

TYPEFICATION: A LEARNING TOOL FOR TEACHING
TYPOGRAPHY TO THE DIGITAL NATIVE

by

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DEDICATION

I dedicate this thesis to my husband Josh, for his unconditional love and unwavering patience and encouragement; and to my parents, Pat and Nancy, for their endless love and support throughout my life. I know my mom is proudly watching over me, and her words will continue to guide me.

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LIST OF ABBREVIATIONS

Abbreviation	Description
CD	Communication Design
DNCD	Digital Native Communication Design

I. INTRODUCTION

Communication designers regularly utilize typography, critically thinking about how each letterform participates in effective communication. According to typographer and poet Robert Bringhurst (2004):

The typographer's one essential task is to interpret and communicate the text. Its tone, its tempo, its logical structure, its physical size, all determine the possibilities of its typographic form. The typographer is to the text as the theatrical director to the script or the musician to the score. (p. 20)

The successful practice of typography comes only with the understanding and fluency that is developed through knowledge, exploration, and experience.

This research describes the conceptual development of *Typefication*, a digital learning tool designed to enhance communication design (CD) typographic education of undergraduate students in the 21st century. The interactive website is designed to include a collection of internal tools and experiences for CD students to actively learn typeface classification and the historical context of typography through gamification and connection to authentic practice. *Typefication* seeks to promote critical thinking in CD students through ongoing learning, research, and practice of typography.

The initial concept for *Typefication* was developed from a study of current CD typographic education, student behaviors in the 21st century, and established learning theories that guide current pedagogical strategies. Mockups of the interactive environment and each of its features were designed and presented to a group of five undergraduate CD students for preliminary feedback that will guide refinement and the future development of the online tool. The classification game, one of *Typefication's*

internal tools, was developed further, and functioning paper and online samples, known as prototypes, were created and tested by the participating CD students. Feedback and comparisons of the physical and online interactions were discussed and responses will direct further development of the interactive experiences of *Typefication* and each of its internal tools.

Statement of the Problem

The importance of CD education can be summed up in Milton Glaser's assertion "if you are going to be a revolutionary, it's best to be an informed one" (1998, p. 151). Typography, the art and technique of arranging type, is central to effective communication and, therefore, a solid understanding of the practice is important for all CD students. Typography is often deemed difficult and frustrating for CD students because, as an art, it is subjective and personal in use and, as a technique, it is grounded in traditional rules and conventions.

In *Education of a Graphic Designer*, author and design critic Steven Heller (2005b) states:

The greatest single area of ignorance among students (and some professionals) is type and typography. It takes sustained effort and practice to produce a type-literate student who knows how to compose type, what type is designed to express, and the history of letterforms as design components. By the senior year, too many students are still type novices, following superficial trends or rote traditions, and their portfolios prove that the standard for literacy is not as high as it might be. If nothing else, BFA graduates should flawlessly "speak" the language of type. (p. 129)

Speaking any language just fluently, not flawlessly, involves both immersion and time, and relies heavily on context. Type is the visual representation of language, which impacts communication by conveying meaning through voice and tone. Exploration into the fine details of letterforms and understanding the historical context that has shaped them is the foundation for every beginning CD student. Although fundamental in CD education, this knowledge can be viewed by the student as insignificant and disconnected from the practice of typography.

Exploring and learning historical context is essential for being able to work with type seamlessly in later practice. Acquiring this knowledge requires that CD students comprehend the material as they progress through typographic history; therefore, understanding the learning process and how it affects students is important. Today, the average undergraduate student can be considered a “digital native” (Prensky, 2001a). Born into a digital world, they have been shaped through early introduction, socialization, and heavy continuous digital interactions (Prensky, 2001a). Digital natives are commonly characterized by their constant connection to information and social networks, their “hypertext” minds, and their multitasking tendencies (Prensky, 2001a, 2001b, 2010; Levine & Dean, 2012; Tapscott, 2009; Oblinger & Oblinger, 2005). These common behaviors are affecting how digital natives learn. Communication design programs generally have many benefits for digital native students, including collaborative learning, regular integration of technology, and “active” learning experiences. However, theory, history, and research are frequently taught with more traditionally passive techniques, including lectures and reading. Both of these traditional practices are commonly perceived as boring to the digital native. Furthermore, when taught through engaging

methods in the classroom, continued practice is still required. Digital natives need to be fluent in their use of typography; however, knowledge of typographic theory and history, as well as continuing research, while crucial for proficiency, are often inadequate because of a lack of motivation and interest in the traditional practice required.

Statement of Objective

Understanding the Historical Context of Typography

At its core, typography is the result and reflection of its own evolution, a continuous shift in cultures and developments. It is shaped from both its history and its effect on history. Understanding these shifts creates a context and foundation for designing with type and, therefore, is fundamental for every CD student in typography. Communication design students depend on this knowledge to become innovative and successful in a growing and competitive discipline. How can CD students in typography effectively learn this fundamental material and be encouraged to explore to gain necessary experience?

Engaging Communication Design Students

Creative and critical thinking, at the most basic level, is learning with both the retention and comprehension of material (Bouchard, 2011). According to contemporary cognitive theories, learning is an active process dependent on factors including the individual student's effort and engagement with material (National Research Council [NRC], 2000; Pritchard, 2009)—motivation is central to the effectiveness of learning. “We learn and remember what attracts our interest and attention, and what attracts interest and attention can vary by learner” (U.S. Department of Education, Office of Educational Technology [OET], 2010, p. 16). Educators are tasked with teaching specific

curriculum with instruction and created experiences that promote understanding through active engagement. How can CD students be effectively engaged and learn the essentials of typography?

Educating the Digital Native

Although results will vary between individuals, understanding common characteristics of students in today's society is crucial for creating optimal learning experiences. In 2012, 96% of 18–29 year olds were Internet users, and 84% of them were using social media (Anderson & Rainie, 2012). Digital natives' daily interaction with the Internet and constant connection to each other through social media has affected their learning habits and preferences both inside and outside the classroom (Levine & Dean, 2012). Can learning through technology lead to more effective experiences for digital natives?

Learning with Digital Learning Tools

After years of use, interaction with technology is a normal and expected part of everyday life. A 2009 study of undergraduates found that four out of five students feel “education would be improved if their classes made greater use of technology” (Illinois State University survey as cited in Levine & Dean, 2012, Chapter 2, para. 16). Digital learning tools and techniques including e-textbooks, gamification, and social networking have become increasingly popular in education at all levels to engage students. When supported by learning sciences to enhance the educational experience, these tools can be effective (OET, 2010), which raises the question, can a digital learning tool be used to effectively enhance the digital native communication design (DNCD) student's learning of typography?

Learning with Typefication

This research examines the use of digital learning tools to aid undergraduate students in the 21st century and documents the conceptualization and design of *Typefication*. The digital learning tool was designed to enhance typographic education through an interactive online environment that will encourage DNCD students to continuously learn, explore, and practice. Through continuous connection and engagement in content, *Typefication* will improve DNCD students' critical thinking skills and proficiency in their use of type.

Thesis Organization

This thesis is divided into five sections. The Preliminary Research section provides investigation into CD typographic education and the areas *Typefication* will focus on, as well as the impacts *Typefication* can have on digital natives' learning experiences. The Creative Process section details the concept development and initial design of *Typefication* and the development of the classification game prototypes. The Results section gives an in-depth look at the features of *Typefication* and the preliminary feedback from focused discussions and prototype testing with CD students. The Conclusion sections discusses how this interactive website and included tools, such as games, can enrich digital native's CD typographic education, as well as future research in support of developing *Typefication*.

II. PRELIMINARY RESEARCH

A study of the subject and audience is important in determining the educational value of a digital learning tool. Specifically, choosing features and connecting the goals of the tool to learning science research is crucial (OET, 2013). This chapter investigates learning typography in today's CD discipline. An analysis will show the characteristics of digital natives and potential aspects of *Typefication* that can enhance their learning experience. A survey of CD students and educators is evaluated for current opinions and trends in CD typographic education.

Communication Design Education

CD education today is a direct reflection of the model started in Germany at the Bauhaus in 1919. Walter Gropius, seeking to unify art and technology, combined fine artists and craftsmen "to build for the future" (Meggs & Purvis, 2006, p. 310). The Bauhaus is credited with implementing the "preliminary course," under Johannes Itten (Meggs & Purvis, 2006). This course was taken by all students to learn basic design principles of shape, form, color, and material before entering into specialized workshops. This philosophy has influenced art and design education ever since. Students learn foundational concepts and theories that are applied through studio projects and practical application.

Today, CD education differs in curriculum and courses from program to program. Some CD programs offer limited generalized courses that cover principles and specialized topics together. More commonly, curriculum starts with foundation courses, which then will progress to an array of specific topic courses. In both situations, a large amount of material is covered. CD students are tasked with learning design principles,

theory, history, and new technologies while developing process and conceptual thinking skills to produce innovative projects. Developing the skills that CD students need to become successful communication designers is unmanageable in such a limited time frame (Heller, 2005a). Heller goes so far as to state, “There are not even enough days in an average undergraduate four-year graphic design program to develop the skills and foster the talents necessary to become a viable practitioner” (p. ix).

Foundations in Typography

CD typographic education generally begins with fundamentals, including anatomy and history, then progresses into learning current technologies, developing conceptual thinking skills, and working on studio-based typographic projects. Typography is a skillset used in the majority of CD courses and understanding fundamental material is crucial for future success both academically and professionally. Understanding letterforms and identifying the small details is the base foundation for learning typography. Chessin (2004) agrees, “teaching good visual judgment to a designer begins with such small details as the counter of a letterform, or the proportion of the x-height to character width” (para. 10). Although the anatomy gives terms to the parts of the letter, those meanings are defined through the evolution of typography.

The history of typography began over 200,000 years ago with the first cave drawings (Meggs & Purvis, 2006) and advanced through the development of the alphabet, the creation of manuscripts and movable type, and into current-day digital practice. A CD student learns about how human cultures influenced and were influenced by the continuing technological advancements that played vital roles in type development. For example, Johannes Gutenberg, credited with inventing movable type in

the mid 1440s, printed the first typographic book—the forty-two-line Bible—in response to the demands of a growing, educated middle class (Meggs & Purvis, 2006). Movable type changed the path of visual communication and spawned the discipline of typography. Many lessons learned from the years following Gutenberg’s invention give meaning to the terms and conventions communication designers use, such as leading and kerning.

The invention of movable type led to the art and skill of designing what type visually looks like. A typeface is the specific design of a set of characters. Typeface designers commonly design a regular or roman version, and then based on the same design, create additional cuts that are organized as this typeface’s “family.” The cuts, or typefaces in a family vary, but commonly they consist of a regular, bold, italic, and bold italic version. Larger typeface families may include light, semibold, condensed, expanded, and mixed variations such as bold condensed. Each typeface is the result of the society it was designed in, the visual form dependent on the technology available, and the culture and needs of that society. Knowing this historical context shapes typographers’ perspectives and appreciation of their tools, and ultimately makes them more informed in their choices.

