

WELCOME TO NORMALTON: LEVERAGING EFFECTIVE E-LEARNING PRINCIPLES FOR ADULT LEARNERS

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This design case details the critical design decisions used in the development of an e-learning module library for North Carolina local government officials focused on land use regulations. These modules cover topics from an introduction to land use regulations, to evidentiary hearing conduct guidelines, defining vested rights, and explaining how to adopt and amend an ordinance. This project was in response to the North Carolina League of Municipalities (NCLM) members' increased requests for training in this subject area. This organization requested the assistance of the two faculty members at the University of North Carolina at Chapel Hill School of Government (SOG) who specialize in this content area. Additionally, the professional organization wanted to mitigate risk from cases going to litigation for improper land use decisions. The Target Accomplishment Past Prototype Artifact (TAPPA) Process (Moore, 2016) was used for the module development. This five-step process emphasizes the rapid development of distance education content artifacts in close collaboration with subject matter experts. Between 2013 and 2018, the TAPPA iterative design process guided the development of sixteen modules moving from initial script to finished modules. This design case is relevant for instructional designers who need to develop comprehensive e-learning modules covering complex and often complicated tasks. Examples of design decisions, informed by Clark and Mayer (2016)'s principles of multimedia design, are dispersed through the design case.

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INTRODUCTION

Planning and land development decisions have significant impacts on quality of life in any community. These decisions determine everything from what commercial property can be developed to whether a neighbor can make an addition to their house. Acquiring a thorough understanding of the various local, state and federal regulations for these land use decisions is a daunting task that is often delegated to novice planning or governing board members. It is therefore not surprising that these boards can often make costly mistakes that result in lawsuits and hefty fines. The significant impact of these are high-stakes, as the decisions can potentially affect everything from tax revenue that supports social services such as parks and schools to property value and community enrichment. However, many board members feel uncomfortable with making these decisions due to their lack of experience or knowledge of the regulations and seek assistance from their local professional advisory organizations.

The North Carolina League of Municipalities (NCLM), is a service and advocacy organization that represents every city and town in North Carolina which counts nearly 400 municipalities and 100 counties covering over 53,000 miles and a population of over ten million. This includes the Raleigh and Charlotte regions, which are the first and fifth fastest growing regions in the United States (NCLM Vision 2030 Handout, 2014). NCLM identified the cause of many land use lawsuits as being a lack of training. The board members did not understand all the nuances of the land use regulations and were in severe need of more training and support. The NCLM Division that specifically works with the

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land use regulation side of things is the Risk Management Division. The leadership of this division initially looked at providing face-to-face training and workshops in-house but realized that they needed to leverage the expertise and skills of an established, recognized state resource for training: the School of Government (SOG).

The SOG is a unique resource in that they are situated within a tier 1 research institution, the University of North Carolina at Chapel Hill, but focus all of their resources towards local government officials. The SOG was founded to be a nonpartisan resource for local government officials. The decision to be policy-neutral was intentionally meant to address a gap in the resources available to local government officials. The SOG seeks to improve the lives of all residents of North Carolina through a focus on assisting local government officials in running state and local government. While traditional academic departments will focus on undergraduate or graduate student education, the SOG does not offer undergraduate courses and instead focuses on local government officials. The SOG provides training and resources, annually providing over 200 courses reaching over 12,000 local government officials.

High Stakes

Land use decisions involve various codes and policies at all three levels of governance—from federal guidelines to state statutes to local ordinances. These can be difficult for even an experienced lawyer to keep track of and even more so for someone with less legal experience and training. This was evident prior to 2013, as the NCLM had been involved in a series of cases involving land use procedure and decision making. These cases were long and complicated due to the legal and financial implications and proved to be costly for the NCLM to litigate and settle. The role of the NCLM was to cover the legal fees to represent member organizations. The NCLM, and specifically the Risk Management Division, concluded that they needed to improve the training and resources for their member organizations and the boards that were responsible for making land use decisions. The Risk Management Division decided that a relatively small investment in training would be more cost effective in the long run.

In 2013, NCLM and SOG entered into a multi-year partnership to develop a library of self-paced e-learning modules covering various aspects of land use regulations. The goal of the project was to create a library that would be made available to the members of NCLM for free and available for purchase to others interested in the modules. The intention was to address the complexities of land use procedures in a way that made it understandable for the average board member. Two SOG faculty members served as subject matter experts (SMEs) for the project. Their primary role was determining and developing the instructional content of

the modules based on: 1) improving the knowledge level of land use decisions made by governing and planning boards; 2) addressing solutions to common questions received by the faculty; 3) improving the comfort level of the board members in making land use decisions. In addition, the SMEs wanted to use the modules to supplement their face-to-face training opportunities in a flipped learning model. While many boards would prefer that the SMEs came to their offices to provide personalized face-to-face training, this was not feasible due to time and geographical challenges. Instead, the SMEs wanted to create a library of e-learning modules that served the dual purpose of bringing up the baseline knowledge of planning and governing boards and provide an on-demand resource for those interested or needing to understand land use regulations better. Additionally, the professional organization was looking for ways to mitigate risk from cases going to litigation for improper land use decisions. The full module library is available for purchase through the SOG website and is provided for free to NCLM members.

