A Content Assessment Tool for the exhibit design process, using graphic design and communication theory as a framework for generating meaningful messages.

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A Content Assessment Tool for the exhibit design process, using graphic design and communication theory as a framework for generating meaningful messages

By

Kimberly Rene Topp

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF FINE ARTS

Major: Graphic Design

Program of Study Committee:
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Iowa State University
Ames, Iowa
2011

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ABSTRACT

Current museum exhibit design models take designers through stages of defining goals, developing products or exhibits, and implementing the design. The models are intended for a staff of various experts who are expected to use their talents in creating an effective, meaningful exhibit that conveys a particular message. In many cases however, a single curator whose expertise is not in the field of design or visual communication, is given the task of designing exhibits. Curators may or may not have a few staff members or volunteers to help in the design process, but the lack of graphic design or visual communication expertise leaves out much of the know-how necessary in order to develop an intended message of an exhibit. This thesis proposes a Content Assessment Tool (CAT) that can be used as a tool to implement communication theory into the exhibit design process. The CAT was created by using Berlo’s communication model (Source, Message, Channel, and Receiver) as a framework that was then elaborated on to accommodate the instructional, graphic, narrative and interactive components that all go into exhibit design. To understand how the CAT can work as an evaluation tool and to demonstrate the necessity of such a tool, four small Iowa history museum curators were interviewed about each museum’s design process. Exhibits from each museum were photo-documented and two from each museum were then selected to be evaluate with the Content Assessment Tool. The findings revealed a significant weakness for museums in the development of exhibit graphics in generating and enhancing an intended message. All museums, even museums with experts on staff, that wish to enhance or strengthen the narrative of exhibits could benefit from such an addition as the CAT within their design process.
CHAPTER 1. INTRODUCTION

The design of museum exhibits is a complex process with many phases. Suggested processes of designing have been around for decades, some of which are elaborate scripts, detailing who does what and when, while others offer loose suggestions of phases to follow. These models address when and where particular tasks should take place, but not how to ensure that an exhibit delivers the message intended by the designer. This message is developed through the use of graphics, narrative, interactions, and arrangement, not just the display of artifacts. This is a concern for museums, as the expertise of curators and directors (who are often in charge of designing exhibits) is not typically in any field of communication, or design. This lack of expertise creates a gap where exhibits are designed with few of the same considerations about message commonly utilized in professions such as graphic design.

How then, can the exhibit design process be amended to better serve museum curators and to help develop a meaningful message? This research has devised a content assessment tool (CAT) that can be used as a tool during the exhibit design process. The CAT is comprised from components of visual communication theory that are applicable to exhibit design and that are specifically targeted toward strengthening the intended message of an exhibit. This tool, when included as a part of the museum exhibit design process, intends to fill the gap between curators who have little visual communication expertise and museum exhibits that need a clear, effective message.

This paper first looks at design process models to determine what already exists as tools for museums to use when designing exhibits. Exhibit design research in the past few decades has focused primarily on improving larger museums, and for good reason. Large museums feature a constant flow of diverse visitors, expansive and interesting exhibits, and the willingness, budget and time to commit to formal research. These museums also have the luxury of large staffs with a variety of skills sets. For example, some large museums, such as the Chicago Field Museum, have developed process models featuring detailed instruction for exhibit development (Figure 1). These detailed models incorporate surveys, exploratory studies, design methods, site investigation and project analysis. This is an appropriate interdisciplinary process when there are design teams, subject specialists, surveyors and contractors.
available, but even with all of these factors in place, the proposed process lacks assessment tools to ensure that the overall message is kept consistent.

Figure 1: The Chicago Field Museum’s exhibit design process.
Simplified models have also been developed as a summation of the exhibit design process. One of the most popular identifies four main phases: conceptual, development, functional and assessment to be utilized by the design team (Dean, 1996). These phases may accurately represent the design process (Figure 2), but upon further investigation, appear to be too vague for a museum director to implement effectively. This is especially true if the exhibit is being designed by a small museum that may have limited staff expertise. For example, a museum exhibit being designed by an anthropologist and an archivist team compared to an anthropologist and a graphic designer team will develop very different exhibits because they will approach the “development” phase differently. By creating the content assessment tool that focuses on the creation of message, the development phase (referred to as the brainstorming phase in other models) is expanded to be more useful for designers.

![Figure 2: David Dean’s exhibit design process model.](image)

For this paper, curators and directors of small museums were interviewed to gain a better understanding of real-world design processes, and what the resulting exhibits look like. The CAT was then used to assess whether or not these museums were creating a clear message or not and where the strengths and weaknesses were. The findings showed that there is a clear need for a tool such as the CAT to be brought into the design process early on as a way to be sure that the intended story and message is effective and clear. This is an especially useful tool for a museum staff that might lack an employee with an expertise in visual communication.
CHAPTER 2. REVIEW OF LITERATURE

2.1 Necessary processes for exhibit design

This chapter explores the elements required to design a comprehensive exhibit to explore the tools that are currently available to exhibit designers. To do this, general design protocol and recent discussions in “design thinking” will be discussed, followed by current models of exhibit design, and instructional design. These components each have numerous models developed that intend to guide a user through the process.

Ever since the Industrial Revolution, models for efficiency have been of great interest to businessmen and researchers. This idea of modeling an efficient process has brought about everything from the assembly line, to the current education system, to the design process itself. There have been models for the engineering design process (Rosenstein & Rathborne, 1964), the industrial design process, (Archer, 1969) how to design instruction, (Willis, 1995) the graphic design process (Bennett, 2006), even museum exhibit design (Dean, 1996). In some cases, individual design firms and museums utilize their very own unique design protocol (Museum, 2005). This aspiration to “scientize” design made the biggest move during the 1960s in the “design methods movement.” The Conference on Design Methods, held in London in September 1962, is regarded as the event that marked the launch of design methodology as a legitimate field of study. Through the years, the field has seen ebbs and flows of success and rejection while trying to distinguish whether or not “design” was something that could be modeled – especially in comparison to scientific methodology (Cross, 2001).

The critical distinction between the practice of science and the practice of design is that science methodology validates results while design results do not have to be repeatable and in most cases, must not be repeated (Cross, 2001). A quick glance at the two type of models shows this clearly, as scientific models often feature linear, step-by-step processes where design models discuss “spaces to travel through” (Brown, 2008) and hazy transitions. It seems necessary then to define under what category exhibit design should be situated. While the aesthetic approach with differing solutions link it to the design method, the intention of an exhibit to educate, and to have a certain attracting or holding power, implying that there are results that may very well be validated (e.g. (Adelman, Falk, & James, 2000; Falk & Adelman, 2003; Falk & Dierking,
The exhibit design process, along with other design processes like graphic design, is suspended between a rigid scientific process model and a more fluid design model, with little or no research having been done to find a suitable compromise.

With these considerations in mind, this literature review will examine numerous design processes that have been developed for design in general, graphic design, instructional design, and exhibit design.

2.2 Theoretical Design Process Models

Social, political and economic developments of the late 19th and first half of the 20th century brought about industrial and technological breakthroughs that created social and economic complexities for people and their environment. Disciplines such as architecture, urban planning, engineering and product development began to tackle new types of problem solving that moved beyond traditional artifact making and into more informed and methodical approaches. Design methods originally drew from a 1962 conference called "The Conference on Systematic and Intuitive Methods in Engineering, Industrial Design, Architecture and Communications" (Jones, 1970). John Chris Jones and Peter Slann, both early user-centered designers, organized this event in order to address concerns about how their modern industrialized world was being manifested.

A major piece that came out of this conference was the Royal Institute of British Architects’ *Handbook of Architectural Practice and Management*, where architects began staking the claim to what they considered as the “ultimate” design process. (*RIBA handbook of architectural practice and management*, 1965). Here, a four-phase process is laid out (Figure 3):

![Figure 3: RIBA design process model.](image)
The sequence is quite vague in this generalized form, but further definition of the phases helps to define the steps. Assimilation in this case is the accumulation of general information, especially related to the design project. The general study is in place to investigate the nature of the problem and possible solutions or means of solution. In the development phase, the designer develops and refines one or more tentative solutions. Finally, the designer communicates the solution to people inside or outside of the design team. There are flaws in the sequence in part because there are so many flaws throughout design. Rarely does the development stage go smoothly, often times leading the designer to recurse through phases 1 and 2.

To account for this, the designer can track back through the design process and allow it to become more detailed through each level. A process patch for this was developed (Markus, 1969; Maver, 1970), but issues with this map arise as it assumes the early stages to get everything laid out and for materials or images to be applied in the later detailed steps (Figure 4). What of integrating even the little pieces as a conceptual whole? Lawson (B. Lawson, 2005) conducted a study that showed the process in reality often works backwards to the Markus/Maver map in that the details pop out first and lead the rest of the design.

Figure 4: Markus & Maver design process model has the design become more detailed throughout the process.
Another well-known model (Figure 5) shows that the design thinking process can be described as three metaphorical spaces (Brown, 2009). The *inspiration* space is the term used to imply a motivation toward a solution. *Ideation* is where ideas are generated, tested, and developed. *Implementation* is the final stage where the designer charts a path for completion. This allows for the designer then to loop back into and out of the stages as necessary. This somewhat chaotic theory may be the most helpful thus far, as it does not just describe the result of the phase, but it describes what must be put in. For example, where Markus and Maver tell the designer to simply conduct analysis, Brown tells the designer to consider what the business problem is and where the opportunity is. Brown tells the designers to observe people, how they think and what they need. These suggestions of how to create a human-centered product are a critical difference that sets Brown’s model apart from previous models.

Figure 5: Brown’s design thinking process takes the designer through a series of spaces.
The method employed by museums and staff can greatly influence the outcome of any project. There is evidence that designers think differently from non-designers (Lawson, 1979a). If a museum curator or director is also in charge of the design of exhibits, one might hope then that this individual thinks to at least some extent like a designer. Often times however, individuals running the museum are historians, local business owners, or city council committee members — only sometimes having design experience.

This idea that designers think differently from non-designers is not new and the way designers think has since been termed “design thinking.” Lawson (1979b) compared problem-solving strategies of designers with scientists. 3D colored blocks were arranged and the participants were asked to rearrange the blocks into a specified order. The methods used by the two groups were strikingly dissimilar. Architects proposed a series of solutions and eliminated unsuccessful options. Scientists tried to find a rule or formula for solving the problem and then figure it out. The experiments were repeated using first year students as compared to graduating seniors. The first year students utilized a method similar to the scientists, showing that designers learn “design thinking” during and presumably as a result of their education.

This difference might be explained by time constraints placed on the two types of professionals (B. Lawson, 2005). Design tasks often have a quicker turn-around time than what the scientific world is faced with. The scientist and scholar are able to suspend judgment and decisions until more information is acquired and known. There may be paper deadlines or grant proposals with ending dates, but the scientist is allowed to show the current progress, explain the research that is still needed and continue on. Designers are rarely afforded such a luxury. There are reasons for this; one being that the scientific world demands absolute accuracy while the design world settles for more subjective results.

The point being that “design thinking” is less likely to be present in today’s small museum exhibit designer because this individual is not typically a designer and is not likely to be working with or under anyone who is a designer that might teach this new strategy. Rather, the individual has grown up in a public school system that fosters the more rigid, structured thinking and has continued to utilize this method to get by. Tim Brown (2009), Lawson (B. Lawson, 2005), Cross (Cross, 2006) and others all point to the application of design thinking as to what will “transform organizations and inspire innovation.”
2.3 Design Processes in Practice

A considerable number of design process models have been developed through the years to help define the way in which “design” happens. These are maps that lay out the order of the design process. Some are quite plain and simple, while others are complex information graphics. Some companies have become so good with this process that they revolve their business models around it. IDEO works with companies to revamp or kick-start product development through a human-centered, design-based approach. They “envision new companies and brands and design the products, services, spaces and interactive experiences that bring them to life” (Brown, 2008). There is a great deal that small museums can learn from IDEO’s design process (Figure 6).