Typography classifications categorize typefaces based on historic and visual attributes—each represent a stage and visual shift in letterforms brought on by changes in society and technological developments. Figure 1 shows an example of the evolution within the overarching serif classification. These typefaces started as a reflection of handwriting and later shifted to reflect the refinements of new technologies; throughout the evolution of type there is distinct “tension between the hand and the machine”

(Lupton, 2004, p.13). As the oldest text classification, Humanist typefaces visually reflect the broad-nib pen with thick, asymmetrical serifs (feet) and heavy bracketing (connection from serif to vertical stroke). Slab serif typefaces, the last of the serif classification, have thick straight strokes with no contrast and block serifs, a byproduct of the industrial revolution; these typefaces were designed for use in advertising. Although not an exact science, the various classification systems aid a communication designer's organization of the vast amount of typefaces available. Typeface classifications help CD students understand how history and technology influenced the visual forms of each character, and how they can alter a typeface's personality or tone in communication. Many contemporary typefaces may not fit a classification perfectly, however, a good majority are revivals or related to classical typefaces (Dodd, 2006), and studying the details, similarities, and differences in typefaces can be helpful in developing personal attitudes and awareness for type.



Figure 1. Examples of serifs from each serif typeface classification. From left to right: Humanist, Old Style, Transitional, Modern, and Slab Serif classifications.

Each of these beginning lessons in anatomy, history, and classification shape a designer's perspective and will ultimately make them more informed in their design choices. CD educators teach using various instruction methods; however, many continue to teach this information through lectures and reading assignments. Aside from the teaching techniques, the wealth of knowledge is difficult to cover in one course and continued learning efforts are dependent on the CD student. *Typefication* seeks to find

new ways to incorporate fundamental lessons into an online environment that is accessible and which keeps DNCD students interested in continued learning and practice.

Exploration and Research

Successful typography effectively communicates a message, and the practice of successful typography comes with due diligence of research, exploration, and experience. It is imperative that CD students go through this learning process; otherwise, they become dependent on word of mouth or search engines to find “good fonts.” A common tactic for CD students, depending on others’ knowledge will never allow the student to develop their own understanding of type. “Too many times [CD students] just choose Futura, Helvetica, or Rockwell because that’s all they know, without taking into account what it means to make those choices or how those choices affect their design” (Vit, 2008).

Many professional designers use only a few typefaces throughout their career, some even claim one or two. Renowned designer Massimo Vignelli (1991) states: “In the new computer age, the proliferation of typefaces and type manipulations represents a new level of visual pollution threatening our culture. Out of thousands of typefaces, all we need are a few basic ones, and trash the rest” (para. 1). Although professionally acceptable—particularly when grounded in reasoning and experienced opinion—forcing this mentality onto DNCD students in their formative stages can prevent an advanced comprehension of successful communication through typeface choices. While studying typography, CD students need to continually interact with type to learn. Ilene Strizver, author of *Type Rules*, notes that sharing favorite fonts with CD students, who in return will use those exact fonts, “robs them of the very critical task—the font exploration—that

should precede any design job, and in fact, should probably take a lot more time than it currently does for many designers” (2010, para. 4). Typeface selection is subjective and difficult at first, but researching a wide selection of typefaces to compare and contrast will result in strong analytical skills, and over time lead to deeper understanding and recognition of design choices.

Font Access for Communication Design Students

Ongoing research and exploration of typefaces is often inadequate because of limited access to usable fonts, and the lack of a quick and easy process to research all available fonts. Whereas the term “typeface” refers to the design of a set of characters, the term “font” refers to the digital file of a set of characters that are used on the computer. Computer systems come with a selection of preinstalled fonts available for immediate use. However, the majority of fonts are purchased and licensed directly through either a type foundry—the designer and distributor—or through online retailers such as Adobe and FontShop. Each font comes with a license and terms of use for a specific number of computers the font can be installed on. Fonts are stored on the computer and installed when needed through a font management system such as Font Book on Apple Macintosh computers. CD students commonly have access to a selection of fonts installed or stored on computers owned by their CD program. As an example, other than system fonts, Texas State University’s CD program has licenses for a base group of 25 fonts, referred to as “comdes base” (see Figure 2) that are installed on all computers in labs and classrooms. The program also has licenses for Adobe® Font Folio®, a collection of 500 fonts (see Figure 3), that are stored on the same computers and installed by CD students as needed. While there are a large number of accessible

fonts for use in projects, they can only be viewed and used while on campus and they are stored in multiple folders.

Due to the cost of fonts and licensing agreements, CD students are often restricted to using only lab and classroom computers to explore different fonts that a professional designer may use. This limits the previously discussed vital research of typefaces. Additionally, searching through folders and finding basic information becomes time-consuming and increasingly frustrating. A CD student needs to first find the names of the fonts available and research them through web searches or reading. *Typefication* seeks to give CD students a single location to track and research all the fonts they have available to them.

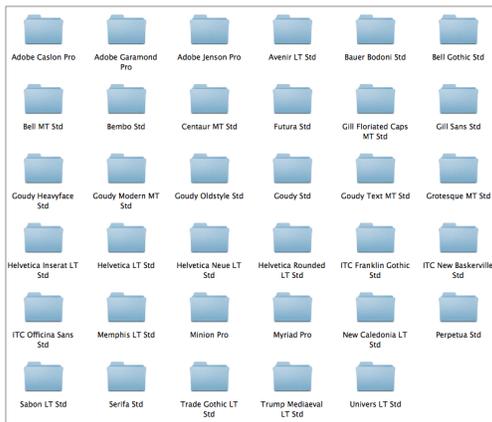


Figure 2. Comdes base fonts.



Figure 3. Uninstalled available fonts.

Typography Resources

CD students are encouraged to continue their typographic education outside of the classroom through reading books and magazines, and utilizing blogs and the vast amount of online resources available to them. On an initial search of “fonts” in Google, hundreds of thousands of results come up, and one of the first pages showing contains mostly websites for free fonts. Free font websites lack structured quality control, and in close observation, many free fonts show imperfections in design (Peters, 2010). The abundance of resources and the questionable quality of these resources, make sifting through and evaluating online information a long and arduous process. *Typefication* seeks to give educators a way to guide students to new valuable sources and information, and it will allow CD students to collect and share their own resources in one location.

Learning in the 21st Century

As a designer, identifying and understanding your audience is crucial for effective communication. Likewise, as an educator, identifying and understanding your students, is crucial for effective pedagogy. An undergraduate student of the 21st century is part of the first generation born after the digital revolution and into a world where computer and Internet technologies play an exponentially larger role in society and their personal lives (Tapscott, 2009). These students are commonly referred to as “Millennials” (Howe, Strauss, & Matson, 2000), the “Net Generation” (Tapscott, 2009; Oblinger & Oblinger, 2005), and “Generation Y,” among other terms. In relation to technology and education, this group is frequently referred to as “Digital Natives” (Prensky, 2010; Palfrey & Gasser, 2008; Levine & Dean, 2012).

The term “Digital Native” was first proposed in 2001 by Mark Prensky to distinguish characteristics between these “digital speakers,” born into this digital world (after 1982), and “digital immigrants” with roots in a world without computers and networking (2001a, p. 1). The term references an attitude and culture and not an assumed mastery in technology (Prensky, 2010). Whether mastering programming languages such as C# or simply using a mobile phone to tweet, the average college student’s exposure to technology has made it transparent that this technology use is simply a function of life.

Typefication seeks to help with some of these academically challenging issues by creating an interactive online environment geared towards keeping the DNCD student actively engaged and on-task through connected learning, researching, and practicing experiences.

Learning Theories and the Digital Natives

“Schools should be places to learn, not to teach. [Digital natives] need to learn how to look for information, analyze and synthesize it, and critically evaluate the information they find” (Tapscott, 2009, Chapter 5, Section 7, para. 1). Digital natives learning behaviors and preferences result directly from their continued use of the Internet and constant connection through social networking. Understanding the academic challenges faced because of these behaviors serves in guiding pedagogical strategies and the development of learning tools.

Connections. Digital natives have grown up constantly interacting with video games, mobile applications, and Web 2.0 (Prensky, 2001a; Tapscott, 2009). They are used to jumping between screens and content, and although they are constantly viewing new sites and information, the depth of reading is shallow compared to reading books

(Levine & Dean, 2012). This hyperlinked nature is different from the traditional methods of viewing information in a linear format to jumping through information (Rich, 2008) in possibly unconnected ways. Constructivist learning theory focuses on the concept that learners actively build understanding and knowledge on already existing knowledge (even if incorrect), experiences, and beliefs (NRC, 2000). Jumping around and multi-tasking tendencies can affect the development of meaningful connections between content that is needed to construct understanding. These meaningful connections are especially important when working with abstract ideas (Dominowski, 2002).

Additionally, this constant Internet connection leads students to both expect information instantly and to use the information immediately (Levine & Dean, 2012). This has had a negative impact on research in schools. Digital natives are most likely to research using Google and Wikipedia instead of the library, and they are more concerned with speed than quality, usually limiting their research to the first couple results listed without further investigation (Brabazon, 2007). Digital natives get a large range of information through Internet searches; however, they rely most heavily on the visual nature of images (Prensky, 2010; Jukes et al., 2010; Levine & Dean, 2012) and do more scanning and less in-depth reading to comprehend information. Preferring digital media to analog (Levine & Dean, 2012), they will continue to research this way.

Typefication seeks to solve these issues through using the Internet—an environment already associated with research—to create experiences and content that is focused in one location. Information will be displayed with multiple layers of connection, through organization, hierarchy, and color. *Typefication* will use short summations, which will contain links, allowing the student to learn more as needed or when interested.

During research and practice, the DNCD students can add notes and links to the pages to help build connections. Constructivist-based learning theories center around the concept that through actively constructing these connections, learners more easily build knowledge (NRC, 2000).

Practice. Continuous practice is extremely important for all learners. Experience, exploration, and contextual activity are needed to build meaningful connections and networked concepts that lead to understanding (Dominowski, 2002; NRC, 2000). This can be problematic for digital natives who are distracted with technology, and find educational outcome more important than the traditional focus on process (Levine & Dean, 2012). In CD education, the process including research is just as important to the outcome for conceptual and innovative thinking. Experience is fundamental for active learning. “Constructivist learning in inductive. ... The activity leads to the concepts; the concepts do not lead to the activity” (Cooperstein & Kocevar-Weidinger, p. 141). Furthermore, learning is situated in context and authentic tasks connecting the student to professional practice are essential (Brown, Collins, & Duguid, 1989); authentic activity is linked to better engagement in material, as well as interest and attention (Pritchard, 2009).

Typefication seeks to create an environment where research and practice can occur simultaneously. By eliminating distraction and with the addition of extra content, DNCD students will be encouraged to focus on working with and viewing as many typefaces as possible. By constantly comparing and contrasting, they can evaluate what visually is successful or what visually will not be successful in their project, reducing their continual use of the same typefaces.

Motivation. The learning process is individual and dependent on the learner's motivation to learn; whether for reward (extrinsic) or personal (intrinsic) reasons, it is essential that the learner actively choose to participate (NRC, 2000). Motivation is often positively affected by the perceived usefulness of the material, as well as when learning in social situations or helping others (Dominowski, 2002; NRC, 2000). Digital natives are characterized as being only attentive to information that interests them, which is often confused with a short attention span (Prensky, 2010). Their interest in and use of social media is a reflection of their preference of collaborative environments (Levine & Dean, 2012) and social situations.