This design case discusses the design process and guidelines deployed in the development of this e-learning module library. The case begins with an overview of the instructional design process used, Moore's (2016) five-step TAPPA (Target, Accomplishment, Past, Prototype, Artifact) Process and then provides examples of how design decisions were made based on Clark and Mayer's (2016) multimedia and e-learning design guidelines.

CONTEXT

The SOG is an academic department of approximately 60 full-time faculty and 40 full-time professional staff personnel. The faculty holds traditional academic titles (e.g., Assistant Professor, Lecturer) but their work is different than in a traditional academic department. For the SOG faculty, their courses are structured as workshops and mini-conferences. While a traditional faculty member will teach Monday-Wednesday-Friday (MWF) courses, the SOG faculty deliver the majority of their training in smaller segments, such as a multi-day workshop or day-long seminar. The learners for SOG training courses are local government officials who range from 23 through 70 years of age from a variety of educational backgrounds. As with many continuing education or professional development opportunities, there are stark differences in participants' educational and life experiences. For these sessions, local government officials from across the state receive specialized instruction on topics ranging from conflicts of interest to learning how to be a collaborative county commissioner board member. The courses are offered on a fee-basis, and these funds are used to fund the operations of the SOG. The workshops and seminars have always been well-received, but as travel budgets have been constricted and educational and training needs have

CATEGORY	MODULE NAMES
Land Development Ordinances	<ul style="list-style-type: none"> • Introduction to Land Use Decisions • Amending Local Development Regulations • Spot Zoning • Conditional Zoning • Appeals of Staff Decisions and Interpreting the Ordinance • Subdivisions
Quasi-Judicial Decision Making	<ul style="list-style-type: none"> • Conducting an Evidentiary Hearing • Making a Quasi-Judicial Decision • Variance Standards • Special Use Permits
Special Topics	<ul style="list-style-type: none"> • Vested Rights • Exactions • Group Homes • Adult Businesses • Conflicts of Interest • Preservation Commissions and Certificates of Appropriateness

TABLE 1. E-learning module category and module names.

increased, local government officials have sought more online or web-based instruction from SOG faculty.

Web-Based Training at the SOG

The SOG has responded to these requests for more distance learning opportunities by devoting significant personnel and financial resources towards the development of their webinar infrastructure (see Moore & Fodrey (2018) for an in-depth review of the SOG distance education infrastructure). Annually, the SOG delivers approximately 25 webinars that cover topics including ethics for elected board members, tax collection policies and procedures and legislative updates. In addition to webinar delivery, the SOG has devoted resources towards e-learning module development, the focus of this design case. Outside of the e-learning modules developed for this project, the SOG develops on average one to three e-learning modules per year.

Development Team

This project's development team consisted of five full-time staff and faculty members from the SOG: one project lead/instructional designer, one multimedia developer, two faculty members (subject matter experts), and one staff member who voiced the audio quiz feedback.

Module Content

The content of each module was determined by the subject matter experts (SMEs). During the development period from 2013-2018, sixteen modules were developed in the three categories of: (a) Land Development Ordinances,

(b) Quasi-Judicial Decision Making, and (c) Special Topics (Table 1; see <http://bit.ly/landuse-library> for full module descriptions). Each module is approximately 20-30 minutes in length and includes a combination of text, graphics and practice self-assessments.

DESIGN CHALLENGES AND PROCESS

One of the two SMEs served as the content lead for each module. This SME would draft the script, review the draft for feedback and provide the audio narration for the module. The second SME would provide feedback on the synced module before the final version was released to learners. For each module, the SMEs sent a Word document of the script to the instructional designer. From this document, a first draft of the module was created in PowerPoint by using stock images and animations with the multimedia developer creating custom graphics as needed. The modules were published using Adobe Presenter in an HTML5 output so that the modules can be accessed on either a computer or a mobile device. The modules were hosted online on the SOG's Adobe Connect account.

Design Challenges

At the start of the project, the development team understood this would be a multi-year effort to create a full library and faced three design challenges: 1) creation of a unified look and feel over multiple modules, 2) effective management of timelines and development, and 3) how to make modules consistent between the two SMEs. The first design challenge was how to create a unified look and feel over a series of modules, a majority of which did not even

Conflicts of Interest



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of Public Law and
Government

Bio | Contact

Outline	Thumb	Notes	Search
1. Conflicts of Intere...			00:23
2. Acknowledgement			00:08
3. Module Overview			01:15
4. Examples of Typical...			02:23
5. Why Have Rules			01:43
6. Types of Conflicts			00:07
7. Financial			01:23
8. Relationship to aff...			01:05
9. Bias			00:34
10. Rules for addressi...			01:53
11. Legislative Decisi...			02:13
12. Quasi-Judicial Dec...			03:36
13. Administrative Dec...			01:26
14. Application of Ru...			00:07
15. Consider This			00:37
16. Consider This			00:43
17. Process to address...			02:13
18. Conclusion			01:44
19. Contact Informatio...			00:16

14 Minutes 32 Seconds Remaining

Rules for addressing conflicts

- Rules vary significantly based on the **type of decision** involved
- **Do not vary** depending on the type of board



City Council



Boards of Adjustment



Commissions

FIGURE 1. Example of border design element with captioned pictures.

have titles or topics at the start of the project. To address this challenge, the development team decided to not only create a PowerPoint template but also create specific design elements that would serve to unite the content across modules. For example, when adding a text caption to an image we used the same style and changed the border color to match the module color theme (Figure 1).

