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# Developing Distance Education Content Using the TAPPA Process

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ORIGINAL PAPER

# Developing Distance Education Content Using the TAPPA Process

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**Abstract** The proliferation of distance education has occurred alongside the emerging technologies of the Web 2.0 and Web 3.0 environments, changing the way instructors approach, design, and deliver their instructional materials. In the past, instructional design (ID) practitioners relied on instruction system design (ISD) models that focused primarily on macroinstruction. It is now important for these practitioners to use microinstruction strategies to keep pace with the technology evolution. This case study describes the TAPPA (Target, Accomplishment, Past, Prototype, Artifact) Process which was created using the Generic Model for Design Research (GMDR) proposed by McKenney and Reeves (2012) and uses selected ID concepts from the ADDIE (Molenda *Performance Improvement, 42*(5), 34–37, 2003) framework, and the Dick and Carey (Dick *Educational Technology Research and Development, 44*(3), 55–63, 1996), Backwards Design (McTighe n.d), and Rapid Prototyping ID Models (Tripp and Bichelmeyer *Educational Technology Research and Development, 38*(1), 31–44, 1990). The TAPPA Process is ideally suited for the microinstruction development typical of distance education environments and has been used to create more than 25 webinars and 12 e-learning modules over the past four years.

**Keywords** Design-based research · Distance education · Instructional design process · Instructional design · Microinstruction · Online education · Online learning · Web-based instruction · Webinars

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## Institutional Context

Morrison et al. (2013) explain that an instructional designer "has the primary responsibility for designing the instruction" (p. 19). That design is where the instructional designer has a significant amount of flexibility. Instructional design projects are similar to puzzles. Although there are multiple methods for piecing a puzzle together, some strategies are more efficient than others. Likewise different instructional designers may reach similar conclusions for their 'puzzles,' though they may reach them in different ways. Christensen (2008) suggests that instructional designers should pick what process works for them and be fluid in their approaches. Instructional systems design (ISD) models are typically set up to reflect contemporary environments and limitations. As new technologies surface, instructional designers must look at ways to integrate them into instruction. The Dick and Carey Model (Dick 1996) and ADDIE (Molenda 2003) were created before online education was prevalent (Irlbeck et al. 2006) and therefore may not be good fits for distance education content development. Irlbeck et al. (2006) continue to explain that because an increasing number of instructors and learners are taking advantage of online education, instructional design (ID) practitioners must adapt their design models accordingly (Irlbeck et al. 2006).

The TAPPA (Target, Accomplishment, Past, Prototype, Artifact) Process was created using the Generic Model for Design Research (GMDR) proposed by McKenney and Reeves (2012), and is ideally suited for the microinstruction development typical of distance education learning environments by serving three main purposes:

1. Maximizing the efficiency of rapid prototyping by adapting the instructional design principles of analysis and assessment offered by ADDIE (Molenda 2003) and

the Dick and Carey (Dick 1996) Model, and utilizing the framework of the backwards design approach.
2. Creating a process that allows for the consistent development and delivery of instructional materials in an online learning environment.
3. Creating an adaptive and responsive process wherein both novices and experienced practitioners can develop online learning environments.

The author developed the TAPPA Process at a school within a tier 1 research institution in the southeast United States. The education and training within this school is unique as it is tailored primarily to local government officials instead of traditional undergraduate and graduate students. Resultantly, the school's client group is most closely aligned with adult learners and its course offerings generally include seminars and workshops that meet continuing education or professional development criteria. Each year this school typically offers between 100 and 150 face-to-face courses to more than 10,000 attendees ranging in topics from property taxes to ethics. Additionally, following the economic downturn of 2008 and its consequent downsizing of local government travel budgets, the school began devoting Information Technology Division (ITD) infrastructure and personnel to the development of its online course offerings.

In 2010 the school's ITD had an existing workflow process for the delivery of webinars, e-learning modules, and classroom captures. This process did not, however, provide any instructional design guidance and focused more on the technical requirements for course delivery options and the associated responsibilities in supporting these requirements. The author aimed to develop an instructional design process to support effective creation and delivery of distance education offerings by applying the GMDR originated by McKenney and Reeves (2012). The author hoped this process would foster consistent development of instructional materials as client group demand for distance education offerings increased. Of the school's distance education offerings—webinars, classroom captures, and e-learning modules—the author chose to develop the TAPPA Process using webinars because they are most frequently chosen by school faculty. The author set out to create a hybrid instructional design process that met the specific needs of the school's work: a process adaptable enough to support the diverse populations served by the school's distance education while providing an easily replicated structure to meet the growing demand for these offerings.