![Diagram of IDEO's design process model.](image)

**Figure 6:** IDEO’s design process model.

The first basic step is “understanding the market, the client, the technology and the perceived constraints on the problem” (Littman, 2001). For IDEO, this means researching what the client’s competitors are currently doing, what it is users are asking for, and what technology is available. Museums, in their often non-profit nature, rarely consider what competitors might be doing – where is the target audience going and what are they doing *rather* than coming to the museum? Who is this target audience? Here the museum director would also clarify potential budget, size or time constraints on the project.

The second step is to “Observe real people in real-life situations.” This allows the design team to figure out what makes the users tick, what is found confusing, what they like or dislike, what needs are not addressed by current products and so on. This step is what users perform as they use a product, realize what is wrong or annoying, and begin critiquing it. It makes sense then that the design team should be out doing the same research for similar products to find the optimal solution. Museums can benefit from this as well
– taking a day trip to a similar museum and watching visitors can provide insights into what works and what does not. Museums could do this even with their own installations.

Step three is “visualize new-to-the-world concepts and the customers who will use them.” This phase is the essential brainstorming phase where any idea — good, bad, far-out, or ugly — is thrown out as an option. Imagination is key here, but rationalization will come into play later. This phase may be one of the hardest for a non-design thinker to complete successfully. Museum directors for example may not have a design background much at all, but are instead business and administratively focused. After visiting other museums and observing users, the designer can take the new knowledge and develop something new. From here the design team might start creating prototypes or quick renderings to help show the ideas that they have come up with.

The fourth step is to “evaluate and refine the prototypes in a series of quick iterations.” Getting too attached to an early prototype can be quite detrimental to a final design, but every prototype should be seen as a tool that can be learned from. In the design world this is a familiar step that often includes usability testing at the back end of it to see how the user interacts and if the instructions are intuitive.

The final stage is the implementation stage wherein the product reaches the market or the user. Getting from the prototype to the final product can take the most time, due to all of the different components that must come together.

Other successful companies have acquired similar design strategies (Clark, 2010). For IBM, “Designers have long understood and used experience design elements to enhance the interaction among customers and product offerings. We are now in an age of applying this interaction knowledge to all aspects of doing business.” The model used by IBM (Figure 7) is almost identical to the IDEO model – the only addition being an “iteration” loop that allows for the designer to repeat the “observe, brainstorm, adjust” as many times as necessary.
The mention of “experience design” is important here as it is the result that connects product design to exhibit design. Just as IBM and IDEO have figured out that product design is not just about creating a singular object, exhibit design is not about simply displaying an artifact, but about creating a meaningful experience for the user. Humans encounter countless experiences throughout a lifetime. Some experiences are ongoing, but many — such as visiting a museum — have identifiable boundaries. These boundaries, at the very least, consist of an attraction to initiate the experience; the engagement, which is the experience itself; and the conclusion, which provides some sort of resolution. Considering the number of experiences in which an individual participates in, it becomes clear how important experience design is if a product or exhibit is going to stand out so it will be memorable and create meaning.

Though this model has proven useful for corporations such as IDEO and IBM, its framework alone is too vague for the purposes of developing a model for museums. The main reason is that corporations such as IDEO and IBM are able to have an expert on staff for each element of the design process. During the marketing research phase, a specific marketing researcher is assigned to the task and is ideally aware of how this should be completed. This separation and expertise of duties can also be seen in the exhibit design process of large museums where there are staff members for every task, from surveyor to someone who screws in exhibit light bulbs. This is a stark contrast to the staffing situation at smaller museums where exhibits and programs are designed and maintained by two or three individuals. In order for a design process model to be useful for a staff of non-designers, more specific considerations need to be identified.
2.4 Theoretical Exhibit Design Process Maps

The professionalization of design throughout the twentieth century has seen the segmentation of the design field. Different professions sought to distance themselves from one another in order to establish stronger identities (Lake-Hammond & Waite, 2010). This is especially true for industrial design, graphic design and architecture. On the other hand, exhibition design has remained an occupation in which versatile innovators from a range of traditional trades have been embraced. The complex requirements of exhibit design has kept at least a few designers working in project-oriented multi-disciplinary teams. This integration of disciplines has worked well for large museums, such as the Field Museum, which fully utilizes the scope of skills that a large team has to offer. How though, can a small exhibit team determine the most important roles and cover so much ground with a significantly more limited staff?

The Chicago Field Museum’s process (p. 2) includes teams for development, graphic design, exhibition design, production, and administration. These teams are taken through two proposal phases, an organization stage, drafts, two design phases, detailing, production, and a revisions stage. The process for the museum lays out what needs to be done during which phase, for example, Design Concept Direction happens during the “drafts” phase, followed by the media/interactives check. During this phase, the mood and concept is established, the artifacts are selected, the placement of key objects is determined and the path is also determined. Once this content is all decided upon, the design phases begin and will ideally build off of it.

Exhibit layout and design makeover suggestions were made in Exhibit Makeovers (Parman & Flowers, 2008) where worksheets and matrices were made for curators to follow. The implied design process model (figure 8) first defines three touchstones or goals that the museum’s design process should always begin with: the museum’s mission, the main messages to convey, and the amount of money available to spend. From here, the design team is able to begin discussing concepts and story lines that will
accentuate these three touchstones.

![Diagram of Parman and Flowers' exhibit design process model for small museums.](image)

**Figure 8**: Parman and Flowers’ exhibit design process model for small museums.

Once the design team has agreed upon a storyline, individual team members are to collect visual research – colors, examples, images – to help show how they see their ideas becoming a reality. Here, the group decides on a consistent look or theme and can begin to organize the layout of the exhibits with respect to both how it fills up the floor space and utilizes wall space. At this stage, it is recommended that team-members consult a cost-matrix to ensure they are coming up with ideas that are plausible.

Now that a general storyline, layout, and budget are defined, the team can take the suggestions to stakeholders, volunteers and/or board members who have yet to see the design. They can take feedback and suggestions and move forward into the final phases. With approval, the team begins working the more detailed look (the graphic design) of the exhibit(s) through the composition, mood (color), typography and accentuated objects. With the right people contacted to help, installation can begin. As the final phase, the design team is encouraged to acquire feedback about the exhibit – through provided anonymous comment sheets or by asking teachers how the students reacted.

Whatever the detailed process might be in designing an exhibit, a long-time expert on educational exhibit design, (Miles, 1988) laid out 6 phases that he says all projects progress through (Figure 9). Miles clarifies right away that these stages might be subdivided or might run together. The pre-planning stage is quite similar to Parman & Flowers’ model wherein the individual or group defines the mission of the exhibit. Miles includes the budget here, and at the end, the project is to be presented to stakeholders or committee members.
The Planning stage of Miles’ features the storyline/theme development, evaluation of resources and the laying out of a project schedule. The next and largest stage is the Implementation stage. This is where the difference between models designed for large museums and models for small museums is most prominent. Here in the implementation stage, we see that Miles accounts for numerous workers to be assigned to making the exhibit happen. Draughtsmen work on 3-D aspects, graphic designers create the “look” of materials, while educational experts figure out how content should be phrased and ordered. These specialists work hand-in-hand as a team in creating the final exhibits.

Once this is finished, the Present & Evaluate phase occurs, this is where the exhibit is opened to the public and visitors can be evaluated regarding what worked and did not. The final stages concerns exhibits being properly maintained and kept up-to-date.

Miles’ model contains clear differences from Parman and Flowers’ model – namely in the Implementation stage. Where Miles has experts assigned to doing their jobs, Parman and Flowers have the small team constantly connected, helping each other at each step, and finding any experts at the end if the budget allows.

Another popular project model was developed by David Dean (Dean, 1996) where four main phases were identified: Conceptual, developmental, functional, and assessment (p. 3). Within the conceptual phase, ideas are generated that are in line with the museum’s mission. Resources are evaluated and a schedule of exhibits is created to consider how many are needed and where they should be installed. The developmental phase is broken into two sections, the planning and production stage. For the purposes of this paper and consistency in terms and visual language, we will rename the production stage as the implementation and adapt the model (figure 10).
Within the planning stage, the storyline, cost plan, educational plan and exhibit design plan are all constructed. In the Implementation stage, the exhibit components are prepared and mounted, the educational program is developed and the promotional plan is implemented. This is where the exhibit is presented to the public. The functional phase is also broken down into two sections: operational and terminating. The operational stage is where the exhibit is presented to the public and the educational programs are implemented. Visitor surveys are conducted to identify common issues. The terminating stage is the end of the exhibition’s life. Objects are returned to the collection, accounts are balanced and the gallery space is cleared and repaired if needed. Finally, the assessment phase results in an evaluation report and suggested improvements to the product and the process.

These exhibit design models feature many clear similarities: they begin with the museum’s mission, develop a storyline, design the exhibit, install, and gather feedback. Dean has used Miles’ model with the addition of the “terminating phase”, and a few differences in the goal and planning stages. These both assume a team of experts working to complete the main design task, with proficiency in the areas related to instructional design, graphic design, and 3‐Dimensional design.

2.5 Instructional Design Process

Museums are perceived, above all, to be educational organizations by many museum practitioners and visitors. Motivational studies have demonstrated that most visitors go to museums to learn (Macdonald 1993; Falk et al 1998; Ellenbogen 2001). Researchers and designers have yet to come to a conclusion on what it takes to create a “successful” exhibit design. Should it be fun? Does it have to be educational? Is it successful if it sparks interest in a subject? Though there is no agreement on this, the objective of the
exhibit should always be considered. More often than not, exhibits exist to educate. To do this effectively instructional design needs to exist as an integral part of the design process.

Different conceptions of instructional design models have been around for decades and though no singular model has ever been decided upon, their purposes have been consistent: Improving learning and instruction by means of problem-solving and feedback; improving management of instructional design by monitoring functions; improving evaluation; and testing or building learning theory (Gropper, 1977). What is the best, most efficient way to teach? It doesn’t appear that there is one answer to this either, but exhibit designers can certainly learn from the lessons and models that have been proposed through the years.

What might seem most relatable to designers would be the backwards design model (Wiggins & McTighe, 2001). Instructors are given an objective (teach about insects) and then define how to get there. What kinds of lessons are needed to educate students on this topic? Backwards design aims to identify the desired results, determine what evidence it will take to enhance that knowledge, and plan learning experiences and instruction to accommodate this (Figure 11). Desired results or goals are determined from asking what the students should be able to do, what is worthy of understanding, and what is the overarching message that should endure? Once these objectives are defined, the instructional designer can begin to consider what evidence might be acceptable in achieving this. What will prove sufficient in deciding if a student understands something? Ideally, there is a collected assessment of evidence to validate that learning has been achieved. A range of assessment methods might be approached including observation/dialogue, quizzes/tests, or performance tasks. The scope of this information gathering might range from short to long-term, or from highly structured to unorganized. However it is planned, it should accommodate for the ongoing inquiry and rethinking that happens in learning. Once this is determined, educators can plan instructional activities. Here there are many considerations such as what enabling knowledge and skills are needed, what activities, materials and resources, and is the design coherent and effective?

<table>
<thead>
<tr>
<th>Define Goals</th>
<th>Assessment</th>
<th>Planning/Implement</th>
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<tbody>
<tr>
<td>Goals</td>
<td>Observation/Dialogue</td>
<td>Facts/Concepts</td>
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<tr>
<td>Standards</td>
<td>Quiz/Test</td>
<td>Activities</td>
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<tr>
<td>Curriculum Expectations</td>
<td>Academic Prompt</td>
<td>Resources</td>
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<td></td>
<td>Performance task</td>
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Figure 11: Adaptation of Wiggins & McTighe backwards design model.
This technique could prove very useful in exhibit design and is inline with the idea of using hierarchy when displaying objects. When a museum is considering which artifacts are the most important, or most telling of the story, they need to then translate that into how the object is displayed. People in Western cultures read from left to right and from top to bottom, and this tells us to arrange display galleries in such a sequence; headings and text should appear in top-to-bottom order. This convention should only be broken if there is a good reason to do so. When proposing layout and graphics especially, the user should consider the instructional methods as proposed by Wiggins – what is worth being familiar with, what is important to know and do, and what should stand as “enduring understanding.” The designer has a wide range of means in order to accomplish this. Emphasis on objects can be obtained by placing a color behind it, by isolating the object, by placing the object closer to the viewer, by using a shaped background or even through lighting. This backward design will help the exhibit designer figure out the elements that should be given more attention to within the exhibit and what kind of attention.