The second challenge was how to effectively manage timelines and development to meet the production goals of two to four modules a year. As previously mentioned, the SOG faculty teach professional development courses both within the SOG building and across the state. While important, the development of the modules could not come at the expense of the teaching, consulting, and writing responsibilities of the faculty. Many SOG faculty found it difficult to devote the necessary time to module development as it is a labor-intensive process. For the project lead, it was critical to manage the timeline including development, prototyping and recording sessions to maximize faculty efficiency. These are both critical design considerations as Clark (2002) emphasizes that instructional design's ultimate goal is making sure learning objectives are met through successful project management. This project was essential but not the primary responsibility of the members of the development team. Moreover, the final challenge was to create consistency

across each module even though they had different SME leads.

TAPPA Process

The project lead decided that a consistent development process was needed to guide the creation of the modules. The lead decided to use the TAPPA (Target, Accomplishment, Past, Prototype, Artifact) Process (Moore, 2016). This is an iterative five-step process developed for collaboration with SMEs and the type of short development windows involved in this e-learning module project. The application of each phase is summarized in Table 2.

Target

The first phase of the TAPPA Process starts with determining what the finished product will be (Moore, 2016). This approach comes from Backward Design (Wiggins & McTighe, 2005). In this project, the team identified several critical design considerations that needed to be addressed immediately. First, the development team needed to select a delivery tool for the modules and ultimately selected Adobe Presenter. Adobe Presenter is a PowerPoint add-in that allows for animation and quizzing elements and can be published in HTML5 format, which is viewable through a website URL or on a mobile device. Presenter-specific elements such as

TAPPA PHASE	PROJECT APPLICATION
Target	<ul style="list-style-type: none"> • Selection of Adobe Presenter • Development of land use icon • Development of PowerPoint theme
Accomplishment	<ul style="list-style-type: none"> • Incorporation of quizzing within modules • The summative survey focused on comfort with making decisions
Past	<ul style="list-style-type: none"> • Use of PowerPoint theme • More efficient production development timelines after first modules
Prototype	<ul style="list-style-type: none"> • SMEs able to view module as a learner would • Ability to view and take quizzes as a learner • Shorter development timelines
Artifact	<ul style="list-style-type: none"> • SME able to identify graphics or animations that needed revisions to more effectively communicate concepts

TABLE 2. Project application for each phase of the TAPPA Process.

quizzing display are available as a placeholder without a Presenter license, and full functionality is available when a licensed user publishes the files. Since the SMEs were familiar with PowerPoint, Presenter offered the best tool for collaboration between the designers and SMEs because Presenter keeps everything in PowerPoint. Next, the development team created an icon for the land use regulation series. This icon was added to the custom PowerPoint template created for the project and would serve as the unifying element between each module.

Accomplishment

The next phase built off the first phase by determining what the criteria for a successful project would be (Moore, 2016). It was essential to have an understanding between the designers and SMEs about what success looked like before embarking on such a large-scale project. There would not be a summative evaluation for these modules. Instead, the SMEs were looking to develop more competency and comfort for board members tasked with making land use decisions. To measure comfort level with making these decisions, a web-based survey was sent to the learners who completed the modules (see Assessment section for discussion of those results). In the development of the modules, SMEs used iterative review and feedback when reviewing each other's module content. This review happened in two stages—the first was a peer review of the written script and the second was the draft of the module. Additionally, as the team finalized modules, SMEs incorporated them into their face-to-face training, providing feedback from learners.

Past

For the third phase of TAPPA, the project lead used past e-learning module projects to guide development of these modules (Moore, 2016). One of the key references

was the North Carolina State Ethics Online Program that the project lead had previously worked on in 2010. This project also needed consistency in design across several modules and the target audience for was public services and legislative employees covered under the North Carolina State Government Ethics Act. In this project, a PowerPoint template was created that included a design element that provided a visual link between all of the modules in the training.

For the land use project, the team followed this past project in several ways. Similarly, the team used the PowerPoint theme that is consistent across the entire library. For each module, a new color theme and customized title slide were created. Additionally, styling and formatting design decisions that were added to the first set of modules became the design style guide for subsequent modules. This allowed for faster development and re-use of design elements (Moore, 2016). As the SMEs and designers worked on the modules, they developed a working relationship that made both sides more efficient in understanding what the other group intended. An example is that the number of internal peer reviews decreased over time as the designer was more adept at selecting images that met the SMEs' expectations, and the scripts needed less work as the SMEs became more adept in structuring the content. These are reflected in the project development timelines where the first set of modules took about four to six weeks to develop, whereas the latter modules were completed in two to four weeks.