Typefication seeks to connect DNCD students to common practices in the CD profession, by using similar modules to type management software like Suitcase Fusion from ExtensisTM. It will also use technology and modules similar to online font foundries and stores such as, FontShop.com, where professionals commonly buy fonts for their collections. DNCD students will develop better organizational skills and better understanding of common font buying practices. *Typefication* will eliminate extra steps by allowing DNCD students to view, research, and practice with the selection of the typefaces they can access, helping them to concentrate on applicable research.

Typefication will utilize an internal social network that provides students a social motivation component to discuss and share typography-related resources. The open environment will also give educators the opportunity to post questions and guide discussions. Using connected tools such as educational games gives CD students the opportunity to actively participate in learning.

Digital Tools in Education and Practice

Digital natives prefer digital media and interactive experiences that allow customizable experiences (Tapscott, 2009). Digital learning tools can help enhance education through a customizable and individualized educational experience. Interactive experiences promote engagement with content, and allow students to continuously review and explore material learned in the classroom (NRC, 2000). The Internet has unlimited sources for implementing and hosting these tools that can, in return, be easily updated and enhanced for more effective learning (OET, 2013). “Students value the ways in which technology helps them achieve their academic goals and prepares them for their future academic and workplace activities” (Dahlstrom, Walker, & Dziuban, 2013, p. 9). 76% of US undergraduates surveyed about technology agreed or strongly agreed that it helps in their academic success (Dahlstrom et al., 2013).

A Survey of CD Typographic Education

Survey data from students and educators was collected to find trends and preferences in problem areas in CD typographic education. Students and educators at one institution answered an anonymous survey in order to compare overall how students and instructors viewed these areas in their curriculum. The survey was answered by 26 undergraduate CD students who had completed a Typography I course and 9 educators who have taught basic typography courses at various institutions.

76.92% of CD students found understanding classification very important as a designer (19.23% moderately important); while only 38.46% found knowing the history of typography very important as a designer (42.31% moderately important, 11.54% slightly important, 7.69% not at all important). CD students were asked to select teaching

methods/technologies they prefer—the most selected answers were instructor lectures/presentations by 65% and interactive games (computer based) by 46%. Although results varied, when asked to rank aspects of typography on their level of difficulty, a majority of the CD students found typeface pairing, typeface selection, overwhelming amount of typeface choices, and typesetting rules the most difficult. One CD student commented, “What makes a good typeface that is worth purchasing and when purchasing, what do the different classifications (OT, MT, etc.) mean to us after we graduate?” Educator responses were similar, citing typeface pairing, typeface selection, and historical context of typography and its effect on communication the most difficult for their students.

Overall, students were not using typography related tools currently available; however, 81% of CD students and 100% of CD educators wish more tools were available to help with typography knowledge and use (15% of CD students had no opinion). Typeface pairing, selection and typesetting rules were selected most when asked what tools they would like to see more of. One student commented that they would like “forums for us as a student body to discuss type and what it means, how it is used, etc.”

III. CREATIVE PROCESS

The concept for *Typefication* evolved through a better understanding of typographic education in the CD discipline, as well as through an investigation of how technology and digital tools can effectively enhance the typographic education of the digital natives. This chapter provides an overview of the creative process used to develop the initial concepts and design of *Typefication*, as well as functioning prototypes of one of its internal games.

Concept Development and Initial Design

Affinity Diagramming

The first step in the creative process was visualizing and analyzing the connections between digital natives, contemporary learning theories and pedagogical strategies, and CD typographic education. Affinity diagramming is a process used to “externalize and meaningfully cluster observations and insights from research” (Martin & Hanington, 2012). All researched learning theories, teaching strategies, characteristics of digital natives, and topics in CD typographic education were written out onto separate sticky notes (see Figure 4). Learning theories and strategies were grouped first to the digital native characteristics, and issues in learning were clustered with those specifically in CD typographic education. Visualizing these connections generated the thoughts behind the digital learning tool as an interactive website, with hosting multiple tools and learning connections.



Figure 4. Affinity diagramming.

Lists, Sketches, Wireframes, and Mockups

Using the connections from the diagram, a list of features and internal tools was created, and sketches (see Figure 5) were used to determine an initial structure of each specific section of *Typefication*—Dashboard, Learn, Research, and Practice. Sketches allowed for quick iterations to encourage thinking about the workflow of the tool and development of further features. Wireframes are visual structural layouts, which were created to finalize the placement and hierarchy of content. Mockups are refined designs, commonly a final step before development, are used to present designs to a client. Mockups (see Figure 6) of the four main sections were designed for elaboration on the features and fine details of the tool, and they were used to discuss the potential learning tool with a small group of DNCD students from Texas State University.

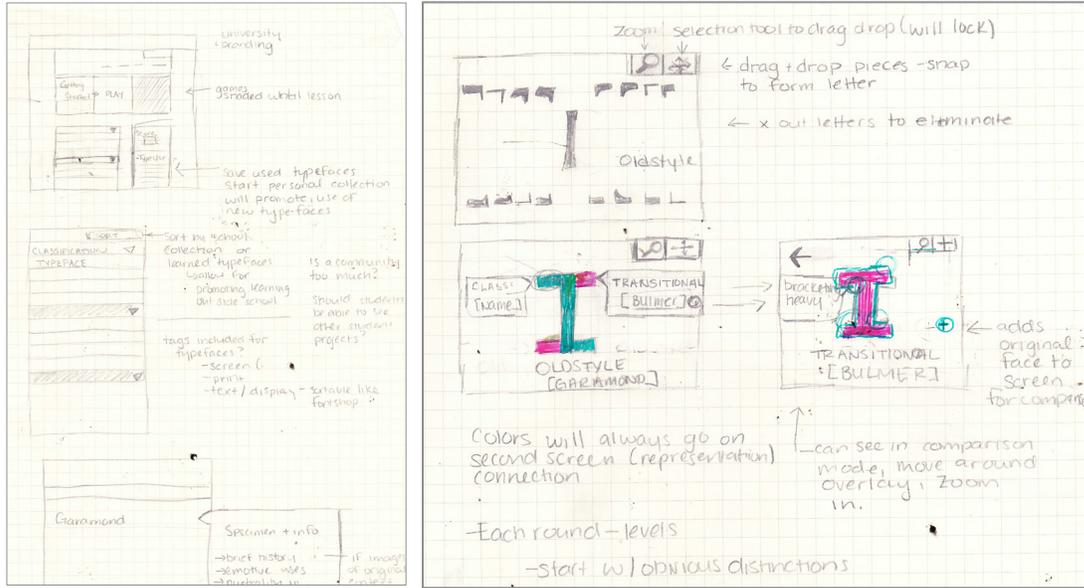


Figure 5. Initial sketches.

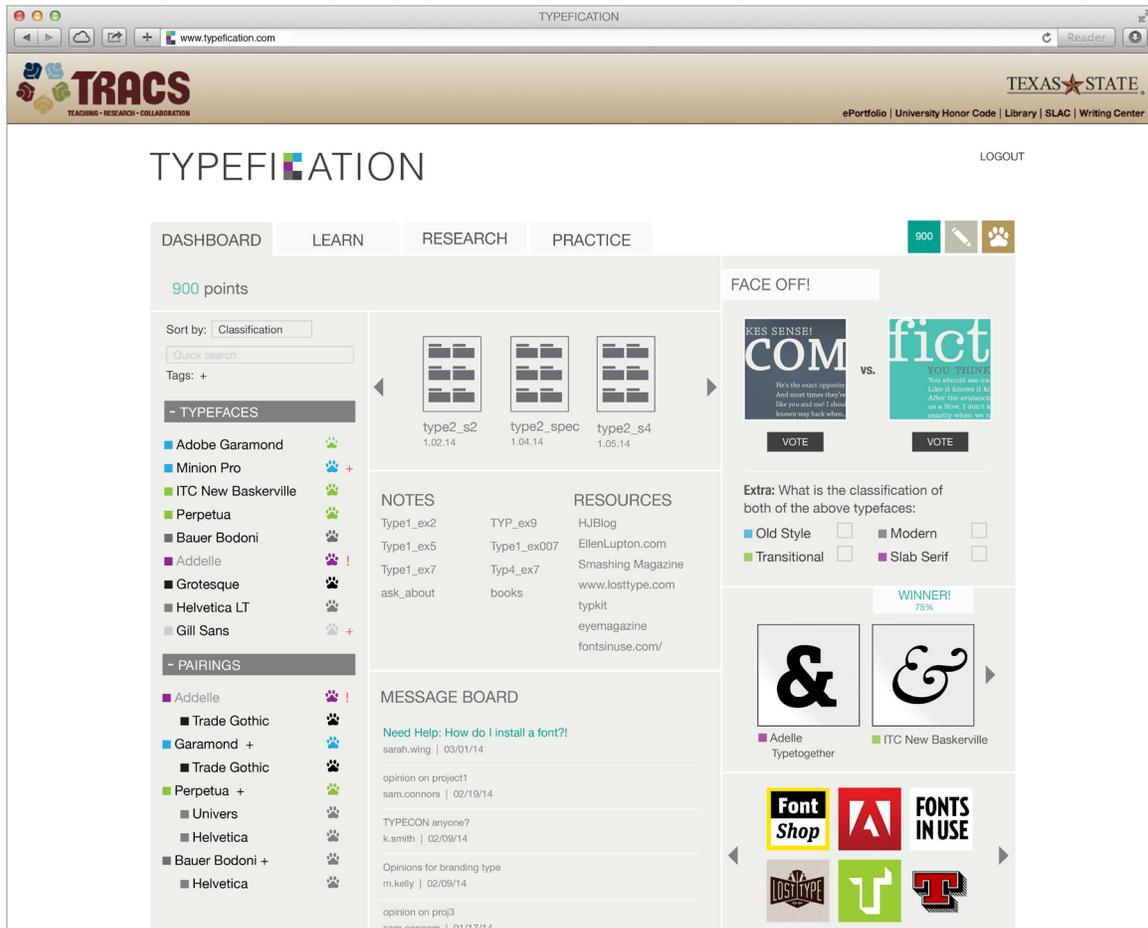


Figure 6. Example mockup of *Typefication* dashboard.

The Classification Game Prototype

Concepts of three games came from problematic areas in typography: (a) history and tools, (b) understanding of classifications, and (c) voice and tone of type. After the initial list of features was created, each game concept development started with a few initial rounds of sketches.

“ADDIE,” an approach to instructional development (Kovalchick & Dawn, 2003) that is often used in gamification for learning, includes: (a) *analysis* of the game for education applicability; (b) *design* of educational objectives and strategies; (c) *development* and creation of instruction and parts; (d) *implementation* of the instruction to students; (e) *evaluation* for feedback which occur both during design and development (formative), and after (summative) (Kapp, 2012). All three games went through the analysis process to determine inclusion in *Typefication*. The Classification game was chosen to be developed further into a working prototype for evaluation.