Instructional design practitioners should select a design model that enables them to reach a desired goal, whether this is creating a self-paced e-learning module or a synchronous learning event, such as a webinar. Gordon and Zemke (2000) identify four main deficiencies with ISD models including being "too slow and clumsy" and "cling[ing] to the wrong world view" (p. 44). In the past, technological limitations made product revisions a challenge; thus, greater emphasis was placed on the planning stages of projects, as evidenced in the front-end analysis steps of ADDIE (Molenda 2003) and the Dick and Carey Model (Dick 1996). Rovai (2004) identifies a paradigm shift within higher education that is changing the focus from "providing instruction" to "producing learning" (p. 81).

Improvements in technology have made multiple revisions possible, resulting in a more recursive and iterative design process. The three-phase model proposed by Sims and Jones (2002), which includes the "notion of iterative development" allowing for "prototypes [that] test the water before the completion of the entire course" (p. 4), reflects this new emphasis. The Sims and Jones (2002) model aligns with the characteristics of design-based research and the development of online learning environments. Arshavskiy (2013) cited Michael Allen's belief that because it is not possible to create a "perfect product", instructional designers should instead "focus on producing useable [e.g. prototypes] products as quickly as possible" (p. 17). Technology now affords even a novice practitioner the ability to produce mockups for instructors to review and provide feedback on using e-learning software applications such as Articulate Storyline and Adobe Captivate. The TAPPA process takes advantage of these abilities to produce more prototypes and reinforces the type of iterative design process common in more contemporary instructional design models.

Despite the integration of project management phases like initiation, planning, and development, existing design models often have project management shortcomings (van Rooij 2010). Instructional design does not happen in a vacuum or an academic bubble (Gordon and Zemke 2000). Furthermore, ID cannot realistically be separated from project management requirements such as tight deadlines, efficient and competitive allocation of resources, collaborative development, management of conflicting goals, and established institutional workflows (van Rooij 2010). As the volume of projects increases and production times are reduced, it is vitally important for trainers (and those developing training) to have a strong project management foundation (Fabac 2006). Effectively managing projects to ensure learning objectives are met is a critical function of instructional design and research has demonstrated that the instructional methods used determine the effectiveness of the instruction (Clark 2002).

Amiel and Reeves (2008) suggest that an outcome from design-based research can be a set of "design principles or guidelines…which can be implemented by others… in similar settings" (p. 35). Such an outcome was one of the goals of developing the TAPPA Process. The author determined that a process specifically tailored to the development of microinstruction for the creation of online instructional materials would align well with the design-based research approach. There is a wealth of models to choose from to facilitate instructional design projects, but as Reigeluth and An (2006)

suggest, "the primary research question is not whether a method works, but which method is preferable" (p. 51). Design-based research methodology focuses on the "how, when, and why educational innovations work in practice" (Design-Based Research Collective 2003, p. 5). One of the key components of design-based research is the close relationship between researchers and practitioners. The author worked closely with subject matter experts (the faculty) in the creation of webinars and used evaluations at the end of each webinar to provide formative feedback on the development of the process.

## Developing the TAPPA Model

McKenney and Reeves (2012) identify educational design research as a way to simultaneously advance both "theory and practice" (p. 19). Reeves et al. (2005) believe experimental research designs are not the best fit for instructional technology and instead recommend a "design research" approach (p. 102), which Oh and Reeves (2010) define as being "interactive, iterative, and flexible" (p. 266). Reeves et al. (2005) identify six characteristics for design-based research: focus on complex problems, integration of design principles with technological affordances, inquiry to refine the learning environment and reveal new design principles, long-term engagement and refinement of research methods, intensive collaboration, and theory construction and problem solution. Oh and Reeves (2010) identify the connection between theory and real world settings as an important component of design research. By engaging in design-based research, one can create an "intervention," which Shattuck and Anderson (2013) define as an "object, activity or process that is designed as a possible solution to address the identified problem" (p. 187). Sharing this intervention in the form of a process or theory can make it a resource for other ID practitioners (Teras and Herrington 2014). These outcomes of design-based research align well with the development and subsequent sharing of the TAPPA Process; while the process may not work for every instructional designer, it can help provide ideas and insight. Keeping in mind these important characteristics of the design research approach, the author also employed the three phases of the GMDR, as outlined by McKenney and Reeves (2012) in the development of the TAPPA Process: analysis and exploration, design and construction, and evaluation and reflection.