Prototype

The fourth phase of the TAPPA Process is a combination and consolidation of the evaluation, design and development phases found in other design processes (Moore, 2016). After getting the feedback from the SME on the graphic choices, the SME would record the audio narration which was in

turn synced with the graphics and text within the module. Quizzes were added, and the draft prototype was published and shared via a web link to the SME. From there, they were able to view the module as a learner would, including answering quiz questions and receiving feedback. Requested changes were routed back through the designer. Prototypes were republished, and this iterative process continued until a final sign-off was received from the SME. The shorter overall development windows were a result of fewer prototypes needed to reach a final approval.

Artifact

The TAPPA Process results in the development of an artifact that is well-aligned with the project needs and goals due to the iterative development process (Moore, 2016). For this project, the prototypes delivered as web-based Presenter files helped the SMEs provide feedback on items such as sequencing of content, syncing of audio and other refinements that met the specific module objectives. An excellent example of this is the feedback on audio syncing. At times, the SME found a mistake in how a graphic was brought onto the slide, identified text that needed to be added for clarity, or wanted to slow or speed up the overall syncing. The SME benefited from seeing the module in the same way that the learner would view it.

COGNITIVE LOAD THEORY

While the TAPPA Process guided the design process, the project applied cognitive load theory to guide the instructional design aspects of the project (van Merriënboer & Sweller, 2005). Leahy and Sweller (2016) synthesize the definition of cognitive load theory as a framework that through a recognition of the limitations of working memory can provide guidelines for instructional design. The theory is primarily concerned with the interactions between working and long-term memory with the goal of having information stored in long-term memory and accessible by working memory (Kalyuga & Singh, 2016; Leahy & Sweller, 2016; Martin & Evans, 2018). Cognitive load theory focuses on three types of cognitive load: intrinsic, extraneous, and germane (Chen & Wu, 2015; Sweller, 2010). Clark and Mayer (2016) define intrinsic load as the processing that represents important information that needs to be learned; extraneous load as the processing that learners are doing that is not associated with the instructional goal; and germane cognitive load as the processing that generates new knowledge.

Understanding the importance of managing cognitive load, the project team used the multimedia design principles offered by Clark and Mayer (2016) to design the modules. These design principles are grouped around three instructional goals identified by Clark and Mayer (2016): avoiding sensory overload (extraneous load); focusing on

the important concepts (intrinsic load); and generating new knowledge (germane load). An explanation of the specific design principles and examples from the modules follow with a summary in Table 3.

Avoid Sensory Overload

The first instructional goal is minimizing extraneous processing by avoiding sensory overload (Clark & Mayer, 2016). They elaborate that this goal is the cognitive processing that learners are doing that is not associated with the instructional goal. A common manifestation of this type of extraneous processing is when there is an overload of text or pictures and is an indication of a poor instructional layout (Clark & Mayer, 2016). In this project, we made use of techniques that demonstrate the coherence, contiguity and redundancy principles, all principles that Clark and Mayer indicate can minimize extraneous processing.

Coherence

This principle necessitates that unneeded words or graphics are removed from the instructional material (Arshavskiy, 2013; Clark & Mayer, 2016). By focusing on a concise text, the learner can devote their attention to the crucial aspects. We accomplished this principle using scripting done in Word that was edited before moving into the PowerPoint theme. In rare cases did we add the full narration to the slide and instead provided the full narration text in the notes section of the module that allowed learners only to see the full text when they wanted or need to.

Contiguity

Clark and Mayer (2016) explain that this principle will have a close alignment between printed words and graphics. These are the alignment and proximity design principles (Williams, 2015). The development team knew that most learners would not view the modules in sequential order, but to help maintain continuity and to meet the repetition and consistency principles, we created an icon for the series. This icon appears on the title slide, as a footer in the bottom right-hand corner and as a watermark for the content slides. Additionally, we designed a base template but gave each module its own color scheme. This creates some visual variety but still includes module-linking design elements. Figure 2 provides an example of each of these features as well as the coherence and contiguity principles.

Redundancy

The final way that we designed around minimizing extraneous processing was by being strategic and selective about how we used graphics and audio and where possible not having on-screen text that matched the narration (Clark & Mayer, 2016). Because of the complex nature of some of the



FIGURE 2. Example of coherence and contiguity principles.