Designing the instruction or lessons of each exhibit however takes on a slightly different shape. The most widely taught instructional model today is based on improving the instructor in order to improve the instruction. To do this, the instructor must acquire more information about the students, about methods, and how to convey this to learners. This Dick and Carey model (Figure 12) has the designer identify instructional goals, conduct instructional analysis, identify entry behaviors, write objectives, develop criterion-referenced test items, develop instructional strategy, develop materials, design and conduct evaluation, and revise (Dick, 1990). A model that parallels and builds on this is Braden’s formative evaluation instructional design model where Braden includes formative evaluation following each step throughout the process (Figure 13).
The first step in the Braden model goes through is the assessment of needs in order to identify goal(s). Here, what the users ought to be able to do once they have completed the instruction is identified. For an exhibit teaching about the railroad, for example, the designer will first identify exactly what about the railroad it is that the learner should know. Perhaps the exhibit aims to show how rail cars connect together, and the user should be able to explain to someone how that process works; once this goal is decided upon, it should be decided step-by-step what it takes to perform that goal. In this step designers also analyze what skills, knowledge, attitudes, and any known entry behaviors that are required by the learners.

Analyzing learners and context is the next phase and it draws the link between where the content will be learned and how it will later be used. Based on the analyses, specific “skills to be learned,”
the conditions under which they will be performed, and criteria for success can be shaped. For the railroad exhibit example, where in the expanse of exhibits can learning about the connection of railroad cars occur? Are there elements from earlier exhibits that can be stressed once again here? How can the lesson be related to current technologies that might be familiar to visitors?

From here, assessment instruments are developed, where the ability to perform the objectives is measured. Is there any feedback that the exhibit can give to assess whether or not the students are gathering the appropriate message? This could be as basic as utilizing flip boards for users to quiz themselves, but it may also be an item at the end of the exhibit like a small brochure or a survey. Even if this assessment does not serve as a permanent addition to the exhibit, it would be beneficial in evaluating exhibits for effectiveness.

Now the instructional strategy can be developed that includes “pre-instructional activities, presentation of information, practice and feedback, testing, and follow-through activities” (Dick, 1990). This is where the instructional aspects of the exhibit would be implemented and the elements/interactions that are thought to effectively present the information about the railroad would be decided upon.

Once the strategy is decided upon, it is possible to develop and/or select instructional materials. What manuals or instructions are already available for use? Do original materials need to be created? The term “materials” has a broad connotation and can refer to any sort of media from multimedia presentations to information graphics to websites. Which artifacts are available that might work to better explain the intended concept?

With a draft of the instruction complete, evaluation and data should be collected and used to improve the instruction. This information is summarized and used to revise the instruction, creating an ongoing loop of improvements. This data can be extremely detailed, but can sometimes be done with simple observation. Are users walking right by the sign with the most information on it, and never reading it? Are there discussions being held about the topic while users are looking at it? The gathering of this information does not have to be time or work intensive, but should provide an objective notation of exhibit strengths and weaknesses.

Educational exhibits act as one instructional material utilized through this entire process. As shown by the Dick and Carey model, there are many phases to go through before considering what the form
and content of this instructional material might be. A relevant suggestion as to how to better develop these materials might come from a relatively new instructional design process deemed “rapid prototyping” (Figure 14, Tripp, 1990). The methodology itself has been used for decades throughout design processes, especially in software engineering and was even discussed earlier as the framework of IDEO’s process and success.

![Tripp’s rapid prototyping process model](image)

**Figure 14:** Tripp’s rapid prototyping process model.

Maher and Ingram (Maher & Ingram, 1989, February) assert that rapid prototyping allows users to try out the system, discover the problem areas, and have input into the selection of an appropriate interface. Prototyping may be thought of as a finished model of a product just before it is manufactured, but that definition should be carried much further back in the process. This seems to be more than appropriate for the complexity of instructional design, a human factors-intensive field. As with most, this model begins with analyzing the needs and content as well as a statement of general objectives. From here, right away, design and research commences. This model assumes that the full understanding of needs, content and objectives cannot result without feedback from such a rapid prototype. Thus, these must all coexist within a loop and work in parallel.

The utilization phase here is key and must be used with potential learners or users. This is where the designer observes the learner and asks questions about strengths and weaknesses of the prototype. As a result, the designer is embarking on problem discovery at a phase in which the prototype is not yet a huge commitment. Changes now can be made without the project appearing to be a catastrophic failure.

For exhibit designers, this may mean developing rough exhibits and asking a handful of children to come and test out the lesson. The testing would allow for museum staff to take the feedback and alter the goals, forms, or instruction accordingly.
There is one set-back to looking at instructional design models – especially since most, if not all, have been designed for instruction within a classroom setting. For years, exhibit design has rested on a behavioral model of museum learning (Falk, Dierking, & Foutz, 2007), which postulated that, given the “right” stimulus, visitors would achieve the “right” response. This idea has affected the ever prevalent “attracting power” and “holding power” of exhibits as well as the idea of “time on task.” This psychological theory has fallen out of favor as a model, but many in the exhibit world continue to utilize it.

The integration of instructional design within the exhibit design process as a whole has been important. Since museums are typically free-choice learning situations, the experience is voluntary, non-sequential, and highly influenced by the features of the setting (Falk, Dierking, 2000). Visitor learning is greatly influenced by the ability of the visitor to navigate the given space (e.g. Evans, 1995; Kubota & Olstad, 1991). Similarly, architectural and design factors such as lighting, crowding, color, sound, and space subtly influence visitor learning (Evans, 1995; Hedge, 1995; Ogden, Lindburg, & Maple, 1993). Particulars of exhibit design also influence visitor’s behavior and learning (Allen, 1997; Bitgood, Serrell, & Thompson, 1994; C. Sandifer, 2003).

The influence of prior knowledge and prior interest has been a subject of much research (Adelman et al., 2000; Dierking & Pollock, 1998; Falk & Adelman, 2003; Roschelle, 1995); what this means is that visitor learning is highly dependent upon an individual’s motivation for visiting and his/her identity. One should expect learning to be influenced by an individual’s desire to choose and control his/her own learning (Lebeau, Gyamfi, Wizevich, & Koster, 2001). Several approaches have aimed to address this. For example, the theory of multiple intelligences (Gardner, 1993) proposed that there are different cognitive styles for understanding the world. Kolb (1984), McCarthy (1987), and others proposed a “learning styles” system, which classified learners by their preferred modes of perception. Museums have put in use “multimodal” exhibits to accommodate for this, meaning that they appealed to different learning styles and levels of knowledge (Borun & Dritsas, 1997). The use of a narrative proves to be another method of engaging a diverse audience. The technique has been recognized as powerful exhibit design tool (Bedford, 2001), but has only recently been looked at for its ability to universally engage visitors.
2.6 Graphic Design Process Models

Graphics for an exhibition are an interpretation of its theme or storyline. They are an integral part of any exhibit and are conceived in tandem with the three-dimensional design process. Where budgets are low, or when an existing infrastructure of walls and partitions is present, graphics tend to be the main element in the design process (Hughes, 2010). For displays where the space can be built up from scratch, the role of graphics is smaller, but still significant. Considering the cost-constraints of fabricating from-scratch partitions, it becomes even more important to emphasize the power and process of graphic design within small museum settings. The appropriate treatment of text is essential to good exhibition design and, if mishandled, the most likely cause of difficulties for visitors (Screven, 1986).

The previously mentioned exhibit design models place graphic design as one small component within the exhibit planning stage. Yet, a properly completed graphic design process includes the threading of concept throughout an entire design and through all media including banners, brochure design, websites and catalogues. Graphics stand out in the planning phase as they prove to be at the front end of creating consistency and lessening visitor confusion (Hughes, 2010). Even if a museum has an object to display, the visitor may find the object interesting, but without graphics, will be left to draw assumptions that may or may not be correct (Falk & Dierking, 2000). It takes a quality narrative and design to draw explanations of objects for the viewers. Consistency does not mean dullness, but establishes an exhibition in the mind of the visitor.

Systematic approaches to graphic design have been developed and tested to be quite successful. The models give the designer a clear path to follow and ensure that the steps are beneficial. This reassures the client that time is spent effectively and helps create a timetable that can be agreed upon. In a case study conducted by designer and researcher, Matt Cooke (Bennett) a process model was used in completing a hospital leaflet (Figure 15). The model took him through four stages, each with their own steps and interconnected pathways.
The first stage, definition, is an early outline of the project. A series of questions are asked to establish the nature of the problem and to decide if visual communication can make a significant contribution to the solution. At this point, the designer learns the causes of the problem and defines the target audience.

Stage two is divergence and this is where the majority of background research takes place. Quantitative and qualitative data is compiled, as well as the visual preferences of the target audience. With this new information, the designer or design team can move forward in enhancing the design problem and come up with applicable design objectives. If this process were being utilized to design an exhibit, it would include scouting out and photographing the intended exhibit space, defining age groups and determining

Figure 15: Graphic design process model.
budget constraints. If artifacts are a large feature of the exhibit, an inventory of available resources might also be acquired.

Transformation is the 3rd phase and this is where the design team proposes a set of visual solutions. It is crucial at this stage for the designers to examine why a choice is made – does it apply to the previous research or declared objectives? At this point, with a toolbox of knowledge, the design team is free to develop a vast range of sketches and prototypes that will go through a series of tests and revisions. Nearing the end of this stage, the graphics should be tested on target audience members in order to fine tune and refine the design for the final product.

The final stage is referred to as the convergence stage and this is where the product is ready to be rolled-out in full scale and distributed. In comparison to previously discussed models, this is the equivalent to the “implementation” stage. It concludes with an evaluation of effectiveness, which can lead to improvements in later editions, or even in later projects.

Though the original map for this process appears quite different from typical, more linear process maps, the stages closely reflect that of both Roger Miles’ and David Dean’s exhibit design models. The exhibit design models however place “graphic designing” as a small part within the development phase. A benefit that small museums feature is that they are conducting the earlier two stages as well as doing the graphics – meaning that there does not need to be the overlap of research when the time comes. Information that is gathered in the first two stages can be carried directly into the development phase, without having to be reinterpreted by another designer.

2.7 Principles of Design

Understanding the process that graphic design goes through is a functional jumping off point for developing exhibit graphics, but there are a few principles that graphic designers adhere to when designing an exhibit. Though these suggestions and considerations are not a part of a specific model, they serve as guidelines within the design world to improve communication.

The main challenge posed in exhibit design is an appreciation of scale. Print graphics are normally designed at a comprehensible scale and can be easily printed and tested. Exhibition graphics on the other hand are designed on scale drawings, typically of 1/10, 1/20 and 1/50. A line of type that looks tiny on a
1/50 scale drawing may look tremendously large on a wall. A solution used by many designers in this case is to print numerous sheets of type at different sizes to be placed on a wall to find the appropriate size. This simple process step can reduce extraneous process work vastly when figuring out type sizes for how far away the user will be and for determining type/image height.

Legibility refers to the clarity of letterforms when presented either individually or when composed to form words and lines. This aspect is the one over which designers have the most control and as such, can be the most distracting when done poorly. Where print and screen graphics feature an assumed, close proximity with the user and ample lighting, exhibit graphics creates an environment that the text is situated in. Even well designed text will not be easily read if the lighting is poor or there is reflective glass in the way. This also goes for text that may be legible close up but won’t be clear if it is placed at the back of a display case, far from the viewer.

