)
- Visual (3, 8,11, 17, 18)
- Thought-provoking question (1, 4, 5, 7, 10, 11, 16, 17, 22)
- Interesting fact/statistic (1, 7, 2, 11)
- Quote (1, 7, 17)
- Story/Anecdote (7, 24)

- Pre-test/Quiz (1,7)
- Interactive activity: Click on image (9)
- Introductory screen (3, 20)

Inform learners of objectives

- Title (18)

Stimulate recall of prior learning

- Pre-test (5, 17)
- Questions about previous experiences or knowledge (2, 3, 4, 7, 8, 9, 10, 11, 13, 23, 24)
- Refresher/Need to know information/Summary (5, 6, 12, 17, 20)
- Review answers to pre-test (7)
- Picture matching (9)

Present stimulus material

- **Provide learning guidance**
- Examples/demonstration/analogies/case studies (2, 4, 7, 11, 13, 14, 18, 23)
- Hints/clues (3, 5, 7, 8, 9, 10, 12)
- Mnemonics (5, 11)
- Pop-ups for more explanation (6)
- Additional readings (6, 19, 24)
- Data visualization (2, 7, 18)
- Interactive diagram (6)
- Questions (24)
- Quiz with explanations (11)

- Interactive flashcards (19)
- Rubrics/checklist (19, 22)
- Present unlearning opportunity (5)
- Summary (17, 20)

Elicit performance (practice)

- Quiz (3, 4, 6, 8, 14, 17, 9)
- Game (3)
- Simulation (7)

Provide feedback

- Self-assessment (9)

Assess performance

- Summative test (2, 3, 4, 12, 13, 15, 17)
- Self-assessment (2)
- Checklist (7)

Enhance retention and transfer

- Resources and learning opportunities (e.g., articles, lessons)(1, 14)
- Data visualization (3, 12)
- Summary provision (3, 5, 6, 11, 17, 22, 23)
- Self-assessment/checklist (7, 23)
- Scaffolding (8)

References to numerals cited above

1. Al-Eraky (2012)

2. Al-Shalabi, Andraws, Alrabea, & Kumar (2012)
3. Al-Shammari, Elgazzar, & Nouby (2015)
4. Baba, Sale, & Zirra (2017)
5. Bonner (1982)
6. Brooks (2021)
7. Cheung (2016)
8. Deubel (2003)
9. Dowling (2011)
10. Gagné & Driscoll (1988)
11. Khadjooi, Rostami, & Ishaq (2011)
12. Medina (1990)
13. Mei, Ramli, & Ajhirtani (2015)
14. Miner, Mallow, Theeke, & Barnes (2015)
15. O'Byrne, Patry, & Carnegie (2008)
16. Qutieshat (2018)
17. Ratliff, Masen, Sullivan, Fleming, & Carney (2012)
18. Soo-Phing & Kian (2007)
19. Surrency & Barbie (2018)
20. Sweeters (1994)
21. Theng & Mai (2009)
22. Wong (2018)
23. Woo (2016)

24. Zhu & St. Amant (2010)

Educator/Practitioner-Designated Nine Event Interpretations

Gain attention

- Video clip (1, 2, 3, 4, 5, 8)
- Audio (6)
- Visual (5, 6)
- Thought-provoking question (2, 3)
- Interesting fact/statistic (1, 3, 6)
- Quote (10)
- Story (3)
- Real-world example (2)
- Pre-test/Quiz (2)
- Challenge (3)
- Game (3)
- Poll (3)

Inform learners of objectives

Stimulate recall of prior learning

- Pre-test (3)
- Knowledge check (1, 2)
- Questions about previous experiences/understanding (2, 5, 7)

- Refresher/Summary (3, 8)
- Data visualization (8)

Present stimulus material

Provide learning guidance

- Examples/analogies/case studies (2, 4, 5, 6)
- Hints/cues/prompts (2)
- Mnemonics (4)
- Announcements of important information (2)
- Visual indicators (arrows, highlights, callouts, focused lightening) (2, 8)
- Quiz (5)

Elicit performance (practice)

- Quiz (1, 3, 5, 6, 7)
- Scenario/Branching scenario decisions (3)
- Simulation (1)

Provide feedback

- Rubric (3)
- Self-assessment with checklist (8)

Assess performance

- Summative test (1, 2, 3, 5)
- Pretest/Post test (2)

Enhance retention and transfer

- Resources (1, 2)

- Challenge/game with reward (5)
- Concept maps or outlines (2)
- Paraphrase content (2)
- Real-world examples (2, 3)

References to numerals cited above

1. Boogard (2022)

2. Corley (n.d.)

3. DeBell (n.d.)

4. Dalto (2012)

5. Growth Engineering (2019)

6. Mansbach (2016)

7. Potter (2020)

8. Rogers (2017)

Educator/Practitioner -Designated Nine Event Interpretations

Specifically Addressing Online Learning

Gain attention

- Video clip/animation (1, 2, 4, 7, 9, 10, 11)
- Visual (1, 8)

- Thought-provoking questions (2, 3, 4, 6, 7, 8, 9, 11)
- Quote (8)
- Story/Scenario/Anecdote (3, 4, 5, 6, 7, 8, 9, 11)
- Interactive activity: Hot spot (2) Other (9)
- Challenge/Problem (3,11)
- Poll (2)

Inform learners of objectives

Stimulate recall of prior learning

- Knowledge check (2, 5, 6, 7, 11)
- Questions (4, 6, 7, 9, 11)
- Problem to solve (7, 11)
- Self-assessment (11)
- Summary of need-to know information (1, 2, 3)
- Analogy (6)

Present stimulus material

Provide learner guidance

- Examples/Non-examples/Metaphors/Analogies (1, 2, 4, 6, 7, 11)
- Case studies/stories (1, 2, 4, 6, 11)
- Tips/hints/scaffolds (4, 7, 9, 11)
- Mnemonics (1, 9)
- Data visualization (2, 6, 11)
- Checklist (5)

- Job aids (2)
- Study guide (5)

Elicit performance (practice)

- Quiz (1, 5, 6, 11)
- Scenario decisions (7,11)

Provide feedback

Assess performance

- Summative test (1, 2, 4, 5, 6, 7, 9, 11)
- Game (9)

Enhance retention and transfer

- Resources (1, 2, 7, 11)
- Summary (6)
- Checklist (3)
- FAQ (1)

References to numerals cited above

1. Arshavskiy (2016)

2. Colman (2020)

3. G-Cube (2017)

4. Goel (2019)

5. Hogle (2017)

6. Jaiswal (2020)

7. LaMotte (2015)

8. Omer (2019)

9. Peck (2020)

10. Penfold (2016)

11. WBT Systems (n.d.)

12. Your eLearning World (n.d.)