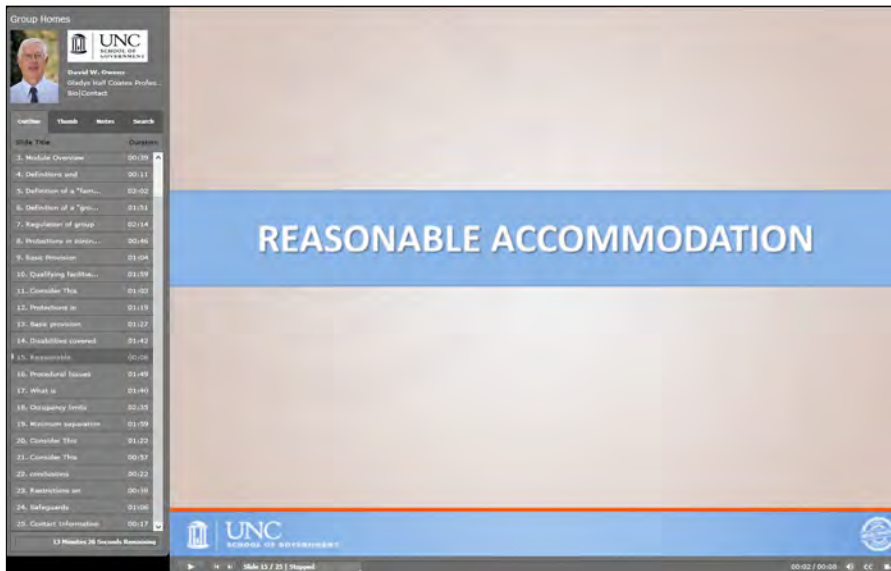


FIGURE 3. Example of segmenting principle with the use of subheads for chunking of content.

material, it was not always possible to avoid having on-screen text, graphics, and audio due to the subject matter. Shorter and Dean (1994) assert that learners are able to remember images more efficiently than things that are read or heard. Understanding this, the development team paid close attention to how images were used throughout the modules. The text, images, and animations on the slides are meant to illustrate the concepts, highlight key points, and engage learners. We paid close attention to how the images and graphics were brought onto the slide. One way to avoid too much text on the slide was ensuring that the text size was never below 18 points. Most of the module content came from text-heavy statutes. Our solution was instead of showing the full statute at one time, we would show smaller

chunks, e.g. one paragraph, at a time. With the learner able to pause, rewind and replay the slides, it allowed the learner to fully grasp the concept before moving on to the next slide.

Focus on Important Concepts

The second instructional goal from Clark and Mayer (2016) focuses on essential processing, which they define as the cognitive processing that mentally represents the critical material. In other words, designers need to help learners know what is valuable and worth their focus and attention, and thus manage the intrinsic load. There are several ways that Clark and Mayer suggest that designers aid in the learners in focusing on the important concepts, including segmenting, pretraining, and modality.

Segmenting and Pretraining

The first part of this principle is segmenting which Clark and Mayer (2016) define as organizing the content into smaller and more manageable parts. One technique that Clark and Mayer suggest is the use of a "next" or "continue" button that gives the learner control over when to move on to subsequent parts. The learner is managing their essential processing by deciding when they are ready to move on. This control allows the learner to dictate when they are ready to move on to the next section; if they are not clear or need a recap they have the ability to do so. The modules demonstrate this principle in several ways. The first is through the naviga-

tion that allows a learner to select which part of the module they would like to see and gives a visual indicator of their progress. The learner also uses the "next" button to move on to the next slide as the slides do not automatically advance. To provide visual cues of different content chunks, we made use of subhead layouts (Figure 3).

Another example of segmenting is when we used colors and shading on graphics to introduce a concept as shown in Figure 4, where the first slide introduces the visual map of the concept and then the subsequent slides give more details for the step. In this example, the learner is able to see where they are visually in the process and move through the steps at their own pace.

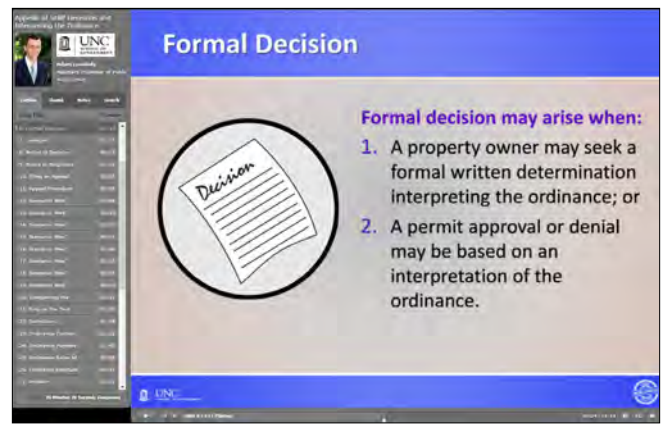
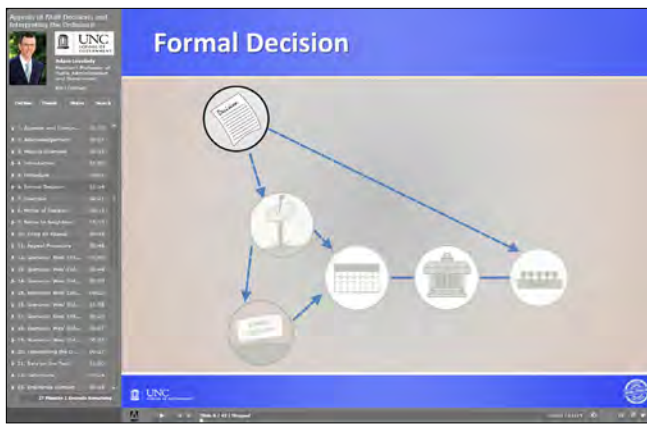


FIGURE 4. Example of segmenting principle.