Readability refers to the ease with which a piece of text can be comprehended and is influenced by the words used and the complexity of the sentence structure. The make-up of the text will depend on the context of the exhibit and the instructional design plan. Reading ages are effectively lower for exhibition texts, due to the new environment and the nature of the museum (Dean, 1996). The Ekarv method (Ekarv, 1999), named after Margareta Ekarv, is a proven set of guidelines (Davies, 2000; Ekarv, 1997) that addresses both legibility and readability issues specific to the exhibitions environment. The guidelines are as follows:

1. Use simple language to express complex ideas
2. Use normal spoken word order
3. One main idea per line, the end of the line coinciding with the natural end of the phrase.
4. Lines of about 45 letters; text broken into short paragraphs of four to five lines.
5. Use the active form of verbs and state the subject early in the sentence.
6. Avoid: subordinate clauses, complicated constructions, unnecessary adverbs, hyphenating words at the end of lines.
7. Read texts aloud and note natural pauses.
8. Adjust wording and punctuation to reflect the rhythm of speech.
9. Discuss texts with colleagues and consider feedback.
10. Pin draft texts in their final positions to assess effect.
11. Continually revise and refine the wording.
12. Concentrate the meaning to an “almost poetic level”.

Most notable are the guidelines relating to line and paragraph length. Users do not always read in a linear fashion, and they often make sense of text by picking out key words and phrases. Designers should avoid
long, densely written paragraphs, and instead stick to small paragraphs that allow visitors to navigate through a text panel easily.

There are principles of design that exist when composing with formal elements and they are referred to as the principles of design. These principles are interdependent and it is necessary for beginning designers to be mindful of them. Balance is stability or equilibrium created by an even distribution of visual weight within both individual elements and the composition as a whole. Unity is about designing a whole in which elements relate to each other; proximity, similarity, and continuity are key components to unity. Within unity, a degree of variety will create visual interest and excitement. Visual hierarchy is then used to organize and clarify information. Rhythm is used to help create a flow from one element to another.

Visual hierarchy is the primary force for organizing information and is used to guide the viewer through a visual arrangement according to emphasis. Some elements are stressed over others, determining which elements the user is to viewer first, second, third, and so on. Giving emphasis to every element however, means giving it to none, resulting in visual chaos. Properly using emphasis will result the creation of a focal point—the most accentuated part of a design. Position, size, shape, direction, hue, value, saturation, and texture of a graphic element all contribute to making a focal point.

Once a focal point is established, the following elements may be included based on the necessary emphasis, creating a flow from the most important element to the least important. There are many ways to create emphasis: emphasis by isolation, by placement, through scale, through contrast, direction and pointers, diagrammatic structures, nest structures, and stair structures (Figure 16). Each of these methods helps to organize information into a logical sequence for the viewer to follow.
If the information is too predictable however, it may become static and boring. In graphic design, a strong and consistent rhythm can help the viewer’s eyes to move around the page. This rhythm can be slowed down or sped up based on the spacing between images and/or type, and creates an underlying beat, while allowing for sparks of visual interest. To do this, requires the understanding of both repetition and variation (Brower, 2007). Repetition occurs when one or a few visual elements are repeated. Variation happens when a break or modification in the pattern occurs, which changes the size, color, shape, spacing, position and/or visual weight of an element.

Unity happens when all parts of the design work together and appear as though they belong that way. The mind attempts to create order and make connections, this is better known as the gestalt theory in psychology. Based on this, certain laws of perceptual organization have been developed to help create order. These laws are: similarity, proximity, continuity, closure, common fate, and continuing line (Figure 17). Similarity groups together elements, which share characteristics. Elements can share shape, color,
texture, color, and direction. *Proximity* places elements near each other, making them seem as though they belong. *Continuity* means that there are visual paths or connections among parts. *Closure* uses the mind’s tendency to connect elements and fill in gaps in order to complete a form, unit, or pattern. *Common fate* refers to elements that move in the same direction, this makes them more likely to be perceived as a unit. Finally, a *continuing line* happens because lines are always perceived as following the simplest path. If two lines break, the viewer sees the overall movement rather than the break.

*Figure 17:* Examples of laws of perceptual organization

Unity and order play a clear role in communication, and can be pushed further with the use of a grid. A grid aligns visual elements along guides that naturally lend themselves to alignment.

Design principles are not limited to the 2-dimensional world, especially when it comes to exhibit design. Hierarchy can be established by the use of foreground, middle ground, and background in a 3-dimensional space. For most observers, elements in the foreground are observed first.

Designers use design principles regularly as a tool in developing meaning and the principles can be used by novice exhibit designers when developing exhibits. The use of these can help create unity, focal points, and organize information, all of which can contribute to strengthening the intended message of an exhibit.
CHAPTER 3. CRITERIA FOR CREATING A MEANINGFUL MESSAGE

3.1 Identifying Criteria for Creating a Meaningful Message

Each of the reviewed design process models serves to tell the designer how the process should progress, but none of the models elaborate on how. This is especially a concern when considering “design thinking” and the way trained designers solve problems differently from other individuals, such as the anthropologists in charge of designing exhibits for a small museum. Graphic designers utilize a number of design principles and tactics in order to create a clear message for the user. This thesis looks at communication theory and at what designers do to create message, in order to develop a content assessment tool (CAT), which could serve as a tool to amend current exhibit design models.

This CAT asks designers to consider each criterion as an element of the design that can enhance the end message and/or goal of the exhibit. Rather than telling the designer to “design graphics” at a stage in the process (such as in David Dean’s exhibit model on p. 6), this tool asks the designer to consider the graphic structure and elements that can be selected to better the design. This goes for instructional intent, interactions, the order in which individual exhibits are visited and so on. Each piece of criteria within the matrix is intended to build upon the end message.

The primary focus of this CAT is on communicating the message from the exhibit to the user. An understanding of this sender and receiver relationship, as described in communication theory, will help determine decisions about such things as structure, color, interactions, and all other components of how the exhibit is to take shape. Humans in general pay more attention to, and remember, messages that they enjoy (Morgan & Welton, 1992). The job of the exhibit designer is not only to create an exhibit that showcases work or artifacts, but also to design an exhibit that attracts and holds the attention of the user. In order for the message of the exhibit to come across successfully, the designer must consider the complex web of skills and knowledge required for two parties to communicate successfully. One of the most commonly cited frameworks was developed that demonstrates this (figure 64) through defining a source, message, channel and a receiver (Berlo, 1960).
3.2 Source/Receiver

In order for the message to be transferred from the source to the receiver successfully, they both must utilize the same skills. Language and sentence structure utilized on exhibit panels, for example, must be at a comprehensible level to the users of the exhibit (Hughes, 2010; Miles, 1988). Information that is too complex will fluster the visitor while information that is too vague may come across as boring and worthless. This is dealt with in a number of ways, primarily by layering explanatory signage and information. Doing this allows for information to be categorized both into levels of complexity for different ages, but also according to Braden’s (Braden, 1996) backwards design curricular priorities of enduring understanding, important to know and do, and worth being familiar with (figure 19). For museums to design exhibits that “speak” at the visitor, a clear understanding of the visitor must be considered. This includes: the user’s communication skills, attitude, knowledge, social systems, and culture.

3.3 Message

As shown in figure 18, the sender encodes a message using such variables as content, elements, treatment, structure, and code. The message is what content and information needs to come across to the receiver. Museums display a vast quantity of information to viewers in a relatively short time span, making the structure and treatment of the message all the more important. An exhibit design needs to tell a story (Berger, 2007) and doing this means creating a cohesive narrative throughout the exhibit. According to Berlo’s communication theory, message is constructed by a number of components: content, elements, structure, treatment, and code, which work together to produce their effects. The techniques used within
visual communication are adapted from the study of linguistics and semiotics, and can be applied to Berlo’s theory. All of the visual components that comprise exhibit designs send a particular message to the viewer, whether the designer intends it to or not (Crow, 2003). Semiotics, as described by an American philosopher Charles Sanders Pierce is the act of signifying, or of transferring meaning. Pierce’s view of semiotics is that the exchange of meaning is affected by the background, education, culture and experience of the viewer. What this means for exhibit design is that there are certain components of design that send inherent messages to the users. These 5 components will now be described in detail.

3.3.1 Content

Content is the information that is the subject of the message. This is the overall message, goal, theme or lesson that the exhibit means to express to the users. The content is the narrative or story created wall with a simple label, which artifacts were selected and the order they are presented in constitute the content. There are many ways to elaborate on the content of a message: it may tell the biography of a person or persons; it may make the viewer feel as if they were reliving the experience; it may be a story being told by a narrator; etc.

3.3.2 Elements

Once the content is determined, elements are the individual items that are assembled to form the message. The most common elements for exhibit design are text, artifacts, interactions, images, and materials. Other elements may be involved, and there may in some cases even be subcategories of elements, but all or some need to come together to send a clear message to the visitor.

Text in this instance refers to the specific information and research that is to be conveyed through typography or spoken language. Artifacts are objects that may be original or replicas that are either a part of the museum collection or a donated collection. These pieces are often the focal point of a history exhibit, and the reason for museums to rotate exhibits. A museum that may have 1,000 artifacts on display may have 20,000 or more stored away, waiting for a turn in the rotation. These items—or elements—on display are selected or should be selected based on whether or not they enhance the overall intended message of the exhibit.
*Interaction* varies greatly from museum to museum and can range from fully integrated hands-on activities to standing within a period room. Hands-on interactions are not a necessary addition to an exhibit, but the consideration of how a user interacts when reading labels or observing photographs should always be a consideration. By reading a text-panel, the user is interacting with it, by observing and trying to figure out how a telescope from 1839 works, the user is interacting. For exhibit designers, this means that the way a single artifact, and group of artifacts are presented, should be considered as an interaction and should again, be done so in a way that will further enhance the message. This goes especially for hands-on interactions where the activity could potentially take away from the actual lesson if it is not closely enough related (Sandifer, 2003).

*Images* are a commonly used element that contributes to a message; they include photographs, illustrations, and video; they can be large, covering an entire wall or small drawings next to a description. They can serve to show artifacts in context, in micro or macro views; graphic images can illustrate how something works, or provide a cut-away view. Where words may fall short, images can be used to enhance a message or stand alone to make a point. It is important for the designer to consider whether or not the selected images really compliment the intended message of the exhibit and whether or not is a cohesive choice alongside the other elements.

*Materials* are what the exhibits are physically made of. Wood, for example sends a very different message than what chrome, fabrics or glass might. Many museums reuse display cases for artifacts through the years, never changing the material aspect of the exhibits other than what the artifacts present. This is understandable in the sense that exhibit cases are an expensive investment, but appropriate additions of materials to the cases based on exhibit content could help to maintain a theme. Materials are also a consideration with interactive components – it must be durable, safe, cost-effective, and still compliment the overall story. This choice in material can have a significant impact on the message of an exhibit. For example, exhibit made primarily of wood might be appropriate for a pirate exhibit, but may not be for a space exhibit.
3.3.3 Structure

*Structure* is a multi-faceted component that determines how different elements are assembled or arranged. The same set of elements can produce different messages when combined in a different way. This is especially important in the case of exhibit design where poor instructions, a lack of hierarchy, or mixed messages can easily confuse the visitor. Structural considerations in exhibit design include how exhibit stands are arranged within the room, whether or not there is a focal point as well as the structure of the graphics. Since structure has many sub-categories, these will be described individually. Graphics can be arranged to appear static or dynamic, they can appear symmetrical or asymmetrical; variations in these structures create very different messages.

The *Narrative* structure can be created through the arrangement of artifacts and content in either a linear or non-linear order. This is where the chronology of the story is determined. Items may be arranged based on a timeline or time periods (figure 19), or there may be particular styles or cultures that are grouped together. Whichever method is used, this presentation should work to tell an overall story that flows through all parts of the exhibit, from the graphics to the text and even into the interactions. For example, if the exhibit is about a historical period, then a linear structure makes sense; if the exhibit revolves around a theme or topic (i.e. “all about cooking”) then a non-linear structure works better.