Discussion and results of the surveys were used in analyzing and determining the outcome, instructional objectives, game play, and environment description, as well as reward structure. Educational goals and objectives were created to help sketch out various levels and the final structures of the game. Design and technical aspects were taken into consideration in developing sample game tasks that took the form of both a paper prototype (see Figure 7) and a functional online prototype (see Figure 8). A sample of five DNCD students tested both versions for experience testing, educational evaluation value, and for a comparison of physical and digital interactivity with the letterforms.



Figure 7. Classification game paper prototype.

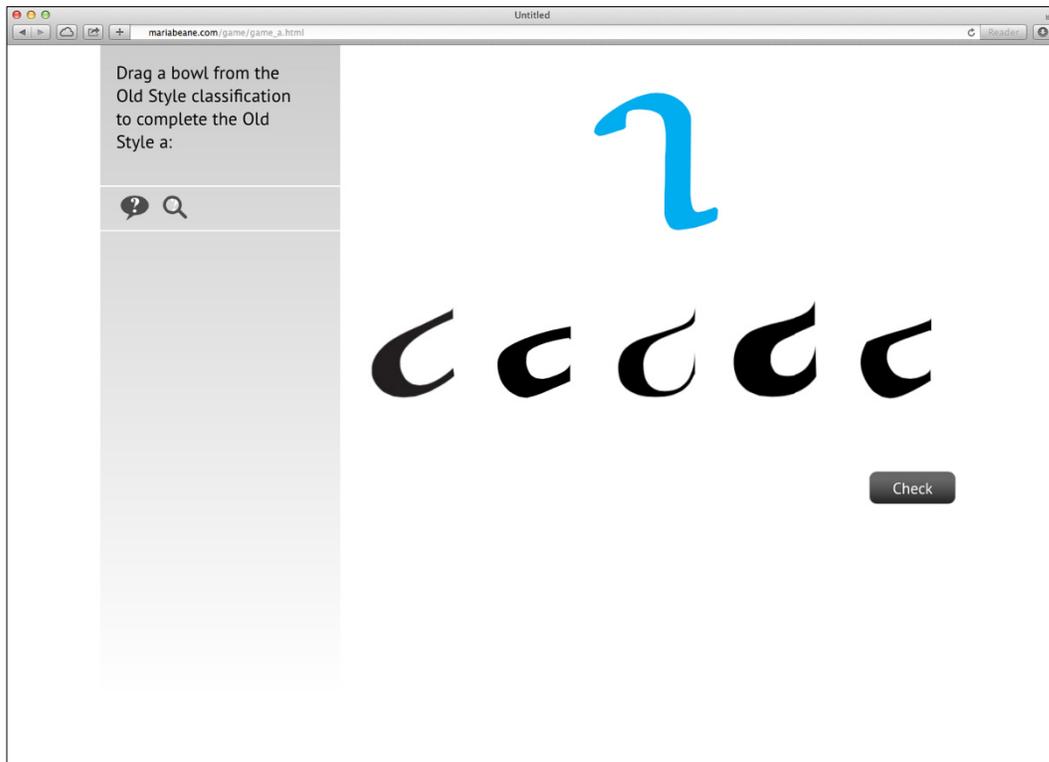


Figure 8. Classification game web-based prototype.

IV. RESULTS

Learn, Research, and Practice with Typefication

Typefication is the concept for a web-based interactive tool where DNCD students will learn, research, and practice typography. The site will be divided into four main sections—Dashboard, Learn, Research, and Practice—which will allow for quick non-linear but connected experiences. *Typefication* will be hosted through an institution's web server, and in the following examples Texas State University's Teaching, Research, And Collaboration System (TRACS) is used. Having the tool hosted through the institution will allow students to access it with their student username and passwords, keeping learning experiences streamlined by integrating it with other course materials. Once signed in, the DNCD student will land on the dashboard section.

Dashboard

After signing in, the DNCD students will be taken to their personalized dashboard (see Figure 9) where all collected resources, notes, lists, and favorite fonts and pairings will be displayed. Educators will be able to post polls and ask questions that can be answered for points. For example, an educator can post two typefaces and poll students on their preferences, giving educators an insight. The page will contain a live forum for classmates and instructors to engage in open discussion and share resources.

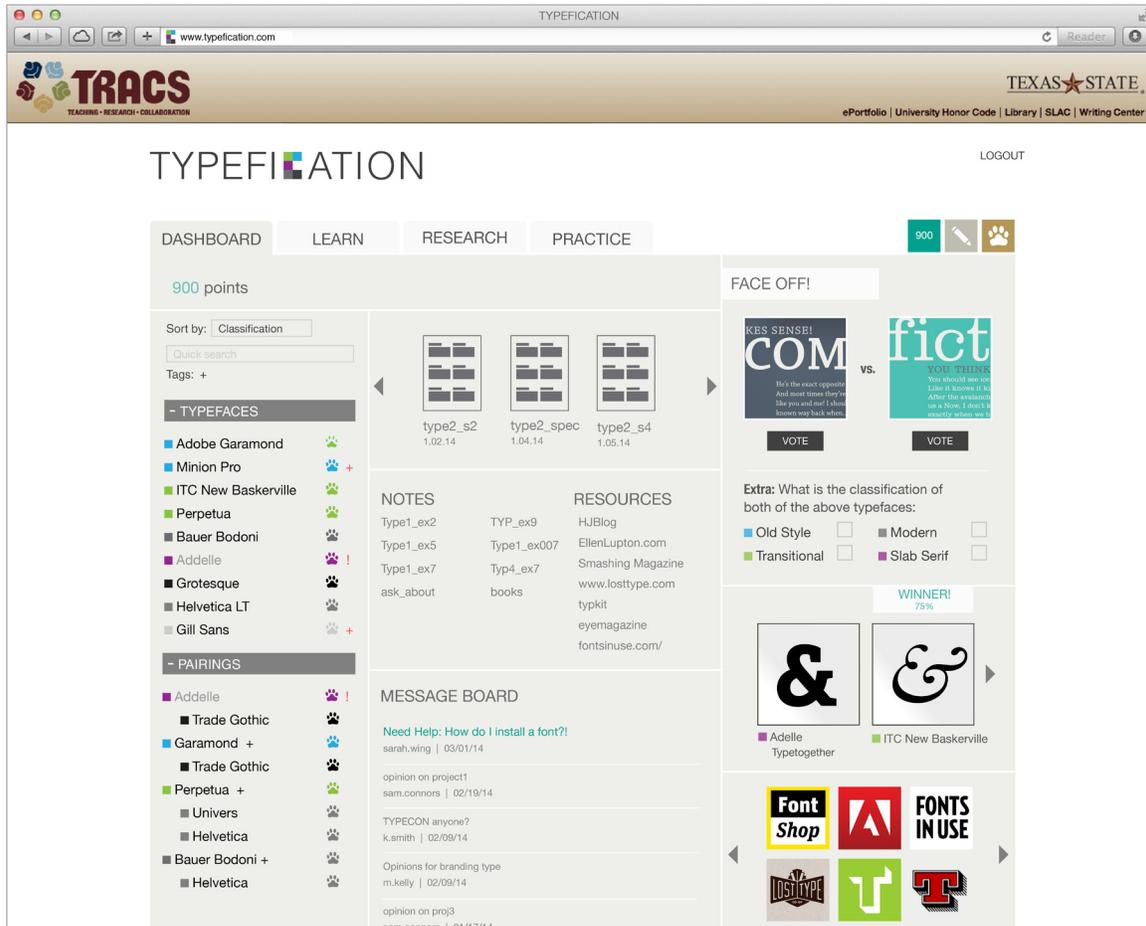


Figure 9. Typefication dashboard mockup.

Learn

The Learn section (see Figure 10) will provide DNCD students a view of the games and levels they have played and are currently playing, as well as a program leaderboard. The Learn section will feature games, lessons, and external resources for learning type history, classification, and typeface characteristics. DNCD students may add resources to their site to keep an ongoing collection throughout their entire college career. Educators will be able to post three weekly features that can include links and information to blogs, typeface designers, books, or other new external resources to get DNCD students to find weekly inspiration.

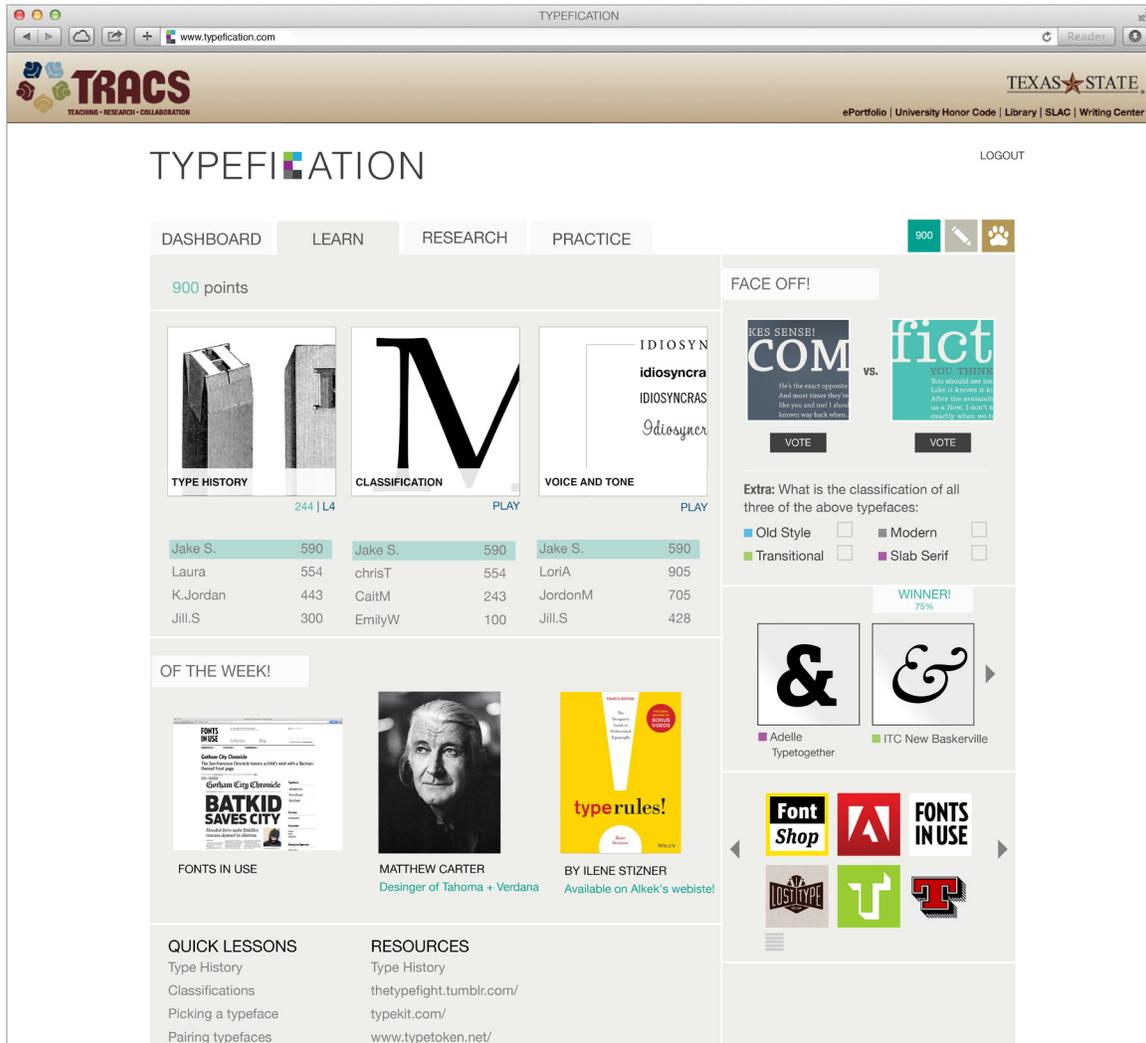


Figure 10. Learn section mockup.