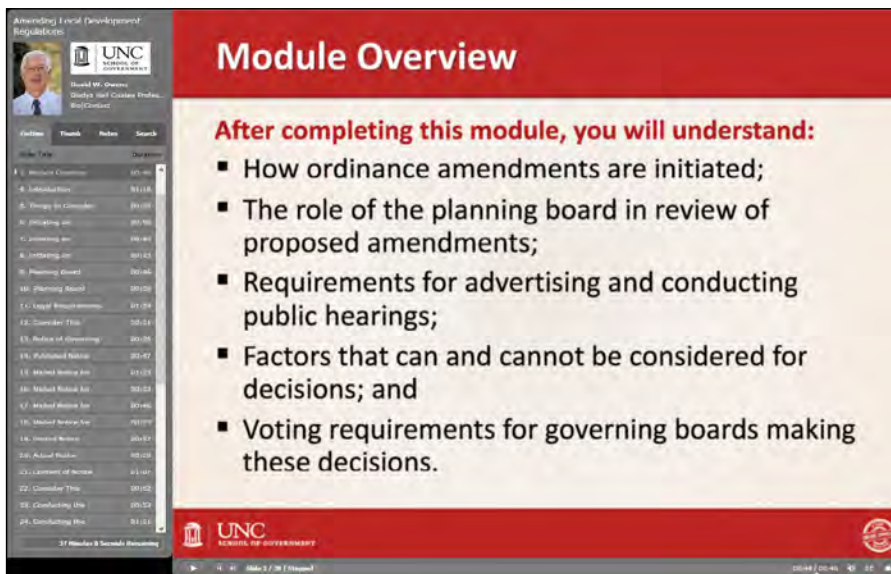


FIGURE 5. Example of pretraining principle with introduction of module overview.

For the second part of the principle, pretraining, we introduced the fundamental concepts using overview slides at the start of each module (Figure 5).

Modality

The third principle that manages the essential processing is modality and is defined by Clark and Mayer (2016) as the use of audio rather than on-screen text. This principle is similar to the redundancy principle in that while each slide features audio narration, the narration includes more than the displayed content of the slide. We further addressed the modality principle by using some image-only slides, as this further reduces the essential processing of the learner (Mayer & Moreno, 2003).

Generating New Knowledge

The final instructional goal offered by Clark and Mayer (2016) focuses on how to develop generative processing, which they define as deeper processing, and is the germane

cognitive load. One of the ways to foster this type of deeper processing is through engagement with the course content. This can be done in several ways, including through the use of personalization, embodiment, multimedia and engagement (Clark & Mayer, 2016).

Personalization and Embodiment

There are two parts to this principle. The first focuses on the personalization of the content. One of the ways that this is done is through the use of a conversational tone in the narration (Clark & Mayer, 2016). The second part focuses on embodiment, specifically the use of human-like elements. To create personalization, each module has a storyline that is relevant to learners. For instance, in module 4,

Making Quasi-Judicial Decisions, we follow Joe the developer as he tries to rezone some of his property (Figure 6). This use of characters, depicted using stock images, throughout the module reinforces the relevancy and real-world application of adult learning theory (Knowles, Holton, & Swanson, 2015).

To create a sense of embodiment, we created the fictitious town, named Normalton, that served as the backdrop for the entire module library (Figure 7). The multimedia developer created a town seal and other graphical elements such as governing board meeting rooms that allowed us to bring this town to life. By creating this fictitious town, it allowed us to provide a setting for the different scenarios. This allowed us to make the content more relevant and feel more realistic—without having to worry about spotlighting a specific jurisdiction that had done something wrong. To protect against this, we did not provide demographic or location cues, e.g. a bustling metropolitan city, in the narration.

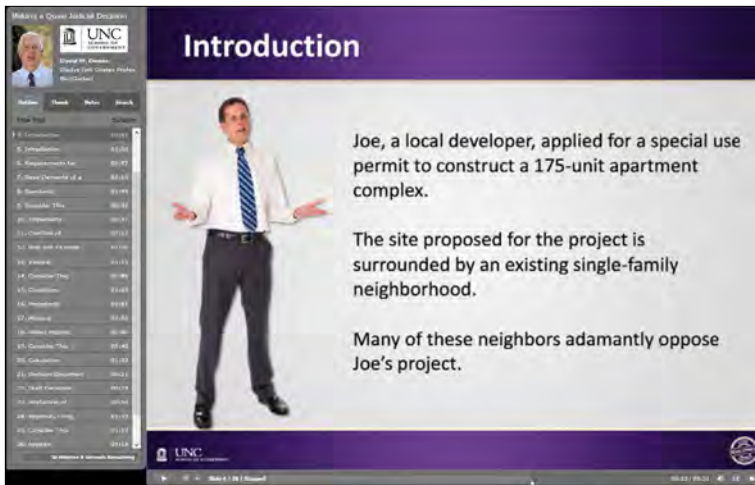


FIGURE 6. Example of personalization principle by presenting a storyline in the narration.