![Figure 19: Example of a chronologically structured exhibit.](image-url)
How the narrative is told will greatly impact the path and order that exhibits are visited in. There are however, a number of ways that paths can be constructed that impacts the way the narrative comes across. Some approaches offer visitors a very open exploration of exhibits and some are very prescriptive, forcing them to work their way along a predetermined path. A single path ensures that all visitors share a similar experience, which is important where the objective is to build up a platform of knowledge. A multiple path exhibition allows visitors to choose a path freely and to follow their own interests and preoccupations. This however can be tricky for the designer, as the user still needs to be aware of where he or she is within the exhibition and within the narrative. The radial pattern, “star” exhibits, areas of affinity, the fan pattern, and map orientation are all alternative path structures (Hughes, 2010) that each have potential for altering and engaging the visitor’s perception of the exhibition subject.

The Exhibit Space Focal Point is the point within the room of exhibits that is the most prominent. It is similar to the way in which written stories build up to a climax or focal point. This space may emphasize a significant point for the narrative, may begin the visitor on the journey through the exhibits, or it may be the grand finale. The design of individual exhibits can follow a similar idea of featuring an exhibit activity focal point. Individual exhibits within the space are typically viewed one at a time, each individual exhibit that is viewed should also feature a focal point. This again, relieves any confusion as to what the viewer is supposed to look at first and sets the stage for what the exhibit activity will be about.

Developing an Instructional plan for an exhibit requires a process on its own. For experienced educators, this process may seem natural, but for non-experts instructional design models such as the Dick & Carey model (p. 18) might be studied. Doing so will help to relate the topics to the visitors and to challenge them to apply knowledge that was learned from the given content. The chosen instructional plan needs to help enhance the story of the exhibit and be sure to not distract from it. This is where the conflict between whether an exhibit should be “fun” or “educational” should fade, as a well-integrated instructional plan ought to merge these two together. Relating the information in the exhibit to the visitor, whether through metaphor, analogy, compare/contrast or another method, is one of the best ways to put the knowledge into terms that the visitors understand and will be interested in. An example of this was done by the Sanford Museum in Cherokee, Iowa where visitors were learning about maps and were asked to use dry-erase boards, magnets and markers to create a map of their own bedroom (figure 20). This technique
related the concept of mapping to something the user would be familiar with, his or her bedroom at home. In an exhibit on arches (figure 21) the visitor is shown a photo of a real life arch structure, an example of a basic arch, and is given blocks to build the simple structure. The visitor is able to compare/contrast this simple arch construction to the more complex version as shown and make inferences on how the more complex arch was completed.

**Figure 20**: A mapping activity that relates learning about maps to the visitor.

**Figure 21**: An arch building activity allows the visitor to compare the simple arch to the real arch.

*Interactions* at exhibits need to be challenging enough to engage the visitor, but must be simple enough as to not distract from the overall message. The interaction itself should intertwine with the story and be relevant. Interactions do not necessarily have to be complex and intricate; for example, a simple addition of fabrics and textures for example can get users to *touch* an otherwise stand-off exhibit and begin to engage other senses beyond just sight. Drawing from their own observational data and literature, Borun and Dritsas (1997) identified seven exhibit characteristics that attract and hold the attention of family groups:

- multisided: the family can cluster around the exhibit
- multiuser: interaction allows for several sets of hands (or bodies)
- accessible: comfortably used by children and adults
- multioutcome: observations and outcomes are sufficiently complex to foster group discussion
- multimodal: appeals to different learning styles and levels of knowledge
- readable: text is arranged in easily understood segments
- relevant: provides cognitive links to visitors’ existing knowledge and experience.
Graphic structure can dramatically change the narrative tone of an exhibit. Shapes, color, images and illustrations can all be arranged in countless ways. Where one arrangement may result in a static, calm feel, another may create an energetic, child-like feel. The variations range from static/dynamic, geometric/organic, symmetrical/asymmetrical, and even repetition pattern can create new meaning based on how shapes are used.

Static images appear to be settled and not moving. The surrounding graphics leave a certain amount of openness that keeps the graphic from appearing like it is about to be set in motion. Figure 22 uses similar colors to figure 23, but the structure of the graphics changes the message quite drastically. The graphics of figure 22 feature sharp lines, aligned, horizontal, similarly sized typography and clear photos. This can be compared to Figure 23, which uses a similar color palette, but features drastic type size changes and circles that seem to move throughout the image. Even the physical form of these two demonstrate the difference between static and dynamic structures, as figure 22 graphics are mounted on a thick, square shaped board while figure 23 is narrow in both width and breadth, appearing easy and quick to move. These attributes all affect the message being presented by the graphics. Figure 23 is designed to be playful and to match the energy of the Kids Power exhibit, which is all about children being active and generating power. Figure 22 on the other hand is about funding at the New Children’s Museum; its target audience is grownups, and its message is more serious.
Figure 22: New Children’s Museum fundraising display uses static graphics as grown-ups are the target audience and it carries a more serious message.

Figure 23: Kid Power exhibit panel uses dynamic forms and arrangement to convey energy and motion.

Rectilinear forms have discrete, defined lines, which generally feature repeated line length and angles. Organic shapes on the other hand are irregular forms of undefined shapes. In general, organic forms are associated with things found in nature, while geometric forms are more often associated with man-made things. This is in part a result of rectilinear forms being so representative of order and organization, while the organic is less predictable and free flowing. The stark contrast in using rectilinear vs. organic forms can be seen in a comparison of Newseum’s exhibits (figure 24) and a Dr. Seuss exhibit (figure 25). The Newseum exhibit features rectilinear shapes repeatedly, even the headlines are in all caps, maintaining the rigid structure. This is done not only to literally mimic the forms seen in newspapers, but also to emphasize the objectivity, organization and serious nature of news. This sends a very different message than that of the Dr. Seuss exhibit, which aims to express the make-believe, imaginative freedom of the stories.
Rectilinear forms and repetition are used to emphasize organization and a serious, objective nature within the Newseum exhibit. Organic forms emphasize the imaginative freedom of story-telling.

Symmetrical and asymmetrical structure can drastically change how elements communicate, since each method has powerful conceptual associations. Symmetrical graphics appear conservative and restful, while asymmetrical graphics generate more energy and playfulness. Symmetry is an excellent tool for presenting side-by-side comparisons where differences can then be spotted more easily. Figure 26 uses a symmetrical graphic to help explain the concept of balance. Asymmetrical graphics can help to create dynamic movement and keep designs interesting (figure 27). In Figure 27, the visitor is directed from a starting point to an end goal; the asymmetry is used to signify that the activity becomes more challenging toward the end.

Figure 24: Rectilinear forms and repetition are used to emphasize organization and a serious, objective nature within the Newseum exhibit. Figure 25: Organic forms emphasize the imaginative freedom of story-telling.

Symmetrical and asymmetrical structure can drastically change how elements communicate, since each method has powerful conceptual associations. Symmetrical graphics appear conservative and restful, while asymmetrical graphics generate more energy and playfulness. Symmetry is an excellent tool for presenting side-by-side comparisons where differences can then be spotted more easily. Figure 26 uses a symmetrical graphic to help explain the concept of balance. Asymmetrical graphics can help to create dynamic movement and keep designs interesting (figure 27). In Figure 27, the visitor is directed from a starting point to an end goal; the asymmetry is used to signify that the activity becomes more challenging toward the end.

Figure 26: Example of an exhibit using symmetry to make the concept of “balance” more clear. Figure 27: Rock climbing exhibit showing asymmetrical structure.
3.3.4 Treatment

_Treatment_ of a message considers elements and structure, but introduces questions of style. While structural elements come together to create the skeleton of the exhibit, the treatment is then added on top to begin adding character, building concept, and creating a unique look and feel. Treatment can include such things as colors, font choice, image style, as well as the tone or spirit of the verbal narrative.

_Color_ is a powerful message tool that can help to set moods, direct users, and distinguish information. While it is inherent in any exhibit, the intentional selection of color to enhance a message requires special consideration. Warm colors (reds, oranges, and yellows) can bring brightness and energy to an exhibit while cooler colors (greens, blues and purples) can create a calm or cold feeling. Metallic, silvers and blacks vs. stark whites and creams will likewise send contrasting messages. Color choice may be used literally, for example a mapping exhibit may use choose colors based on tans of paper and blues of water (figure 28), but the saturation and shade of the colors are still considered based on the tone of the narrative. Conceptually, color can make a drastic difference in setting the mood of an exhibit. Holocaust and war exhibits are usually dark, regularly featuring browns and blacks (figure 29). This generates an entirely different message than the bright, primary colors of a Dr. Seuss exhibit (figure 30). Consider how awkward each exhibit would become if the color palettes were swapped.

![Figure 28: A mapping exhibit that uses color in a literal sense.](image-url)
Font choice can add character and variation to the message of an exhibit. Chosen typefaces must be legible as well as readable in exhibit design. Headings should stand out, but should also have appropriate letter spacing and be clear to read, especially from a distance. Body copy for exhibits should be in a readable typeface, set in manageable paragraphs chunks. This does not limit the body copy from relating to the message, but should interact with other graphic elements such that an acceptable typeface will look like it belongs in the exhibit and still get the message across. Figure 31 uses a script-like typeface that is based on the handwriting often seen on old maps. This treatment reinforces the hands-on, pre-computer style that pirates would have used. This can be compared with Figure 32 from the Newseum, which uses a condensed, all-caps typeface that sends a significantly more authoritative and contemporary message. Type treatment goes beyond just font choice: it can be given depth, light can be added behind it, material choice can be varied and even the base-line can be shifted (figure 33). Each of these changes can be applied to further the overall concept; for example, type treatment such as seen in figure 80 may make sense for a kids radio station, but probably not for an exhibit about World War II.
Figure 31: Hand-written type is used here to show age and to mimic type seen on old maps.

Figure 32: The Newseum uses a condensed, contemporary all-caps typeface to show the seriousness and authoritative nature of newspapers.

Figure 33: This exhibit heading uses a shifted baseline, 3D type and background lighting to create a dynamic message.

Image Style can include everything from the way exhibit walls are painted, how information graphics are designed, how the floors look, and all aspects of images, whether illustration, cartoon, or photograph. In some cases, such as the Dr. Seuss exhibit, the illustration style seems obvious since Dr. Seuss books feature a defined style (figure 34). The playful, quirky style of the forms is fitting for the rhyming, quirky stories. The intention of the story/message along with how it is intended to come across to
the visitor should be factors in determining an appropriate illustration style. What works best when explaining the topic at hand? It is not likely that a Dr. Seuss style will be effective in an exhibit on the Holocaust. Image selection runs along a spectrum of abstract to realistic and within that spectrum can exist countless variations of line weight, treatment, color use, and detail. Photographs are at the realistic end of the spectrum, but even photographs have numerous treatments to choose from. Many historical exhibits are limited to black and white photos, but this image “style” reinforces the historical aspects of the story. Figure 35 shows an exhibit that uses black and white images to show that all of the individuals share a common heritage; the images however are also given a range of tinted backgrounds to show that they are all individuals.

Figure 34: This Dr. Seuss exhibit features an appropriate illustration style that matches those found in the story-books

Figure 35: This exhibit uses photographs that are treated with color tints to enhance the message.

Labels exist in nearly all exhibits. In the most simple of cases, artifacts are labeled with a title and a date. The Label style can be quite simple and plain, but it has potential to fit and enhance the theme of the exhibit. In an exhibit on mapping, labels appear to be written by a pirate, on old torn paper (figure 36). This pushes the narrative of having to help the pirate captain solve puzzles – as if another member of the ship has left the instructions. Labeling artifacts needs to remain clear and succinct, but that does not mean that the label style must be black type on a white rectangle of paper. Figure 37 demonstrates a clear instructional label that is integrated into the activity and appears as a music stand that would otherwise
contain sheet music. This integrates seamlessly with the interaction and the message while remaining clear and easy to understand.

**Figure 36:** This label integrates the pirate theme through torn edges and hand-written type as well as by integrating the pirate into the content of the label.