### Phase 1: Analysis and Exploration

The initial phase of the GMDR involves identifying a problem and producing a diagnosis (McKenney and Reeves 2012). A literature review of possible solutions is conducted to identify the "content, structure and instructional approaches of an intervention" (Shattuck and Anderson 2013, p. 188). The author wanted to determine the most efficient and effective way to develop online instructional materials and deliver them to the school's clients. While the existing process used by the Information Technology Division addressed many communication and infrastructure protocols, it did not address how to create the content delivered through these channels. Additionally, the new process had to be replicable and capable of developing high-quality, consistent course materials—in this case, webinars. Morrison et al. (2013) state that task analysis is "one of the most, if not the most, important part of the process" (p. 15). It is important to have a good understanding of the current environment before being able to properly assess and identify solutions. The author looked closely at the existing work and processes being used for the development of webinars to understand areas to improve the overall process.

In addition to looking at the process itself, the author wanted to also understand learners' needs and ensure that the TAPPA Process was meeting them. Morrison et al. (2013) explains that with a learner analysis it is important for the designer to "identify those characteristics [that are] most critical to the achievement of the specific training objectives" (p. 52). This is why the TAPPA Process starts with the 'target' stage – to anticipate the desired outcomes and then work backwards to determine what would be needed to reach those learning objectives. It would be incredibly difficult to design effective instruction without a solid task and learner analysis (Morrison et al. 2013).

### Phase 2: Design and Construction

McKenney and Reeves (2012) explain that in the design and construction phase, "a coherent process is followed and documented to arrive at a (tentative) solution to the problem" (p. 79). Furthermore, during the design phase, "potential solutions to the problem are generated, explored and considered, then mapped using a variety of techniques" (p. 79).

**Design** Bennett (2011) states, "well-designed and implemented formative assessment should be able to suggest how instruction should be modified" (p. 7). By analyzing data collected at the end of each webinar – specifically in the areas of overall satisfaction, content organization, satisfaction with technology, and length of the webinar – the author was able to identify areas for improvement of the TAPPA Process and use this data throughout the design cycle. At the conclusion of the first webinar to use TAPPA in October 2010, attendees were asked to complete a survey. The 38 submitted responses (Fig. 1) indicated that the structure and delivery of the webinars needed change to ensure adequate time for completion. Several steps were implemented to mitigate this concern. First, webinar registrants were contacted before the webinar and asked to submit questions so that they could be incorporated into the presentation. When external presenters were

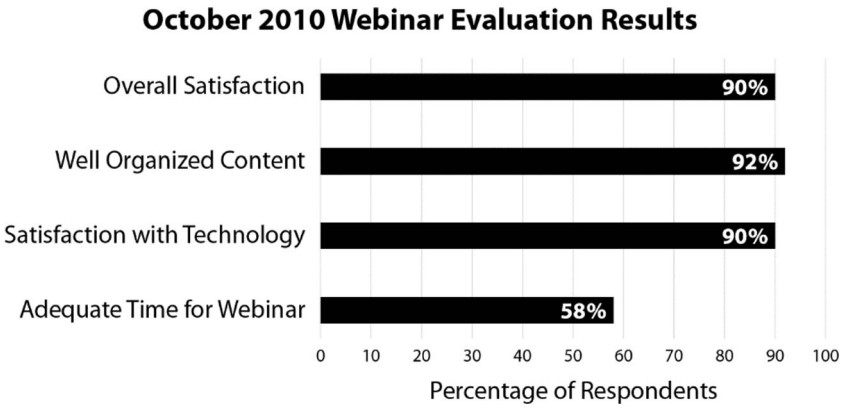


**Fig. 1** Snapshot of webinar evaluation results from October 2010 webinar ($n = 38$)

involved in webinars, clearer expectations were provided to better prepare them for potential questions. Also, a more thorough dry run involving presenters and content was implemented to streamline timing prior to the live webinar.