FIGURE 7. Example of embodiment principle with human characters and fictitious town.

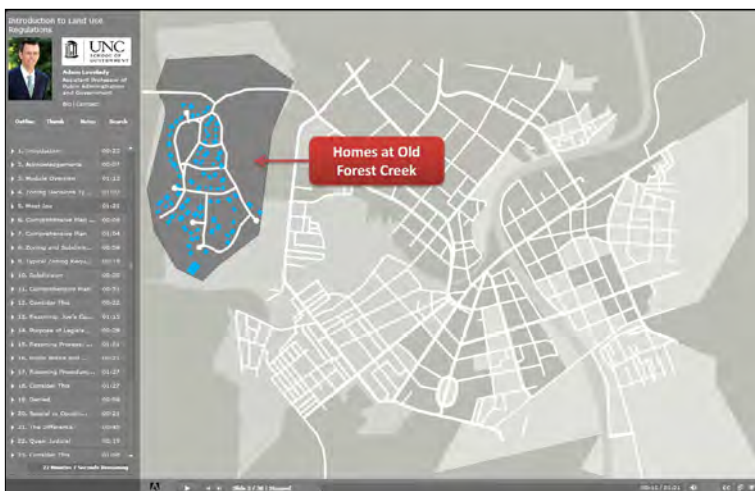


FIGURE 8. Example of multimedia principle with words and graphics presented together.

Multimedia

Another principle that can maximize germane cognitive load is the multimedia principle. For this principle, Clark and Mayer (2016) suggest that words and graphics are presented together. We followed the advice offered by Mayer and Moreno (2003) who note that an effective way to decrease cognitive load is syncing narration with graphics. They further assert that presenting words and images together is a way to foster learning. Throughout the modules, stock characters and images and custom graphics are used to convey concepts such as a development plan for a lot (Figure 8) or a hearing room for an evidentiary hearing.

Engagement

Clark and Mayer (2016) offer several suggestions for how to create opportunities for the learner to engage with content including the use of relevant graphics, self-teaching and peer teaching. Each module features several opportunities for learners to apply the information that they have learned through knowledge checks or self-assessments. These assessments integrated within each module and appear after each content block. The use of multiple-choice questions, as recommended by Clark and Mayer (2016) is a form of self-teaching, and they are presented in the context of the module (Figure 9).

The knowledge checks were positioned after each significant content block and gave the learners the opportunity to apply what they had just learned to a possible scenario. These scenarios were drawn from experiences that had been shared with or handled by the SMEs. The quiz feedback was written to share the correct response and provide an explanation of the legal and practical applications for that scenario and decision (Figure 10). The modules were designed in such a way that an entire board can watch together and then use as a supporting resource in the future, allowing for the principle of peer teaching.

VIEWS AND EVALUATION

The learning goal for this project was to improve the knowledge level of board members regarding land use regulations and make the board members feel more comfortable making decisions. The development team collected data from learners including how many people they watched the module with and their self-reported levels of understanding and comfort. The first survey was presented before viewing a module

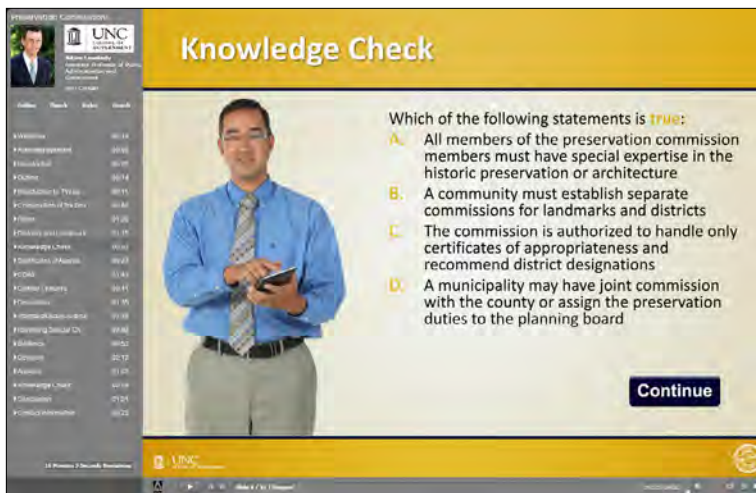


FIGURE 9. Example of engagement principle with self-teaching in the form of knowledge