**Figure 37:** A label mimicking a music stand blends into the exhibit.

### 3.3.5 Code

*Code* refers to the rules and conventions on which the message is built. This helps the user know exactly where to look and what to expect, creating consistency and predictability, which in turn creates a better learning environment. For museum exhibit design, the very nature of the museum becomes the foundation of the code. When a visitor walks into an art museum, there exists a certain expectation that is likely different from the expectation if the visitor were to walk into a children’s museum. Code can be carried throughout the museum through measures such as using *consistent headlines* to help the user know exactly where to look to begin each exhibit activity, and clearly marking what each activity will be about. *Hierarchy* is used at each exhibit through type size variation and color contrast. Headings, subheadings and images should be treated similarly and then given similar hierarchy throughout individual exhibits. After experiencing one exhibit, the user should be able to move to the next exhibit and quickly catch on to establish hierarchy. *Typography* that is used consistently can help in this, as the treatment of headings and
of body copy can help lead the eye and keep information organized. Likewise, *image style* should also be repeated throughout activities. The treatment chosen for illustrations, photographs, and graphics should remain constant, keeping the exhibit space as a whole cohesive in its message. The code then, becomes all of the repeatable elements, structure, and treatment combined to create the expected narrative.

### 3.4 Channel

*Channel* refers to the five senses in which messages are received through: hearing, seeing, touching, smelling and tasting (Morgan & Welton, 1992). Every message must be transferred through at least one sense, or any combination of senses in order to be received. For design, this means selecting a medium to deliver a message that utilizes one or more of these channels. For example, if the chosen typography of an exhibit cannot be seen it will not succeed in reaching the receiver – no matter how strong the message is (Hughes, 2010). Exhibits then have to choose which way the message will be delivered to the visitor. Some examples of channel include:

- Image based exhibit panel
- Text based exhibit panel
- Artifact
- Video clip
- Audio clip
- Touch interactive
- Smell interactive
- Taste interactive

Utilizing more than one channel helps with accessibility issues and is responsive to a range of multiple learning intelligences such as spatial, linguistic, logical-mathematical, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic (Gardner, 1999). Due to the opportunities that may not be present in other, more formal learning environments, the museum setting is ideal for exploring alternative methods in education and for addressing these multiple intelligences.

These categories come together to define the numerous components that are necessary within exhibit design in order to create a meaningful message. This, in turn, helps to create a meaningful experience for the visitor.
CHAPTER 4. METHODOLOGY

4.1 Research Components

This study proposes that current exhibit design processes can be improved. In order to demonstrate this, small history museums around Iowa were visited, a content assessment tool (CAT) was developed, and this CAT was used as tool to assess whether or not exhibits were utilizing visual communication considerations to deliver the intended message. Interviewing the museums gave perspective on how museums function, whether or not they utilize a design process, and what comes out of that process. Two exhibits from each of the four museums were evaluated using the CAT to examine the respective museum’s exhibit design process.

The CAT was developed to demonstrate the numerous components that go into museum exhibit design and creating message. The framework of the CAT was built around communication theory, instructional design, and graphic design and elaborated to fulfill the more specific needs of exhibit design. This identifies the criteria needed to send an intended message from the designer to the end user.

To grasp an understanding of how smaller museums design exhibits, four interviews were conducted with four Iowa museum curators. These interviews sought to uncover what capabilities actually exist within a museum setting such as: who is working there? What is the expertise of the staff? And most importantly, what does the design process look like for these individuals and what are the results? Exhibits from these museums were then examined to see how effective they were at communicating their intended messages. In situations where they fell short, these exhibits helped the author to identify the missing criteria in the design process models. They also serve to demonstrate numerous other criteria that are missing from many exhibit design processes, even in the real world.

Each design process model and each museum exhibit interview was examined using the CAT and evaluated. The design models were looked at in terms of whether or not they asked the designer to consider each piece of criteria within the CAT, and whether or not the criteria contributes to the overall message or goal of the exhibit.
4.2 The development of the Content assessment tool

This communication theory criteria was applied in matrix form as a possible addition into existing design process models. Since the effective communication of message is so important to exhibits, the CAT was used to assess selected exhibits from the four museums visited (figure 40). It becomes clear that design process models are lacking significantly in addressing the issues that are so integral in creating a meaningful message. Dick & Carey’s instructional design process model and IDEOs model in fact do a better job at this than any of the design models, as the instructional design plans (p. 24) call for the designer to consider the user’s previously acquired skills, knowledge, and needs, while IDEO includes an observational phase specifically for getting to know the user (p. 9).

Both Dean (p. 3) and Miles’ models (p. 13) include phases addressing instructional design or developing an educational plan. If it could be assumed that the process being used to complete this phase were Dick & Carey’s model, then the instructional portion of the exhibit would at least take into consideration the sender/receiver relationship. It is a large leap to assume however that this is happening within museums, especially within smaller museums where there may not be an education expert on staff or working as a member of the exhibit design team.

In order to gain a better perspective on whether or not museums are implementing or considering such criteria, four small history museums were interviewed and photographs of the resulting exhibits were taken. This information was then applied to the CAT for assessment (figure 40).

4.3 Museum interview sample selection

The focus for this component of the research was to better understand the design process for small history museums. History museums were selected, as they feature the most variation in messages being communicated to the users. This variation means that designing an appropriate mood and creating an appropriate message to tell the story becomes a critical part of the design process. The first step of sample selection was to generate a list of small history museums in Iowa. The 2011 edition of the Official Museum Directory, published by the American Association of Museums, included information concerning over 7,000 museums, zoos, and botanical gardens throughout the United States. Each entry featured contact information for the museum. Utilizing AAM’s search engine narrowed the list of history museums. Two areas were specified:
a) Museum Type: History Museum, Historic House/Site, Culturally Specific
b) State: Iowa

The museums whose entry met the above criteria were selected for further consideration.

Four small museums that were willing to share their design process and allow exhibits to be photographed were selected to participate. These museums were first contacted via e-mail (Appendix D). Museum visits and interviews were then set up and conducted with these individuals to gather as much information about the design process as possible. Each interview consisted of ~30 minutes of question and answer time, followed by a tour of the exhibit space.

Content for the interview guide (Appendix A) was directed by the objectives of this study and themes from the literature related to museum processes. A preliminary instrument was developed that reflected these themes; however, as a better understanding of the real-world design process was the goal, questions were kept open-ended so not to limit the findings of the study.

Questions included on the instrument were divided into three parts denoting the framework for the study: 1) Staffing Situation, 2) Mission and Goals, 3) Design Process, and 4) Exhibit Enhancement. The staffing situation was questioned to better understand how many individuals were available at the museum to work, and to better define the roles of staff members. Questions included acquiring the museum’s mission statement, determining what an “effective” exhibit design would be defined as, and the context of the exhibits. Design process questions were the most detailed, asking how the process begins, who works on the project and what are the accompanying duties, how are stories and concepts decided upon, and so on. Exhibit enhancement questions refer to the use, if any, of interactive museum exhibits and how they are implemented. This also includes any use of alternative media such as computers, touch screens or projectors that the museum may utilize (see Appendix A).

Approval of procedures and instruments for this study, including the use of human subjects as informants, was obtained from the Iowa State University Human Subjects Review Committee. (see Appendix B).
4.4 Observation guide and photography protocol

An observation guide was developed to focus on-site observations and photo documentation (see Appendix C). Museums were toured with the curator following the interview and observations began at this point. Elements to be noted were: a) exhibit wayfinding and layout; b) sensory attributes; c) level of interaction; d) visual interest; and e) instructional material. This criteria was used so that photos from each museum visit would be consistent and could be compared across museums later on.

Photographs were later referenced when determining whether or not the museum addressed criteria from the matrix. From this, the content, elements, structure and treatment of graphics could be evaluated, as could the exhibit space as a whole. Type treatment could be looked at for appropriateness and to see how well it fit into the overall message. Taking special note of sensory attributes ensured that the use of different channels was being noted: are there audio recordings? Hands-on activities? All of this information was used to assess whether or not the museum’s design process is adequately addressing visual communication issues based on the gaps seen in clarity of message, visual information, hierarchy, etc.
CHAPTER 5. FIELD INTERVIEWS & OBSERVATIONS

5.1 Vesterheim Norwegian-American Museum

The Vesterheim is a museum located in northeast Iowa that focuses on capturing and preserving the Norwegian-American cultural experience. The chief curator is currently the only curator working at the museum, and is in charge of designing exhibits that either she or that another staff member has developed. This responsibility includes selecting artifacts, writing texts, physically installing the exhibit, and developing a certain amount of educational programming. Since the museum is small, other staff members, such as the registrar, who is also the archivist, are also put on exhibit duty occasionally. In this case, the curator’s background is in anthropology, which lends valuable expertise toward the artifacts in the collection.

The design process for the Vesterheim generally begins with a meeting of the “exhibition planning committee” which includes curatorial staff, someone from the development office who ultimately raises funds, someone from the publications department who would publicize and help with writing and someone from the gift shop who would give input on retail opportunities, and then somebody from administration.

Ideas are gathered as a collective brainstorm where each individual brings ideas to the table and discusses it. The idea is described in terms of concept or theme, how it is linked to the museum’s mission, whether it will use Vesterheim objects or other objects, and what would be in it. This is also the point where the group would determine who will be in charge of the exhibit and what, roughly the budget would be. This point may or may not conclude with a written proposal, sometimes it is simply an oral commitment. The group then helps as a sort of front-end evaluation, giving feedback to one another on the idea at hand.

5.1.1 Immigration exhibit

Two Vesterheim exhibits were selected for assessment in the CAT, one on immigration, and another on textiles. The central message of the Norwegian immigration exhibit is to tell the immigration story and the journey that it took. This includes the story of two brothers and how they traveled together by boat, the adventures and misadventures that they had along the way. This boat is the centerpiece of the room and stands out from every angle (figure 38). Large text panels at the end of the exhibit space explain
the history of the migration (figure 39). In the very back of the space, there are buttons that can be pushed to hear audio portions of the story (figure 40). These are the elements that make up the exhibit.

Figure 38: The boat that two brothers sailed to America in is the centerpiece of the exhibit space.

Figure 39: Text panels explain the history of the migration.

Figure 40: Interactive buttons allow the user to hear audio clips of the story.
The reading of information about the migration happens chronologically and takes the visitor from cause of the migration from Norway, to reading letters from travelers, and finally hearing audio clips. The story of the brothers happens as a sort of side-story following the initial narrative. This works well in creating a message, as it first explains why the brothers had to take such a journey. The focal point of the narrative and climax of the story then becomes the journey across the ocean, and this is well matched by the life-sized boat that creates a focal point in the center of the room. Other structural considerations are present, but do not appear to enhance the intended message. For example, the audio interaction that is included is a nice touch, but where it is located separates it from the rest of the story and there is no typography that leads the visitor into wanting to listen to each recording.

The treatment of this audio interaction also does little to enhance the overall message. The audio buttons are contained in a generic gray box with bright red buttons. These look out of place from the rest of the exhibit, which features cool blue-gray colors that play off of the colors on the large ship. Illustrations are used for imagery in a rough painted style that works well with telling the story of rough travels.

All of this together creates an exhibit space that works to tell a story and display some interesting artifacts. However, more attention to graphic structure could be used to enhance the overall message. For example, the large wall of paragraphs is a lot to take in at once and there is not an available short version of the story that parents could quickly relay to children or that children could seek out for themselves. If the focal point of the exhibit is the boat that the brothers came across the ocean on, then the use of dynamic graphics could be used to explain the relationship between the brothers. It is a dramatic story, and the accompanying graphics currently do little to emphasize this.

5.1.2 Textile Gallery

The second exhibit that was examined was the Textile Gallery where textile traditions, both new and old are explored (figure 41). The intent of the exhibit is to demonstrate Norway’s rich history of textile traditions, especially in weaving, embroidery, and knitting; all of which were necessary for daily life when immigrants first began coming to America. The elements of this exhibit are primarily artifacts, labels and
text, with a few diagrams to show how machinery works. There is also a small interaction table off to the side of the exhibit that is intended for children (figure 42).