To refine the TAPPA Process, the author used the webinar evaluation results and continued to work with faculty members to deliver webinars. In 2012 the TAPPA Process was used in the development and delivery of eight webinars, one of which was a series focusing on public health systems research. This series included multiple faculty members, but no external co-presenters. The overall attendance for this webinar was larger than that of the 2010 webinar represented in Figs. 1, and 2 shows a comparison between the two. Three of the four evaluation categories (overall satisfaction, organization of content, satisfaction with technology) remained consistent between the two samples, and the time category showed significant improvement. This indicated that the changes implemented since the 2010 webinar—including a more comprehensive dry run and the solicitation of participant questions beforehand—were effective.

## Construction

McKenney and Reeves (2012) define the second phase of the GMDR as "taking design ideas and applying them to actually manufacture a solution" (p. 79). Thus, the author used the results from the design part of this phase and created the five-step TAPPA Process to devise a set of steps that could be used consistently when undertaking other distance instruction projects.

Bourdeau and Bates (1996) offer a distinction between the macro and micro levels of instruction. Specifically, macroinstruction is defined as the "design of curriculum, courses, instructional materials, learning activities, and support staff training," and microinstruction as the design of "multimedia documents and interactive activities" (Bourdeau and Bates 1996, p. 271). Macro strategies involve bundling microinstructional tasks into a larger entity, such as a curriculum or a course. These strategies seek to group individual, or micro, ideas into a synthesized concept. In the TAPPA Process, the practitioner breaks the tasks into individual pieces, then designs and groups them to form the macro level of instruction. This sequencing of separate, individual chunks leads to more effective macro-level instruction, which ultimately benefits students (Van Patten et al. 1986).

## Phase 3: Evaluation and Reflection

**Evaluation** The final stage of GMDR provides for evaluation of and reflection on the intervention. This intervention—the creation of the TAPPA Process—was an iterative development project that took place over four years. One of the goals was to increase the number of webinars offered while maintaining high levels of quality and consistency. To test the effectiveness of the TAPPA Process, the author used it to develop 16 webinars in 2013–2014 and then compared the aggregated summative evaluation results to those from the May 2012 webinar (see Fig. 3). As with the previous webinars, the attendees completed an evaluation form at the end of the webinar and the author examined assessments in four categories: length, technology, content, and overall satisfaction. The aggregated data for these 16 webinars is nearly identical to, and shows some improvement upon, the data from the May 2012 webinar. As the TAPPA Process has been tweaked, these assessment numbers consistently show an effectiveness rating of 90–96 %. A telling statistic is the 86 % of respondents reporting that the webinar was of adequate length. This statistic is especially noteworthy in that it is based on an aggregate of 16 webinars and averages out to be significantly higher than the initial results in 2010, where only 58 % of the respondents felt the webinar was of sufficient length.

## Reflection

The goal of this study is to develop a process that may prove useful for other ID practitioners and be applied to a larger sample size of more diverse projects and client and learner groups. As the TAPPA process is applied to a larger sample