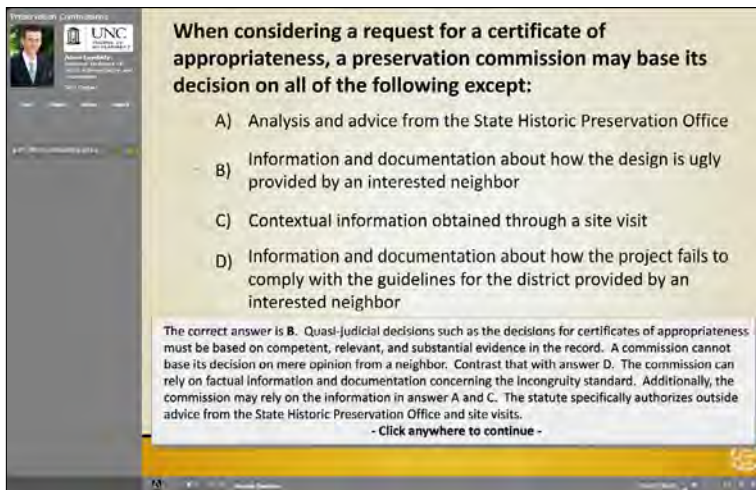


FIGURE 10. Example of self-teaching feedback.

and the second was sent out to those that provided their contact information through the first survey. The first survey captured the viewing numbers, and the self-reported levels of understanding and comfort were collected in the follow-up survey. Both surveys were optional and anonymous, and we did not link respondent responses between the surveys.

Views

Since January 2017, the modules have been viewed by over 3,000 local government officials. Within the 3,000 there are some overlaps as a local government official may have viewed multiple modules. Approximately 47% of the respondents received access to the modules from their unit of government, and approximately 42% received access as part of a SOG course taught by one or both of the SMEs. The modules were usually watched with at least one other person (84% respondents watched with one other person), and the most significant group viewing had twenty-eight

viewers. 70% of the respondents indicated that they served a staff role within their unit of government and 52% felt they had a working knowledge of the module content before starting the module. 18% reported they had little knowledge and another 18% indicated they had a keen understanding.

Evaluation

In the Fall of 2017, the development team solicited feedback from learners to evaluate the learning effectiveness of the modules. Fifty-six learners agreed to complete a web-based survey to self-report their level of understanding and comfort level with the content of the modules. Like the pre-course survey results, these summative evaluation results had a majority of the respondents serving in staff positions (61%), and the average viewing size was four people, which supported one of the module goals of having governing and planning boards view the modules together during board meetings. Before completing the modules, about 71% of the respondents reported that they had no prior knowledge to a working knowledge of the module content and only about 27% felt that they had a firm understanding of the content. After completing the modules, those numbers shifted in that 34% felt that they had little knowledge to a working knowledge but almost 61% reported that they had a strong working knowledge of the module content. We also asked questions about the design elements. The respondents felt that the examples used in the modules were particularly helpful and the scenario-based instruction resonated with them, as they attributed this to their improved levels of understanding of the content as also evidenced by the nearly 92% that felt extremely or somewhat satisfied with the modules.

A common suggestion from participants was to provide more testing opportunities and examples. This feedback will inform subsequent e-learning development for this project. These modules were designed to help learners make local planning and development regulation decisions, and over 75% felt either very or extremely prepared to make these decisions as a result of viewing the modules.

IMPLICATIONS

Training and education are pressing concerns for any organization. As outlined in this design case, the North Carolina League of Municipalities (NCLM) was faced with a critical need to provide essential training regarding land use and regulations to the board members responsible for making these critical decisions. By improving the knowledge level of the board members, the NCLM hoped to mitigate against the costly lawsuits that result from improperly applied

and interpreted statutory requirements at the local, state and federal levels. Moreover, as travel budgets have been constrained with each passing fiscal year, a greater need and demand for web-based training has emerged. The challenge then is how to create high-quality self-paced instruction that can still meet the instructional and learning goals found in traditional face-to-face training.

Web-based training in the form of e-learning modules can be a cost-effective solution to this problem. Since the launch of these e-learning modules, the SMEs have made several notable observations. They regularly receive inquiries and requests for face-to-face training, and when the SMEs share information about the on-demand web-based training, the requestors are excited. The most common reason for requesting face-to-face training is that all board members can receive the same training; when it is a course they have to travel for, often the entire board cannot attend. Boards are often particularly excited to learn that they can complete e-learning modules together in a board meeting. The SMEs have also noticed a change in the types of questions that are being asked. After boards have completed the training, the questions sent to the SMEs have been at a higher level—showing the board has gained a solid basic understanding of land use regulations.

The development of an e-learning module library was presented in this design case through the explanation of the how the TAPPA Process (Moore, 2016) was used in combination with the alignment of the design principles to the instructional goals identified by Clark and Mayer (2016) as being essential to active multimedia development. This design case provided examples which may be of interest and use to instructional designers who are tasked with collaborating with faculty to develop new web-based trainings. The design considerations and examples presented in this design case should be used as a reference and resource for collaboration to efficiently produce high-quality e-learning modules.

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