Figure 41: Vesterheim American-Norwegian Textile Gallery.

Figure 42: Vesterheim interaction table.

The artifacts in the textile gallery are divided into categories and put on display in a non-sequential order. The design of the labels is the same style for all exhibits; this tactic (figure 43) does create a consistency throughout the museum, and does feature clear typography, but lends little more than small bits of fact to any potential narrative. Artifacts are identified with brief labels, but are not shown in context or with supportive elements that would strengthen their story.
Figure 43: Vesterheim label design.

In these photographs, it seems evident that important communication criteria might be missing from the Vesterheim’s current design process. This particular exhibit could be greatly enhanced by providing a context for the items. This does not necessarily mean designing the real environment where they would have belonged, but even photos, images and graphics of how the items were used, where and when would help tell the story. Each item is selected and put on display by the museum because it carries a certain historical value or purpose, the current display of the items significantly underplays this importance.

5.2 Sanford Museum, Cherokee Iowa

The Sanford museum is tucked away in a small Iowa town. The staff consists of two individuals who have expertise in education, one who takes care of the fine arts and aesthetics, and an archeologist who seconds as the in-house builder. The museum features a number of galleries: one of which changes five times a year, including an annual art exhibit; a lower level is made of more permanent exhibits, which tell the prehistory of Northwest Iowa through sea fossils and wildlife exhibits; and there is even a planetarium, the first in the state of Iowa.

The design process at the Sanford museum between conception and being built is quite fluid, as 3 of the 4 staff members bounce ideas and progress back and forth. The staff consists of two individuals who
have expertise in education, one who takes care of the fine arts and aesthetics, and an archeologist who
seconds as the in-house builder. No one individual has specific responsibilities; instead everyone does a
little bit of everything.

5.2.1 Mapping exhibit

The main temporary exhibit on display at the Sanford museum, which was assessed with the CAT,
is about maps: how they have been used, and how to use them. The museum features elements of artifacts,
text, interactions, images, labels and even materials that mimic the old pirate ships (figure 44) that are part
of the narrative.

![Figure 44](image)

Figure 44: Sanford’s mapping exhibit uses wood as a
dominant material to create objects such as a pirate ship stage.

A pirate, Captain Whichways Wright, draws the user through each exhibit station by showing up
on labels and in activities where the user gets to help the Captain figure things out (figure 45). Since many
of the exhibits are designed knowing that school children will be coming through, the themes and exhibits
are divided up into sections so that the large groups of school children can be broken into smaller groups
and visit each section that way. Each station throughout the exhibit utilizes interaction (figure 46) to help explain mapping; in some instances, such as the longitude and latitude section, the experience can be altered depending on the age group that is to be visiting.

**Figure 45:** Captain Whichways Wright shows up in many of the interactions and labels.

**Figure 46:** Small interaction stations are used around the exhibit space.

Educational content is selected in part based on whether or not they are covered within the K-8 curriculum. Maps, for example, may be covered, but at a limited capacity at early ages. This opens an opportunity to add and relate to school curriculum without it overlapping and becoming redundant. During meetings, staff members question whether or not the ideas are practical and ask how the interactions would be shown and an instructional plan can be structured from there.

The treatment of the exhibit addresses the high rate of young visitors, with bright colors and a story-book illustration style (figure 49). The font choice and labels match this as well, as torn paper is used for labels, making them appear older and as if they were left by another member of the story. Even the type choice is done as to appear that it was taken from the old handwritten maps, or written by someone.

This exhibit is an example of how being resourceful in creating a narrative and message can transform the display of artifacts into an interactive experience. The use of a character and simple interactions hold the attention of the visitor while moving throughout the exhibit, adding more to the visitor’s knowledge base at each activity. Each activity is designed to tell another part of the story, and this is done through the attention to design features such as dynamic graphics, hand done type treatment, bright colors and organic forms.
5.2.2 “Feet You Might Meet” exhibit

Another exhibit selected for the CAT is called “Feet You Might Meet.” This exhibit shows the animals that visitors might encounter locally (figure 47) and what footprints the animals will leave (figure 48). The various elements include animal pelts, footprints castings, a title, and labels. The wood paneling of the wall even creates a backdrop that speaks to the “woodland” creatures, without being entirely literal.

These elements are all structured in a way that leads the visitor through the row of animals. Though there isn’t a narrative or a climactic focal point of the exhibit, this seems to work as this gives each animal equal importance. Interactions are structured such that they do not require instruction; both the animal fur and the footprint casting are presented in a way that invites the visitor to touch.

The treatment of the typography in the exhibit heading is placed on a curved, almost bouncing plane that seems to match an animal trotting about. Labels here are treated similarly to the labels from the Mapping exhibit, with ragged edges and a script-like typeface. This use of organic shapes and rugged tone is fitting for an exhibit on outdoor creatures.
These techniques come together to create a quite simple, yet effective experience for the visitor. Though few graphics are present in the exhibit, the treatment of what is there is done in a way that enhances the story. In considering story, this exhibit does not have a narrative or character to follow, but is trying to explain to the visitor what animal footprints look like. The message then, relies heavily on the tactile sense and on being able to compare one animal to another. In displaying the animal pelts and footprints clearly, this exhibit clearly shows the different footprints of native woodland critters.

5.3 Johnson County Historical Society

The Johnson County Historical museum shares a space with the Iowa City automobile museum. Here, the exhibit curator’s expertise is in history, and the intern working for the museum is an art history major. The Johnson county historical society has a large influence on what goes on display at the museum. An exhibit committee suggests artifacts, or exhibits are done based on what needs to be included from the local area. The curator and intern then design the exhibits, unless content is sent out to an outside designer.

The museum is a scattered collection of central Iowa artifacts that appear in no particular order with no clear path to explore other than the natural tendency to begin to the right and continue counter clockwise (figure 49). This is in part due to the wide-open space of the facility and the lack of ability for the museum to build any significant wall partitions. Most exhibits appear as panels of text and photographs, or as artifacts within cases with a label or two.

Figure 49: Johnson County Historical Society museum
5.3.1 Cabin and Mukluk

A few interactive spaces are featured within the museum including a space for kids to play inside of a log cabin (figure 50) and a mukluk tent (figure 51). These spaces are the most interactive (for kids) within the museum and are considered the most popular as well. The elements of this exhibit are the cabin, the mukluk, and the wall graphics. The exhibit space is structured so that the focal points of the exhibit, the cabin and tent, are right at the front and information panels are along the back walls (figure 51), and lead the visitor around chronologically, telling the story of people settling in central Iowa. These panels are posters comprised of collaged photographs and text blocks that are structured asymmetrically, using many rectilinear forms (figure 52). This mix of chaotic layout and rigid blocks creates a poster that appears dynamic.

Figure 50: Log cabin playhouse.  
Figure 51: Mukluk tent and exhibit panels.  
Figure 52: exhibit panels.
The color treatment of the cabin and mukluk exhibit relies on the natural colors from the artifacts, and from the items placed inside such as quilts and tools. The white walls that surround the space however are a stark contrast to this and leave the exhibit difficult to imagine in nature. This is where images may prove helpful to give context, but the images featured on the posters are all black and white since there was no color photography in the time period. The colors that are used in the posters are brown, red and green earth tones that match the colors found in the mukluk and cabin, but that contrast the black and white photographs placed on them.

This exhibit has an inherent narrative behind it, and two kid-friendly interactive pieces, but unfortunately lacks the context to put them in to truly develop the story. The wide-open space of the museum makes exhibit divisions and painting walls difficult. These are the things however that could greatly enhance the message of this particular story and exhibit.

5.3.2 Farm Crisis Exhibit

Another exhibit, which was designed by a professional firm, is the agriculture exhibit that looks at farm life through the major farm crises of the 20th century. In this instance, the museum staff determined an allotted exhibit space, and the concept and script that they wanted for panels. Visitor interactions include a small section of dress up and a corn husking activity (figure 53). Though the main exhibit here is permanent and features permanent panels throughout (figure 54), a small section changes every few months to feature different Johnson County century farms (figure 55).

![Figure 53: interactions include a dress-up activity and a corn-husking activity.](image-url)
The *structure* of the exhibit narrative is broken down into decades and then presented chronologically. This also determines the path that the visitor takes through the exhibit. There are a few interactions that contribute to the story: for example, kids can try on overalls and dress like a farmer, or try a corn husking activity. The graphics are presented as large posters that are rather static, geometric and asymmetrical, but not necessarily for any reason that enhances the overall message of the farm crisis.

The *treatment* of colors comes through in literal earth tones to reinforce the farming narrative; as a brown is used as the backdrop for the posters and the posters use sepia tones. In what might be considered the focal point of the exhibit, at the height of the farm crisis, bright red background panels are used to emphasize the moment of crisis (figure 56). Images are used throughout the poster series, some are cut-out to create a more organic, integrated shape, while others are left as rectangles. They serve as an appropriate mix and are placed to give the visitor a break from reading the large amount of text, while helping to tell the story.
Here, a chronological narrative is created that draws the visitor through the exhibit, and to the end focal point. A consistent mix of images, type and artifacts allows the visitor to either skim through the exhibit, or to stop and read the entire story. The exhibit solves many of the issues seen in the log cabin/mukluk exhibit through the use of the colored wall divisions. This technique helps to guide the visitor along a path and give the artifacts and graphics a backdrop that emphasizes the narrative.

5.4 The Grout History Museum

The Grout Museum of History and Science is one five distinct properties within the Grout Museum district. The mission of the Grout Museum District is to: “provide a better understanding of our world by collecting, preserving and interpreting history and illustrating scientific principles. The Grout Museum collects, preserves and interprets cultural and natural history of the region.” A recent addition to the Grout Museum District is the Sullivan Brothers Iowa Veterans Museum. This doubled the size of the museum and features more permanent, interactive, engaging exhibits that were designed by an outside exhibit firm. The staff was still in charge of providing images and storyline; they chose the images, wrote the text, and did the research. The outside exhibit company then made it all look and sound good, developed interactions, and put it together.

The curatorial staff however, designs all of the temporary exhibits within the history and science museum with the help of various hired interns. Currently on staff is a graphic design intern, as well as a
research assistant intern who both assist the exhibit curator. The design process often changes from exhibit to exhibit, but has a general tendency to start with a suggestion from a committee or community member.

5.4.1 Doll Exhibit

A doll exhibit that opened in March of 2011 will be evaluated on the CAT. The main message of the exhibit is the evolution of dolls through the past century and began with volunteers from a doll-collecting club who suggested a doll/toys exhibit. The volunteers came in and assessed the museum’s collection, determined the elements for the exhibit, cleaned and restored dolls, provided a timeline and history of the dolls, wrote the text, and even helped install the exhibit (figure 57). On the opposite wall that the dolls are presented is a section that includes doll toys and accessories (Figure 58).

The exhibit is structured so that the dolls are grouped into cases based on category and arranged in horizontal rows to allow the visitor to easily compare and contrast each artifact. An organized and mostly symmetrical set-up of the dolls makes them appear more as artifacts rather than toys, which speaks to an older audience. This is reinforced with the type treatment being aligned, serif typeface for the headings and labels. The doll outfits, and the use of a soft blue define the overall treatment of color for the doll exhibit. This soft blue can be found within a few of the doll accessories and also shows up as the background on information panels (figure 61). Walls within the accessories portion of the exhibit are left the default gray of the museum’s walls. Though these treatment choices are in some ways functional, they are not used in a
way that enhances the narrative. The gray for example being painted to look like wallpaper or even plain white would help create the appearance of a child’s room.

The resulting exhibit displays artifacts, but does little to create a meaningful and memorable message. A story is told by presenting the dolls in chronological categories, but is lost when the explanatory text putting the dates in context is left the same size as the text describing each doll and placed in seemingly arbitrary positions. The diorama of dolls and accessories (Figure 61) begins to do a better job of creating context and utilizing exhibit elements such as graphics, artifacts and text, but needs more attention to how these elements are treated.