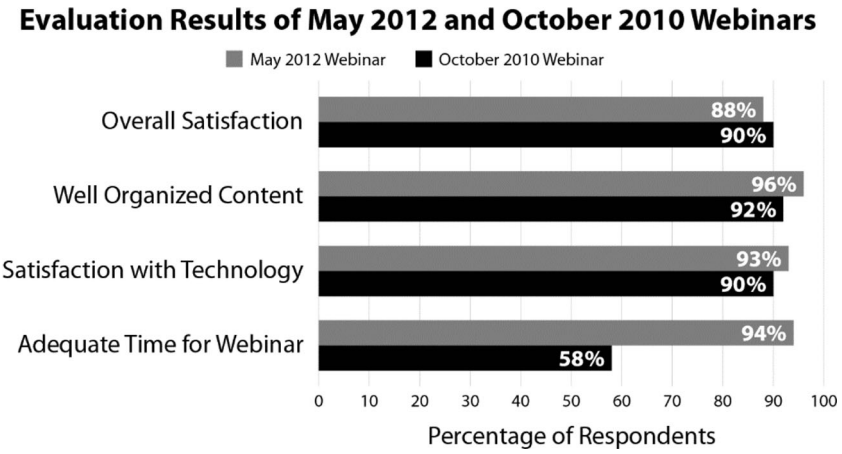


**Fig. 2** Comparing evaluation data between October 2010 ($n = 38$) and May 2012 webinars ($n = 78$)

size, its steps may be refined and adapted to increase the effectiveness of the model for subsequent application to other projects, industries, and learning environments. Since its development in the context of webinars, the TAPPA process has been used in creating e-learning modules as well. This study is limited in that it reflects the experience of only one instructional designer and should be tested with other materials such as e-learning modules and classroom captures. Future research on how other instructional designers have used and applied these five steps in their own projects would further improve and refine the TAPPA process.

## Introducing the TAPPA Process

Successful instructional design models must be able to adapt to the specific project for which they are being used. While some ISD models use straight lines to represent the progression between steps, the TAPPA Process is best depicted with a double helix structure, similar to DNA (see Fig. 4). Kennedy-Clark (2013) suggests that "cyclic and iterative processes involved in design-based research are aligned with the authentic design of educational environments" (pp. 26–27). The decisions at each step can yield different pathways to the next step, and the process will bend and flex as the project dictates. The TAPPA Process is intended to give maximum flexibility to the instructional designer while providing a framework to move through the design, development, and implementation process. The five steps of the TAPPA Process are outlined below in Fig. 4.

### Step 1. Target: what is the End Result or Goal for this Project? What is the use of the Artifact?

The practitioner must know the expected end result to create the framework for the next steps, and this step prompts the instructor to brainstorm the project's intended result, goal, or target and reflects the influence of the Backwards Design Model (McTighe n.d.) on the TAPPA Process. The Backwards Design Model does not provide guidance for the next step after collecting information, but the TAPPA Process addresses this gap by recommending subsequent steps as well