Typefication will feature other digital learning tools, including three games to engage students in type history, classification, and usage. Material within the games will be directly linked back to research and practice through the use of standardized colors for classification representation. Games will be played in an order to specifically build knowledge from one game to the next.

Type History Game

The history game in *Typefication* will set the context for type classification and requires DNCD students to interact with tools for writing and producing type through

history to see how culture and technology has continually shaped typography. Starting with drawing, students will trace forms on screen with the different writing method tools of that time period. As the game progresses through history, and culture and technology advances, the DNCD student will unlock new tools such as a reed pen or a broad nib pen while still continuing to trace letterforms and seeing how the various tools allowed for different types of markings or cuts. Throughout the game, quick facts will be added on screen without interrupting gameplay so that particularly interested students can delve deeper into the information. This game is meant to be a simple history lesson that adds a level of interaction with the tools used first in writing and then in producing type to create a richer learning experience.

Classification Game

The second game will enable students to learn typeface classifications through a deeper examination of the letterform. The game play will involve matching pieces of letters to form the correct typeface classifications (see Figure 11). Played in levels, the game will begin by showing the main stem or body part of a letter within a specific typeface classification in a distinctive color. For example, Figure 11 shows part of an old style letter “a.” The color blue represents the old style classification. The DNCD student will find the matching old style bowl (missing part of the letter) to complete the letter a by dragging and dropping their choice from a group of bowls presented at the bottom of the screen. Once dropped, the DNCD student can check the answer by clicking on the check button. If the dropped letter piece is incorrect, the two letters will show overlapped for comparison on the left hand side of the screen, and the incorrect bowl choice will change from black to a color that does not match the color of the stem (see Figure 12).

The object of the beginning rounds will be to match up the specific classification, not the exact typeface. Every piece on the screen will turn into the associated classification color, and the answer will be given with details about the typefaces and typeface classifications. As the game progresses, the initial letter piece will no longer be color coded but will be displayed in black (see Figure 13), and eventually DNCD students will need to match specific typefaces together. Some rounds will involve more than one letter or piece per letter (see Figures 13–15). When all available questions are answered, each piece will show in the corresponding classification color, and details on the typefaces and typeface classifications will appear when hovering over each one.

In each round, there will be one hint (see Figure 16) that can be selected which will result in the loss of points. The hint will tell the DNCD student which area of the letter to look at and what significant shift in society or technology it resulted from. There will be a magnifying option (see Figure 17) to get detailed views into the smaller nuances of the letterforms. Letters will vary so that the gameplay can continue.

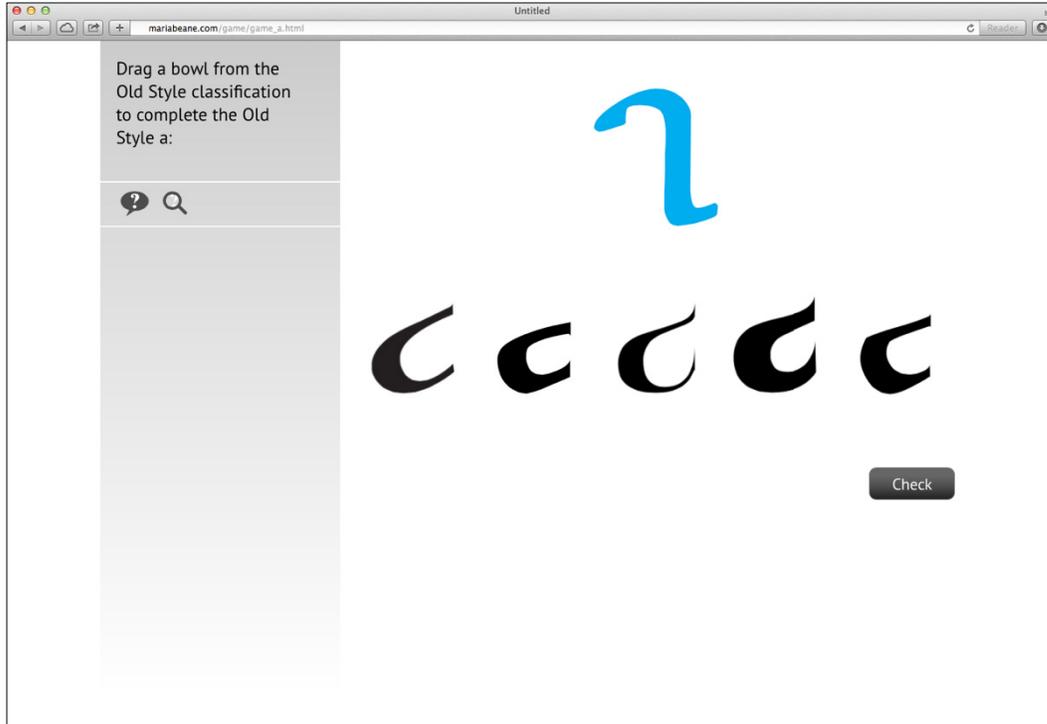


Figure 11. Classification game prototype: Old style letter “a” task.

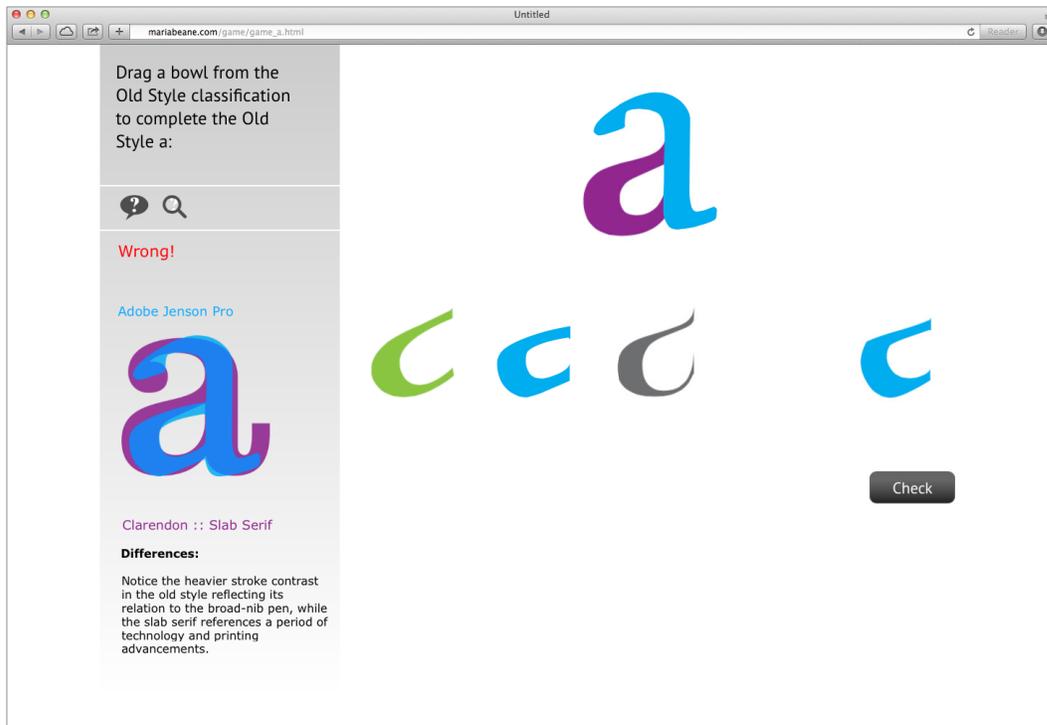


Figure 12. Classification game prototype: Incorrect answer.

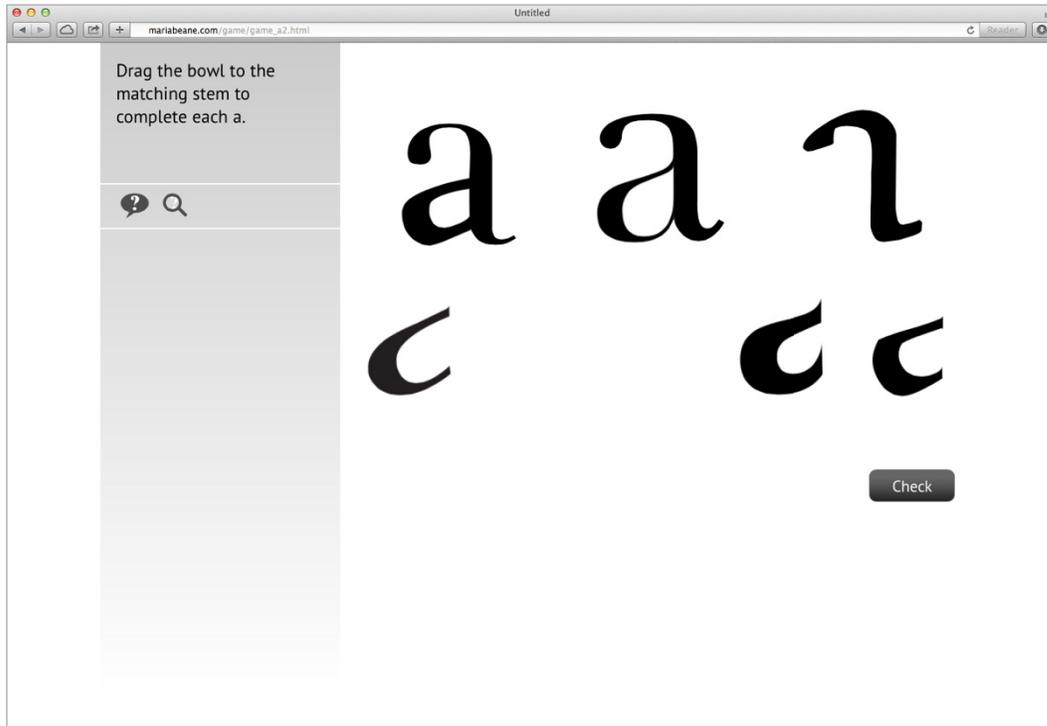


Figure 13. Classification game prototype: Letters showing initially in black.