5.4.2 MASH Exhibit

A Mobile Army Surgical Hospital (MASH) exhibit was the next to be evaluated by the CAT. A large Jeep was the center element of the exhibit (figure 59), while a few artifacts and many posters were presented around the perimeter telling of what it was like for MASH units and soldiers (figure 60). Each poster presented a different topic of discussion, from what it was like to take down the mobile units, to a soldier’s survival story.

The structure of the posters along the walls implies a linear path for the visitor to follow, but the Jeep centerpiece takes away from where the story should begin. The Jeep’s size makes it the natural focal point of the exhibit, but it lacks explanatory elements that could emphasize the role of the Jeep throughout the story. Graphics in the exhibit panels are structured to rely heavily on text as opposed to image, which
sets the tone for a very content heavy, adult oriented exhibit (Figure 61). Rectilinear forms support this further and emphasize the serious nature of the narrative.

Figure 61: Display panels for this exhibit rely heavily on type for telling the narrative.

Color treatment is comprised of tan backgrounds, yellow punctuations, and red accents drawn from the Red Cross. These colors fit reasonably well with the concept and represent the war narrative literally. Type treatment consists mostly of san-serif body copy with weight changes between bold, regular, and slight size variation. Content is arranged in justified paragraph chunks adhering to the rectilinear forms used elsewhere on the posters.

Further review of structure and treatment during the design phase might have provided different options. For example, enlarged photos might be used to engage the visitor, or a stronger use of type hierarchy would help important words, sentences or phrases stand out to the visitor. Curators face the task of finding balance between sharing a large quantity of information, and keeping that information compelling.
5.5 Findings

The CAT is used to evaluate exhibits by asking, “Does the $x$ of the exhibit contribute to the overall message of the exhibit?”, with $x$ being the individual criteria required to create message. Two exhibits were selected from each of the four museums that were visited and these exhibits were evaluated using the CAT (Figure 62). By showing the exhibit evaluation in a matrix format, a few generalizations become clear. The majority of “no” answers came from understanding the *sender/receiver* relationship and from the *structure* and *treatment* criteria.

A noticeable factor that arose from the interviews was the impact that a well-rounded staff had on creating meaning. The Sanford museum had educators, an artist, and an archeologist, who were paying attention to much of the criteria suggested by the CAT, without needing the tool. This is likely because of the expertise that the educators and the artist have in creating meaningful message for visitors. Teachers constantly have to tell stories and make information relatable to students, while the training of an artist is focused on how to communicate a message visually. This combination of staff members resulted in a museum filled with consistently well done exhibits.

The *sender/receiver* relationship within the exhibits received many “no” answers. This criteria was marked “no” if the content of the exhibit did not speak to more than one age group, unless the targeted age group was clear. For example, the Sanford museum had a clear audience of school-aged children, but even with this, they would switch out materials depending on older vs. younger visitors. This kept exhibits challenging and interesting to the different groups. Other museums featured large quantities of text that may be appropriate for an older visitor, but lacked call-out information or quick facts that would speak more to the browsing visitor or to a younger child.
Figure 62: The Content assessment tool (CAT) was used to evaluate exhibits from the four museums that were interviewed.
Content and Elements are well utilized by each museum. These refer to creating an overall theme and choosing the items to represent that theme. Most of the museums used at least four of the six subcategories of elements in each exhibit. This is ample as it is not necessary to use every single type of element, especially if it will not help generate message. For this section, having too many “yes” answers could become distracting. The important consideration here is for the designer to ask questions such as, “Would using these images help to create message?” or “Would using interactions in this exhibit enhance the overall message?” The same considerations go for the channel category of the CAT. Again, it is not necessary to have an exhibit that utilizes every human sense, but important to incorporate more than one.

Structure is an area in the CAT that museums received many “no” answers. This is not to say that museums did not consider instructional design, or that they did not use graphics, but that the use did not enhance the overall message in a significant way. The graphic structure section was the most lacking and this is likely due to the lack of a graphic designer being involved. Unfortunately, this left many of the exhibits either lacking graphics altogether, or lacking graphics that could have been used to create a powerful narrative.

Likewise, the treatment of graphics for many of the museums resulted in the standard rectangular, black and white photo, and large paragraphs of type. This is also likely due to not having a graphic designer as a part of the exhibit design process. Even without a designer on staff however, a curator could take color and consider how it might work to create a desired mood or emphasis. The purpose of the CAT is to get the designer thinking about the different criteria that can contribute to developing an intended message and to try to push the designs toward that, not to expect them to become an expert in graphic design.
CHAPTER 6. CONCLUSION

History museums exist as an important source of cultural, educational, social and political discourse in countless towns, cities and countries around the world. The exhibits within these museums are the main tools that communicate the knowledge, history and artifacts held within the museum’s care. These are the tools that are passing down historical messages to visitors every single day. Yet, there seems to be a gap in the design process of exhibits, and the message they intend to send. This study sought to better understand that gap and to develop a tool that would allow museums to better address it.

To begin gaining a better understanding of the exhibit design process, the many models related to exhibit design were examined. This included models from instructional design, exhibit design, industrial design, and even models that are in use by corporations. It became clear however, that these models do not tell the whole story and that most of them are designed with their intended users being an expert on the process already. Most importantly, design process models are for specifying when a task happens during a process, and not necessarily how it happens. From this, many exhibits are designed with a lack of attention to the design of the overall message.

In an attempt to help museums develop exhibits that feature meaningful messages, this paper took Berlo’s communication model (source, message, channel, and receiver) to use as the framework in creating a content assessment tool (CAT, p. 66). This thesis project broke down the SMCR and then applied components that related to exhibit design such as narrative, 3D layout, interactions, instructional design, and graphics. Disciplines such as graphic design have developed criteria that help to create message; this criteria was also applied within the CAT. Each component throughout the exhibit design process, whether it is the structure of the interactions or the treatment of typography, should be designed with the purpose of enhancing the exhibit’s overall message. A designer using the CAT would be able to check that each component of the exhibit does contribute.

As a method of better understanding how the real-world design process works, four Iowa history museum curators were interviewed and photographs of their exhibits were taken. Both the design process and the exhibits from these museums were then evaluated using the CAT. It became clear that many
museum exhibits are not designed with such communication theory at the forefront. This should not come as a surprise, as few exhibit curators designing these exhibits have a visual communication background.

In the case of the Grout Museum, the doll exhibit was developed by a group of volunteers. There is no expectation that the volunteers are museum exhibit designers; therefore a tool such as the CAT could be used as a guide for the group to follow. It could be used as a framework for the museum to use in evaluating the volunteer’s suggestions, or by the volunteers themselves. Used in this sense, the CAT may be turned into more of a worksheet format such as in figure 63 where questions pertaining to message are listed and space is given for the designers to answer. This would help the volunteers to generate ideas throughout the design process that would directly pertain to the developing message.

<table>
<thead>
<tr>
<th>CONTENT ASSESSMENT QUESTIONS</th>
<th>IDEAS FOR YOUR EXHIBIT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRUCTURE</strong></td>
<td></td>
</tr>
<tr>
<td>How is the exhibit’s story structured?</td>
<td></td>
</tr>
<tr>
<td>How can the path of your exhibit help tell the story?</td>
<td></td>
</tr>
<tr>
<td>How does the instructional plan go along with the story?</td>
<td></td>
</tr>
<tr>
<td>What is the overall exhibit/story’s Focal Point?</td>
<td></td>
</tr>
<tr>
<td>What is the Focal Point of each activity?</td>
<td></td>
</tr>
</tbody>
</table>

Figure 63: The CAT in worksheet form.

The CAT provides exhibit designers with an evaluation tool that challenges them to focus on creating a meaningful message. It may be used as a yes/no evaluation, or as a worksheet to help inspire ideas. However it is used, and within whichever design process it is used, the designers should see a valuable improvement in exhibits where the images, text and story mesh together more effectively.
APPENDIX A. INTERVIEW GUIDE

**Preface:** The goal of this study and of this interview is to create a better design process and to learn of any short-comings in current processes that are not yet understood. Without adding funds or staff, is there a more efficient way to go about the design process for small museums?

**Staffing situation**

I’d like to begin with some general information about you and your position here at the [name of museum].

As I understand, you are the [title]. What are your primary responsibilities? (Ask for any necessary clarification.)

Are there any secondary duties? (Ask for any necessary clarification.)

Do you have any direct responsibilities concerning the museum’s design process?

OR

You said that you’re responsible for [________] in the design process. I’d like to expand on that for the moment. Could you give me an example or two of what your role might look like? (Ask for any necessary clarification.)

What/how many other staff members work on the design process at the museum?
**Mission and Goals**

Now that I have a better understanding of your role, I’d like to discuss the museum’s goals and mission.

History of the museum…
Would you give me a brief history of the museum? When did it first open? Was it the same place then as it is now?

If I don’t have a copy of the mission statement(s)…
To your knowledge, does the museum have a mission statement?
(ask for copy)

Is there a part/section of the mission statement that you feel is the most important to the museum?

What is the most agreeable/accurate definition of an “effective exhibit design”?
 e.g. a fun exhibit? Hold interest? Spark interest in the subject?

Tell me about the nature or context of your exhibits.
 e.g. large objects to observe? Interactive? Highly informative? Highly visual?
**The Design Process**

Does the museum utilize any particular design model when developing exhibits?
What does this look like?
(ask for copy)

Can you tell me about how a project begins?
Where does funding come from?

How is the story or concept decided upon?

Do you research the community/audience?

Do you look at what other museums are doing?
Can you give examples of where this has been done?

How do you decide the educational context?

How do you develop your educational content?

Who develops the design of the exhibit structure?

How does the exhibit structure get built?

Do you follow through with an evaluation of the exhibit?
What does this process look like?

Is there an exhibit you would be willing to show me where your design process has been utilized? May I take photographs?
**Exhibit Enhancement**

What kind of interactive exhibits has your museum featured?

Were they found to be successful? Are they still in use?

Have you utilized touch screens? Computers? Projectors?

What do you find to be a reasonable time frame to complete a project?

What do you find to be a reasonable budget for a project?

What would your dream project be? Unlimited time, unlimited funding.

What do you consider were the major challenges faced during the past 5 years?

What do you consider to be the major challenges for the next 5 years?

In your opinion, what were the major accomplishments of the past 5 years?

In your opinion, what are the major goals/opportunities for the next 5 years?

[THE END]
APPENDIX B: OBSERVATION GUIDE

• Traffic flow from entrance to exhibit
• Traffic flow from exhibit to exhibit
• Is there a take-along?
• Is there an overall theme or narrative?
• Is the type integrated well with the imagery?
• What was the lesson to be learned?
• Are there interactions?
  o Are these intuitive?
  o Too few?
  o Too many?
  o Do they make sense to enhance the learning experience?
• Most/least successful exhibit
• Did any one exhibit seem more memorable?
APPENDIX C: INITIAL LETTER OF CONTACT

Dear Museum Director,

I am writing to see if you and the ______ (museum) ______ would be interested in participating in an Iowa State University (ISU) thesis project that seeks to gain a better understanding of the museum exhibit design process as done by small history museums. As a participant, your expertise will lend essential information about how the design process works in the real world.

In order to develop general suggestions for small museums on the whole, it is necessary to interview experts, such as yourself, in museum exhibit development.

The process will involve the following:
  • An in-person meeting/interview to discuss and gain an understanding of how your museum develops exhibits.
  • Photographs of exhibits wherein this process has been a result
  • A request of exhibit evaluations if any have been completed

Your participation in this project would offer rich information and insight into the real-world exhibit design process. Your involvement is completely voluntary and you may refuse to participate at any time.

Ideally, interviews and visits will be conducted in late April or the first weeks of May, 2011. If interested, please respond to this e-mail or phone at (815) 564-7473 to set up time for a visit.

If you are unwilling or unable to participate, but know of someone who may be, please feel free to forward this information.

Thank you for your consideration,

Kim Topp
Master of Fine Arts student
BIBLIOGRAPHY