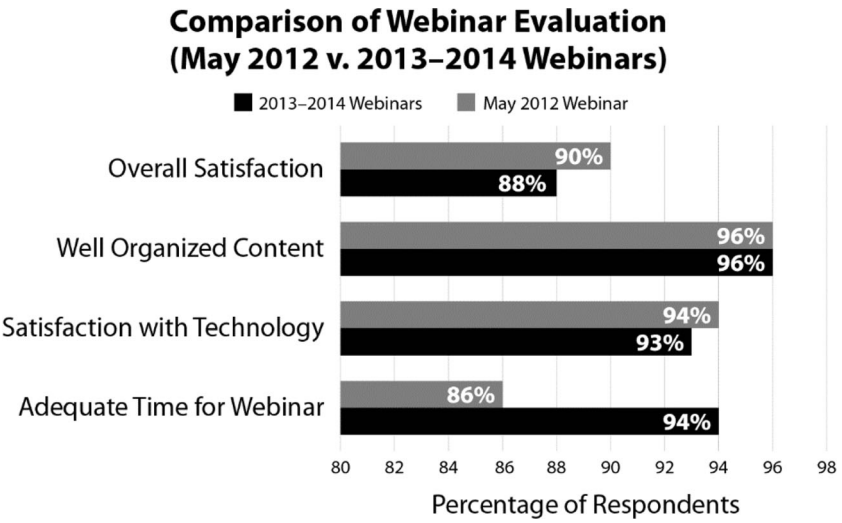


**Fig. 3** Comparison of Webinar Evaluations between May 2012 ($n = 78$) and 2013–2014 webinars ($n = 755$)

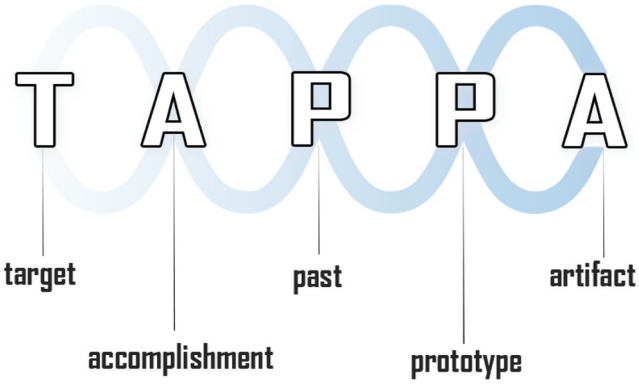


**Fig. 4** The TAPPA Process

as allowing regression at any point. This fluidity makes the overall process more iterative and recursive. Identifying an end result at the outset will foster a more explicit and concise approach in the development of learning objectives and simplify the determination of appropriate steps to reach those goals. One of the potential challenges in working with subject matter experts (SMEs), particularly ones new to online learning environments, is they may not know exactly how they want their artifact or instruction to look. They may make comments such as 'I will know it when I see it' during the initial instructional design meetings. With the TAPPA Process the discussion is focused instead on the end result in terms of objectives, e.g., 'I want students to be able to demonstrate an understanding of the different types of conflicts of interests'. This then allows the instructional designer and instructor to work backwards from this objective and determine what type of instruction would help reach that goal.

### Step 2. Accomplishment: what are you Hoping to Accomplish with this Artifact and how will you know if you have Accomplished it?

In this step the practitioner works with the instructor to determine the most effective methods for evaluating the project. Will a summative evaluation of the learners, which asks them to complete some type of comprehensive test, be used? Will the instructor choose a formative assessment in which learners provide informal feedback during the activity? These details should be considered early in the process because they will impact subsequent steps focusing on development and implementation.

The second step of the TAPPA Process is an adaption of the front-end analyses found in the ADDIE and Dick and Carey Models, which are meant to determine the objectives and inform the next step in the design process. In this step, the practitioner should define what will make this project successful and how success will be evaluated. This consideration is significant because it can reshape the scope of the project and quickly illuminate issues with the overall vision; it can help ascertain whether the target is achievable and realistic. By determining this at an early stage, the practitioner can identify potential pitfalls and avoid them before moving on to the development and design phases. Understanding the complexity and definition of success at the onset will help the designer determine the next steps.

### Step 3. Past: have you Done Anything Like this Previously? What did you Learn from that Experience that can Provide Guidance for this Project?

The practitioner should now consider past experiences that may be applicable to the project. Has the practitioner or have others attempted comparable projects that could provide additional insight? How long did similar projects take to complete? Should the practitioner do something differently this time? These considerations mark the midpoint of the TAPPA Process, allowing the practitioner to step back to evaluate progress and potentially seek feedback from peers, subject matter experts, or learners that will be invaluable in completing later steps. This step incorporates elements of formative evaluation in that it utilizes feedback from past implementations to determine if changes can be made to improve the artifact in this new environment (Bennett 2011).

The third step in the TAPPA Process is an adaption of software versioning, which was the basis of the Rapid Prototyping Model (Tripp and Bichelmeyer 1990). Software developers routinely reuse existing code and build on existing architecture to create or update products. This method ensures rapid development because developers do not need to debug code they already know works correctly. It also facilitates prototyping because the practitioner can proceed from a working example as opposed to starting from scratch. Rapid prototyping is meant to increase effectiveness while addressing the problems in efficiency that plagued other design processes (Tripp and Bichelmeyer 1990). Applying well to microinstruction, it can expedite development and ensure a higher success rate for the project as a whole. Even more, as the portfolio of work grows, so does the ability to take on increasingly complicated projects by building off of similar existing projects.

### Step 4. Prototype: can you Create a Mock-Up or an Example of the Finished Product? Can you Demonstrate the First Part of the Project in Order to Generate Feedback for Future Iterations?

The TAPPA Process consolidates the evaluation, design, and development phases into one step. While learner input is not explicitly sought until this point, subject matter experts have been intimately involved in earlier steps and their feedback has been implemented. With the information gathered in the first three steps (Target, Accomplishment, Past), the

practitioner can determine how to address the project's objectives. The information ascertained during the previous stages will help inform the prototype stage, which was adapted from the Rapid Prototyping Model.