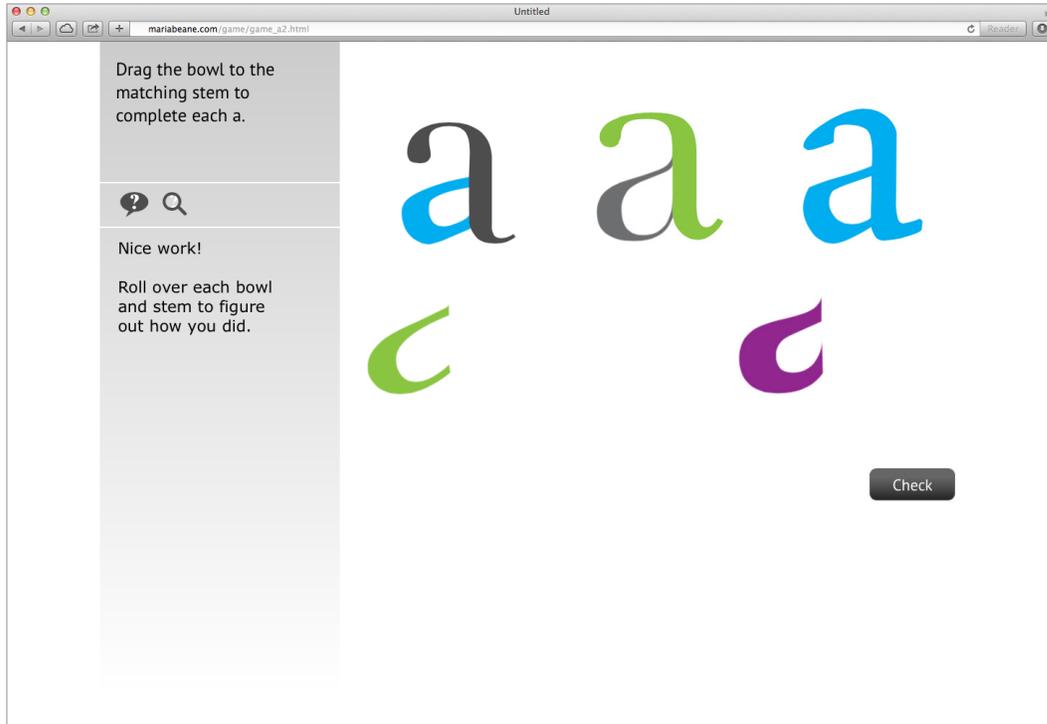


Figure 14. Classification game prototype: Check answers.

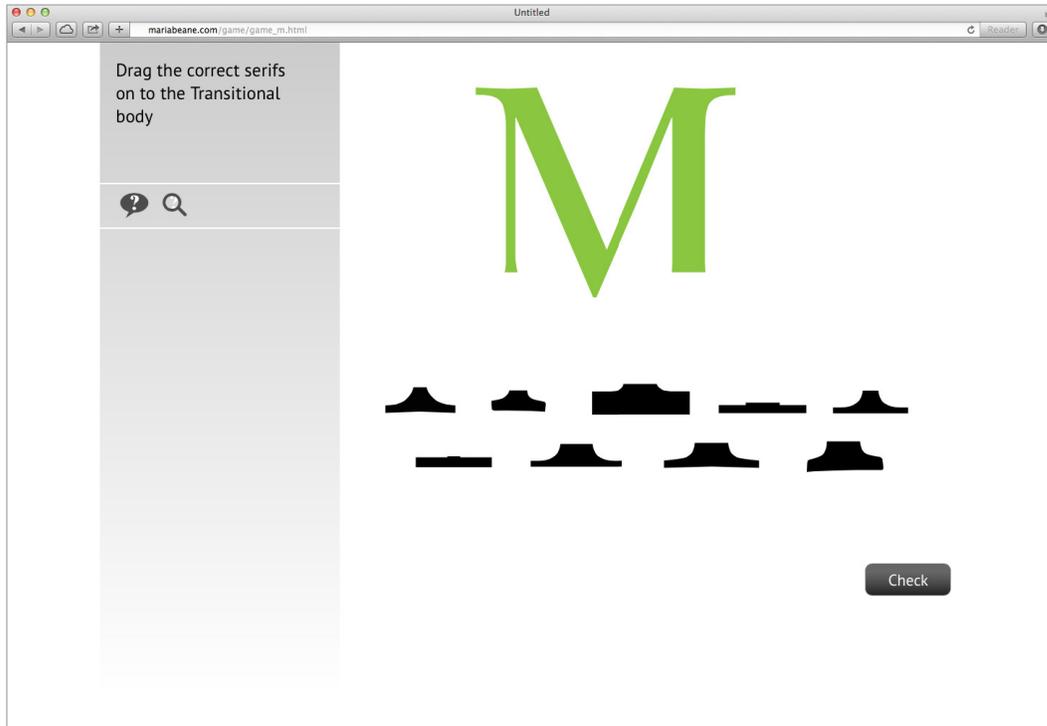


Figure 15. Classification game prototype: Transitional M showing in green.

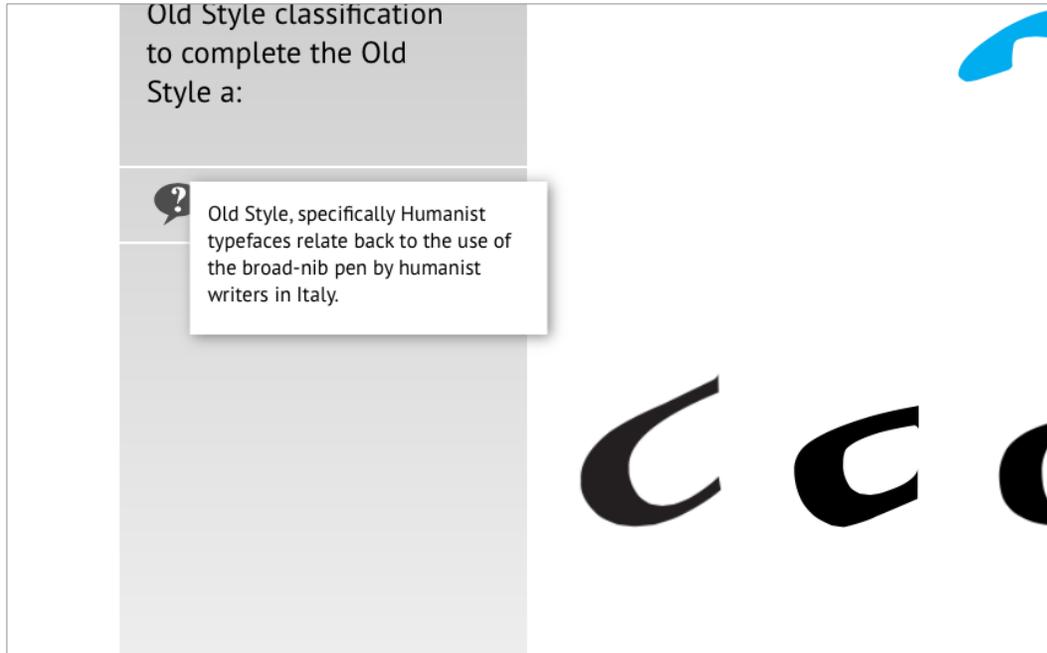


Figure 16. Classification game prototype: Hint.

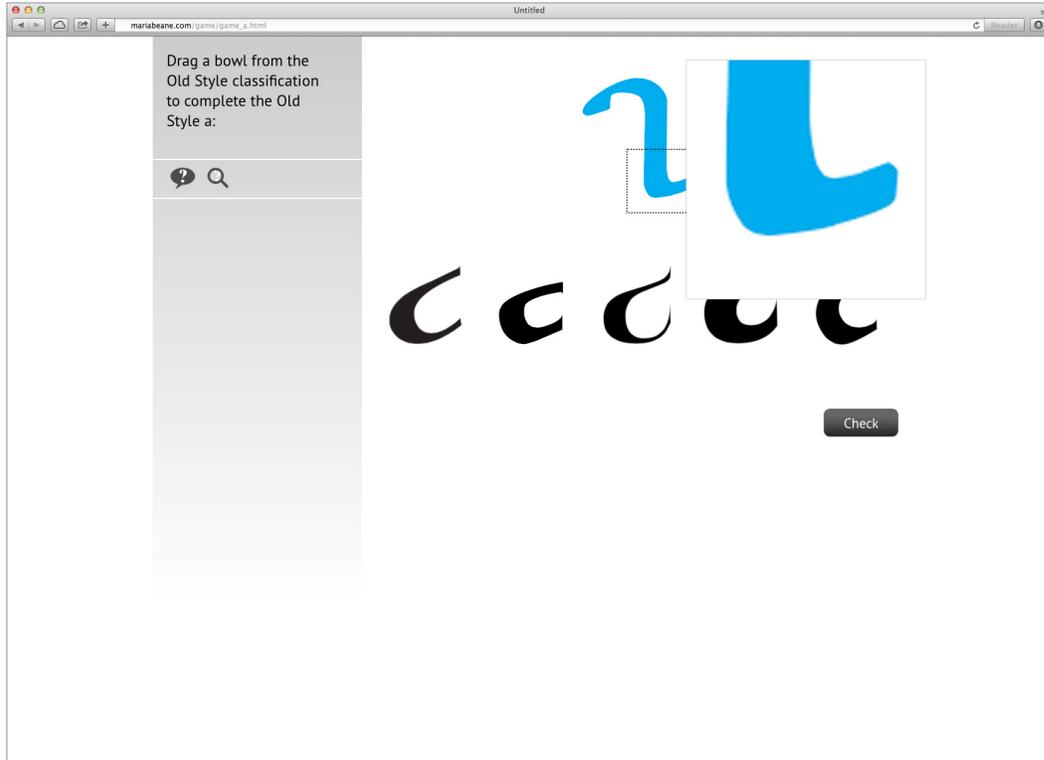


Figure 17. Classification game prototype: Magnifying option.

Type Voice and Tone Game

Once the students understand the history of typography and are comfortable with typeface classification, they will begin to understand how typefaces naturally set various tones and have a voice. The last game of the series will display text set in different typefaces and will ask the DNCD students to add descriptive words about the typefaces or select from a list the best fitting words. Through associating descriptive words to typefaces, the DNCD students will form connections between the visual form and their reactions to what this form personifies. When reviewing these connections, DNCD students can see patterns between visual traits in typeface classifications and what they express.

In later rounds of the game, words will be displayed with attention to variations in typeface styles and settings that communication designers use to effectively

communicate. As an example, these variations might include displaying the word as the bold version of a typeface in all uppercase. Adding in these variations will help DNCD students further connect different visual traits and settings of typefaces to changes in voice and tone.

Research

The research section (see Figure 18) of *Typefication* will give DNCD students the opportunity to view information on all of the various fonts in which they have access to for their projects, in addition to others that they, or their instructors, would like for them to learn. This tool will allow DNCD students to view and use the typefaces while logged into *Typefication*, without allowing them to download the font files onto any computers. By allowing a University's full font library to be viewed online in an organized manner, a DNCD student is encouraged to take full advantage of the school's resources, and research more effectively resulting in more informed decisions on their typeface selections. Unavailable fonts and those currently uninstalled in lab and classroom computers will be marked so DNCD students know when they need to install or purchase specific fonts for use. This process will allow students to quickly find, install, and add typeface selections to their projects when in class.