At the fourth stage, the practitioner will create prototypes in order to receive feedback from the target audience of learners. The practitioner using the TAPPA Process does not request learner input until this point because learners are often unable to articulate exactly how they wish to receive instruction. Piskurich (2006) explains that in the Rapid Prototyping Model, the user group should utilize the prototype the same way they would the finished product. The benefit of this approach is that user feedback during this stage will facilitate a quicker transition to the production stage. Furthermore, the faculty member whom the ID practitioner is assisting may also struggle to adequately articulate learners' needs. The need for visual representation makes rapid prototyping a very effective design method; it allows the practitioner to begin producing visual examples to share with faculty in order to receive feedback relatively early in the process. The faculty member in turn can share these examples with learners to get their input and relay this information back to the practitioner.

Another advantage of the prototype stage is that all viewers (both learners/instructors and the practitioner) are now looking at the same artifact. The learners can point to a specific part of the artifact and give feedback; for example, they can ask the instructor to change a color to be consistent with an artifact already in use, which can be shared with the practitioner for consideration for future prototypes.

During the Accomplishment and Past stages, expectations were set for the artifact's creation, dictating the type of evaluation required. For example, if the instructor is creating self-paced tutorials, formative assessment would likely be used for evaluation purposes. The instructor would create a sampling of these tutorials, share them with learners, and determine whether they are effective and in the preferred format. If the instructor receives positive feedback, he or she would complete additional tutorials in the same manner. During this formative assessment, the instructor would seek feedback particularly on added elements, such as audio levels or the effectiveness of zooming in on specific areas. The instructor would then be able to change or replicate those elements for future tutorials. This initial feedback allows the instructor to rapidly produce the remaining tutorials and deliver them to learners. The instructor would likely seek final evaluations and feedback as well. Generally, however, all tutorials would not be revised unless a major change, such as a significant update to the software, occurred.

The TAPPA Process is ideally suited for micro-learning tasks that together comprise a macro-learning task, such as a full program of study. Here the instructor would develop an instrument to comprehensively assess the effectiveness of the instruction. For an online or self-paced module, the instructor would likely use some formative assessment within the module itself to reinforce key concepts, particularly if the module is dense in content. The designer should also consider whether the instructor needs learners to gradually build knowledge over the course of the module in order to continue.

Even though the Prototype stage is the fourth step of the TAPPA Process, the nature of the process allows quick progression through the previous stages. The Past step, for example, provides an opportunity to tap into previous results, such as feedback on a similar project, which can shape the new prototypes. The ADDIE and Dick and Carey Models present development and evaluation as sequential steps, while the Rapid Prototyping Model considers them concurrent, but distinct. The TAPPA Process consolidates them into one step. This consolidation emphasizes the iterative nature of the development process and shows how design influences development, which in turn can be adjusted after receiving feedback. The process can be repeated as often as necessary to reach the desired outcomes. The project will likely remain at this step for the longest time, but it is the most important step—creating prototypes and getting immediate feedback to inform future revisions.

### Step 5. Artifact: what have you Created? What is the Artifact and how can it now be Implemented to Address the Project Learning Objectives?

The final step in the TAPPA Process is the implementation of the artifact. By presenting frequent prototypes, the instructor has been able to evaluate the different stages of the development process and adjust accordingly. Assessments made and feedback received early in the development process will ensure greater success, and if the preceding steps have been successfully completed, the Artifact, or implementation, stage will not create new challenges.

## Conclusion

Instructional designers and instructors are faced with the daunting task of choosing from a multitude of instructional system design models. The challenge is identifying which model or process will be the most adaptive for their needs. The author offers the TAPPA Process as another process that can be considered by instructional designers, particularly those working in the distance education environments. The TAPPA Process is adaptive and responsive and provides the basic structure a novice instructional design practitioner or instructor needs and the complexity and flexibility an experienced practitioner seeks. It also allows practitioners to choose the way each step is executed. Ultimately, the practitioner will build on the framework of the TAPPA Process to meet project goals and objectives for their specific needs.

Over the past four years, the TAPPA Process has been used to design and develop more than 25 webinars and 12 e-learning modules. TAPPA's adaptive nature has allowed each of these artifacts to be unique and effective while still maintaining the consistency necessary for online learning environments. One of the limitations of the TAPPA Process is that it was developed for a specific purpose: delivering online instructional materials to local government officials. Other instructional design practitioners should conduct additional research in other distance education environments. The author has attempted to implement the process with e-learning modules. Because these modules are not as frequently evaluated as webinars by end-users, however, they have limited potential for assessment. Perhaps future research can address this issue.

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