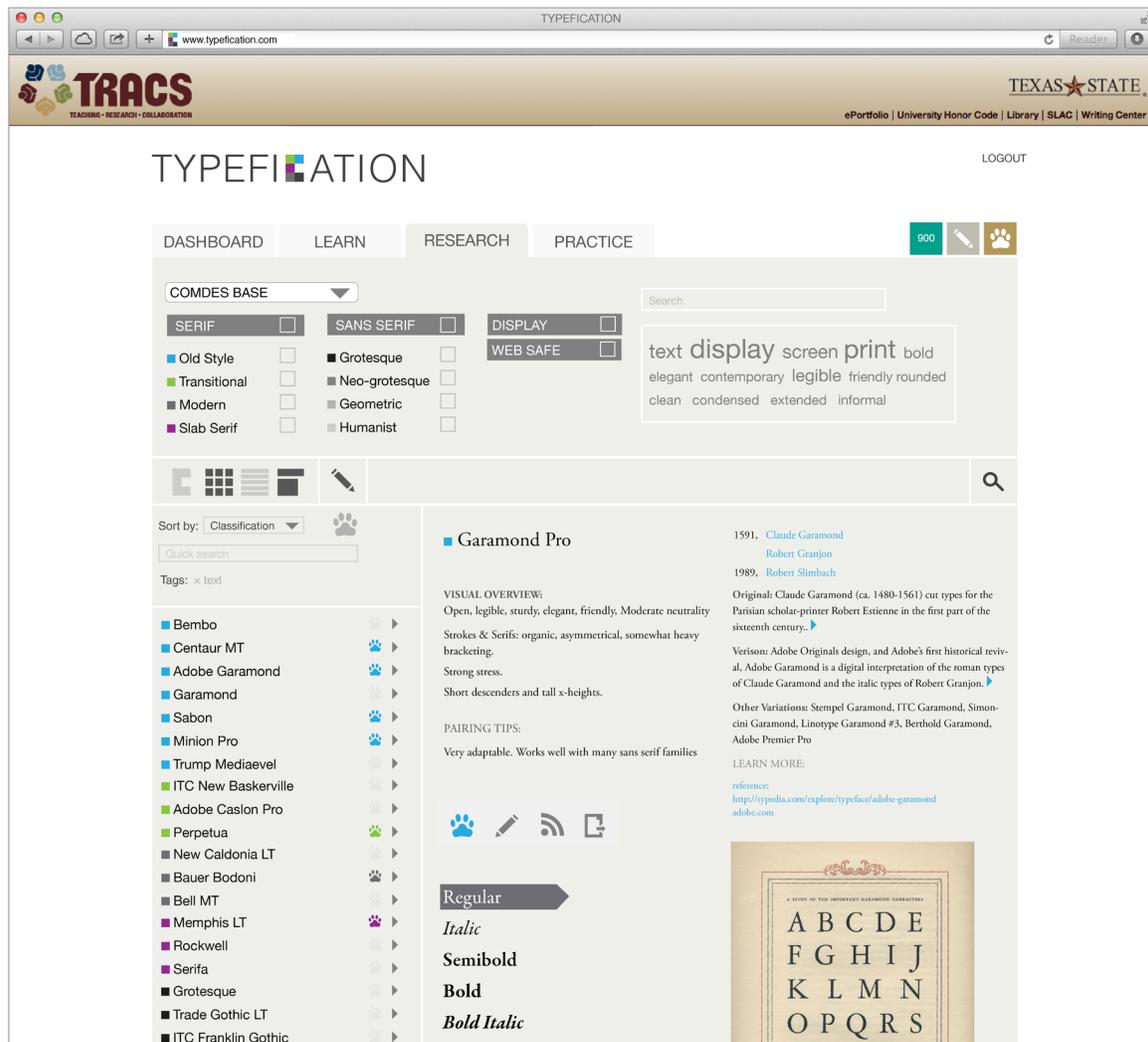


Figure 18. Research Section mockup.

Collections

Typefaces will be divided into collections and sub-categorized by classifications, and listed in the panel on the left side of the screen. Collections (see Figure 19) are considered specific groups of typefaces that can be added by the CD program, educators, and DNCD students. As with most font management tools, collections will allow for sorted views of specific groupings. Typefaces can be added to more than one collection, and when viewing “all” in the research or practice section, duplicates will not appear.

CD program collections. CD programs and educators will be able to add collections of typefaces that can be viewed by all DNCD students or only by a group of selected students for a specific class. As an example, the “Comdes” base fonts that are currently installed at Texas State University will be one collection that all DNCD students have access to, and an educator teaching a Typography I course can add a collection of specific typefaces for only DNCD students enrolled in the class to view.

DNCD student added lists. DNCD students will be able to add collections of typefaces for their personal use. If selected, a collection the fonts installed on the student’s home computer can be generated to allow access to this information when working at another computer. Another example of a DNCD-student collection would be fonts the student has found externally that they would like to purchase in the future.

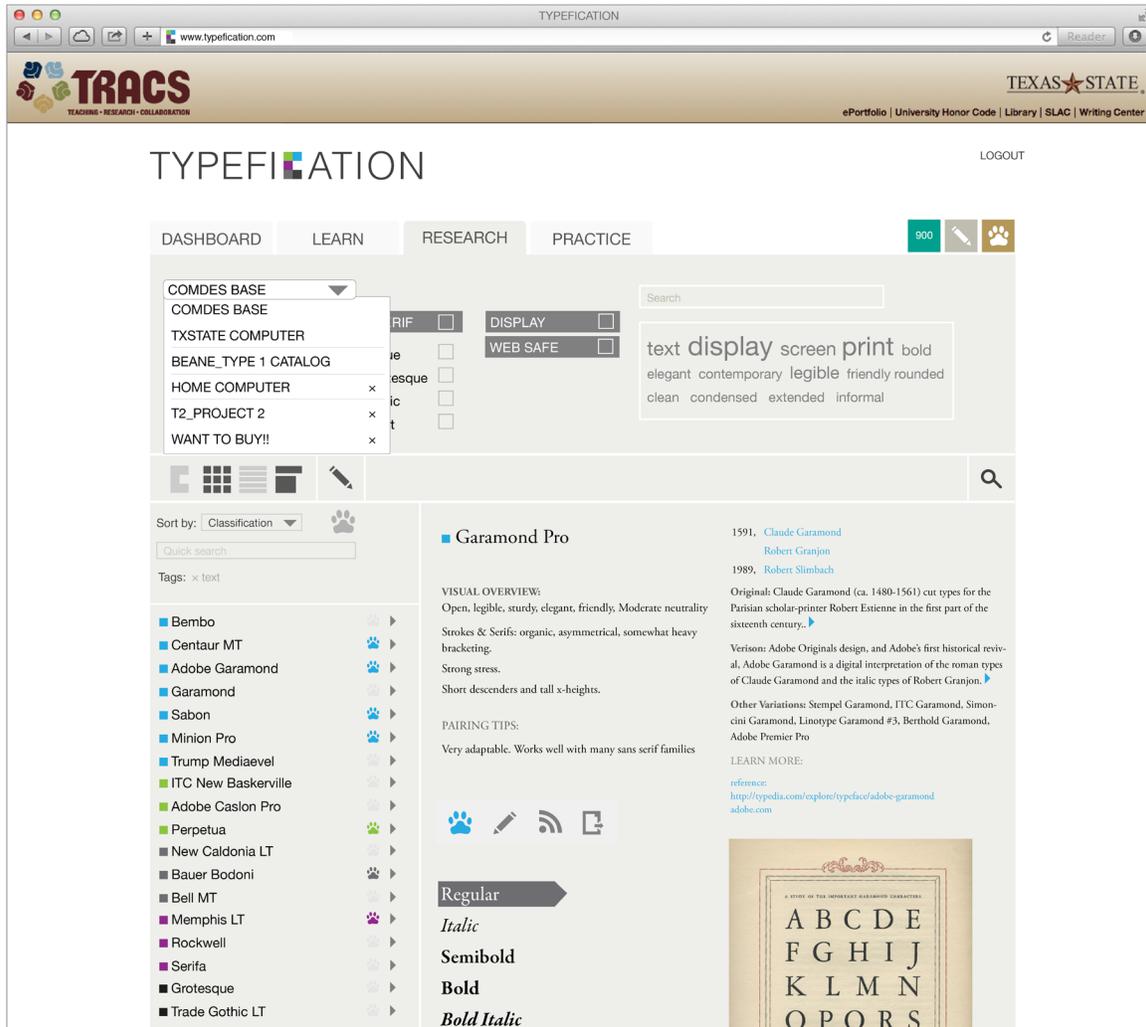


Figure 19. Research section mockup: Collection dropdown.

Font Lists and Searching

Once a collection or series of collections are populated, the typefaces will be sorted by classifications and each typeface will appear with a color square associated with its specific classification next to it. The color-coding method will be the same throughout the site, and will add to the learning of each classification, allowing for students to build knowledge from what they have previously learned about. Fonts can be searched and sorted by various identifiers including student favorites, classifications, year designed, typeface designer, as well as various program and student generated tags.

While researching fonts, students will have the ability to add their own tags—keywords that are added as metadata to the typeface—that can be used when searching for general or specific typefaces.

Typeface Information Panel

When hovering over the classification square, a panel (see Figure 20) will show with quick reference information about the typeface including: (a) a visual overview of the typeface, which relates to the classification; (b) pairing tips; (c) type designer name and country of origin and the year it was designed; (d) type designer, country, and year of the original cut the typeface was based on if applicable; (e) links to external information relating to the typeface; (f) options to add to favorites, add a note, share, or send to the practice section.

When clicking on the typeface directly, the information will display in the main frame of the website (see Figure 21). Additional information will be included in this view including options to view the different cuts of the typeface examples and visual examples of the typeface.

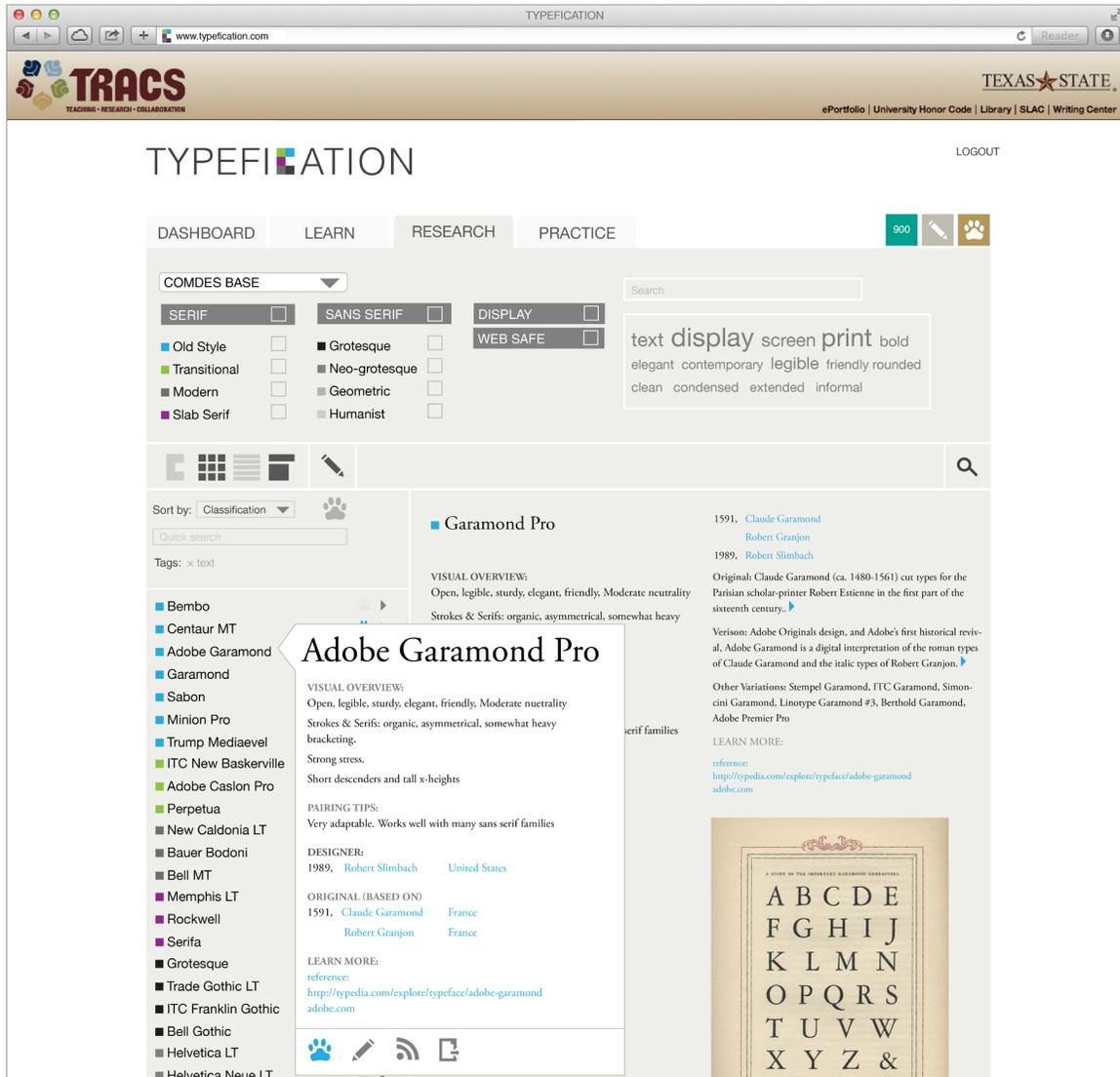


Figure 20. Research section mockup: Typeface information hover panel.

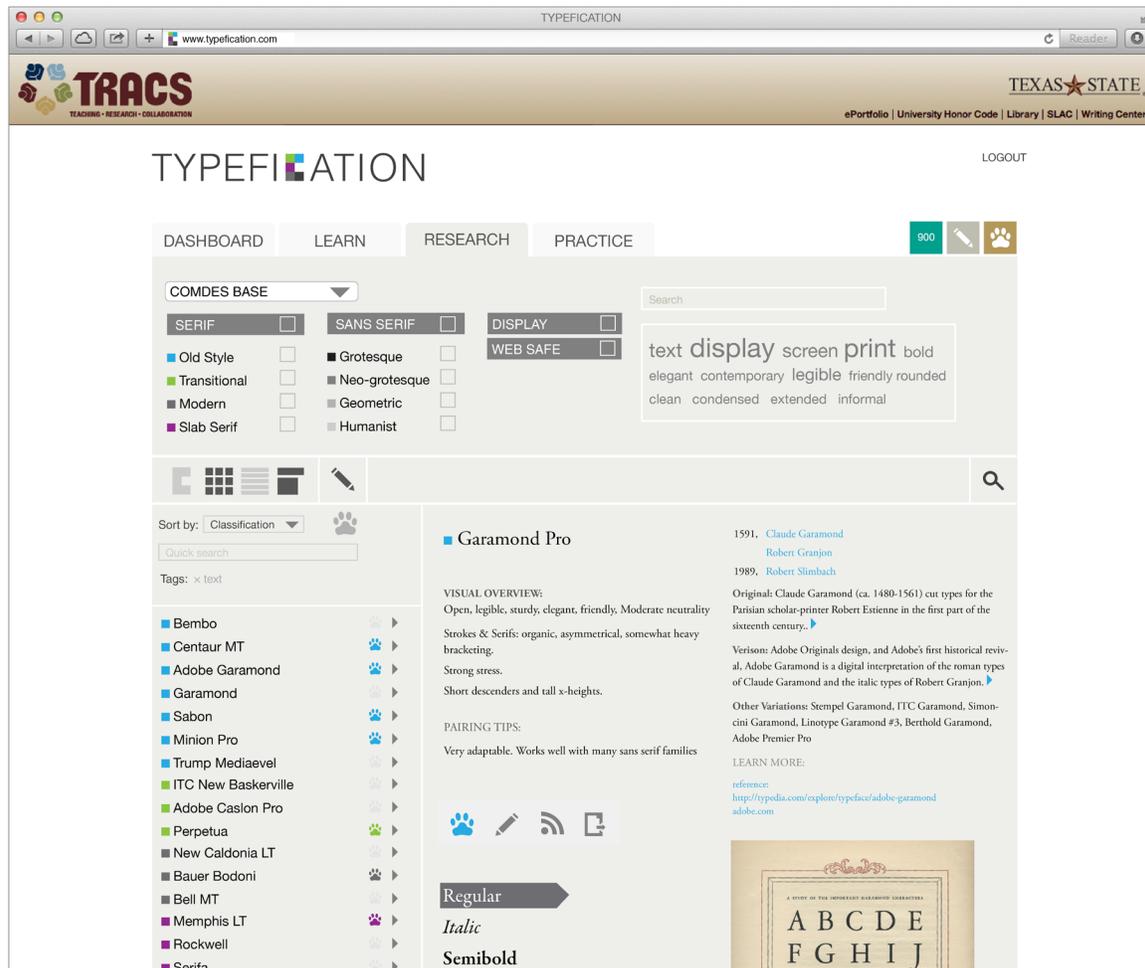


Figure 21. Research section mockup: Typeface information.

Practice

The practice section of *Typefication* (see Figures 22–23) will give students the opportunity to research and practice at the same time. While on this section, the font panel will be able to be toggled between a show and hide mode. When the panel is showing, the typeface information panel will be displayed when hovering over the square classification mark to the left of each font. The main part of the section will allow for students to view text in specific layouts to see selected typefaces in use.

Practice layouts can be saved, sent to favorites, and/or uploaded to use for class project research. The text can be auto generated, or the DNCD student will be able to

enter samples of their own text. The Single Typeface layout will set the same text repeated in multiple typefaces. Text can be auto-populated with favorite typefaces, random selections, similar selections based on a specific typeface, or they can be changed out manually. Pairing typeface layout will give DNCD students practice in setting different typefaces next to each other to see how they work together. These can be auto populated by saved or favorite pairings, or they can be manually selected. Random selection will not be enabled so students will have to visually compare the typefaces and make decisions. Type specimen layout will be used to create a page that will showcase how typeface pairing, type size, and leading work together. Auto-populate can be selected for favorite pairings or selections for each paragraph and headline will need to be manually selected. Specimen view will always include the typeface name and size/leading information identified below each choice for reference. Multicolumn layout will showcase typefaces set in various column layouts. For example, the layout can include headlines, bylines, and paragraphs in columns.

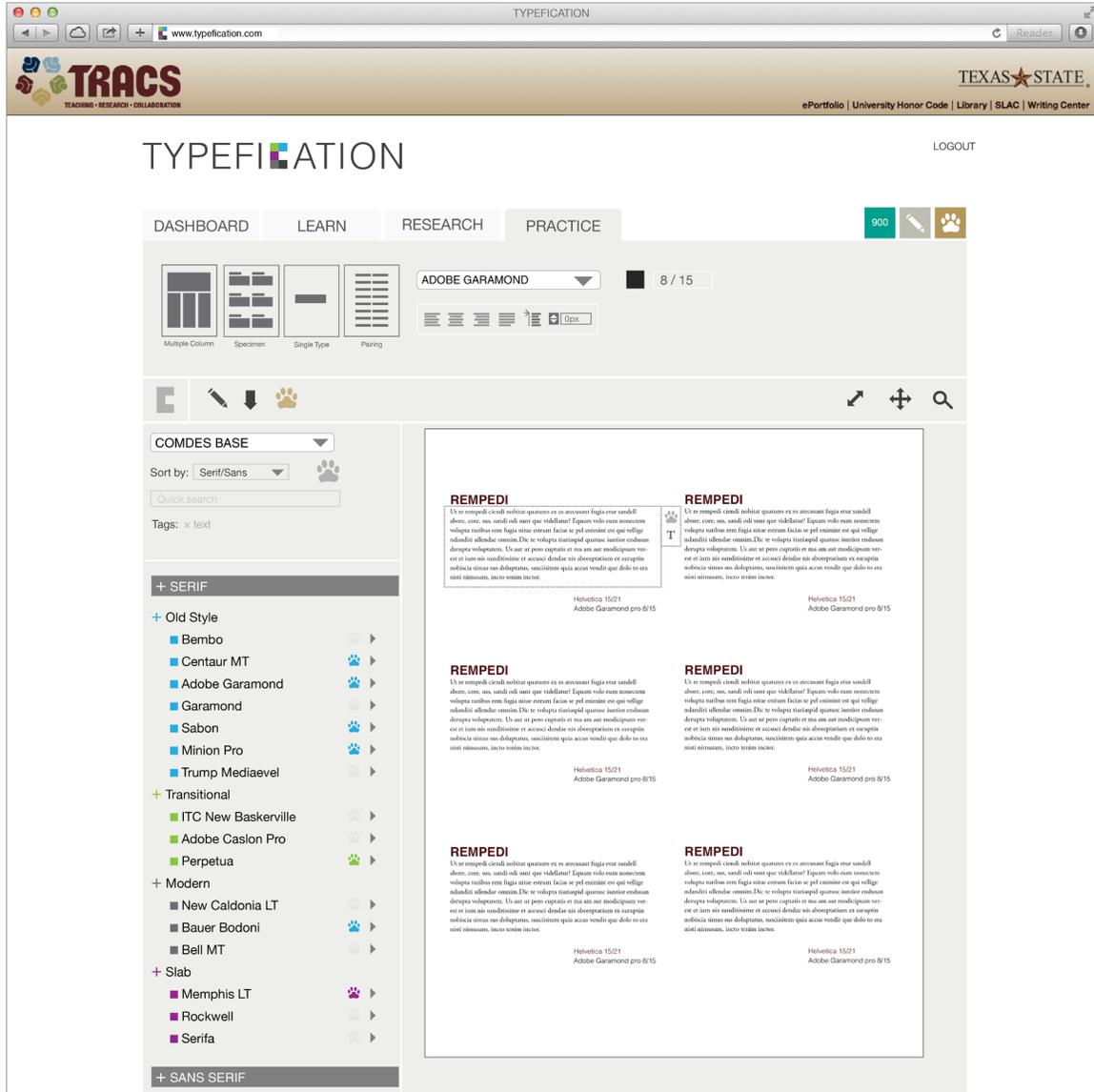


Figure 22. Practice section mockup: Side typeface panel open.

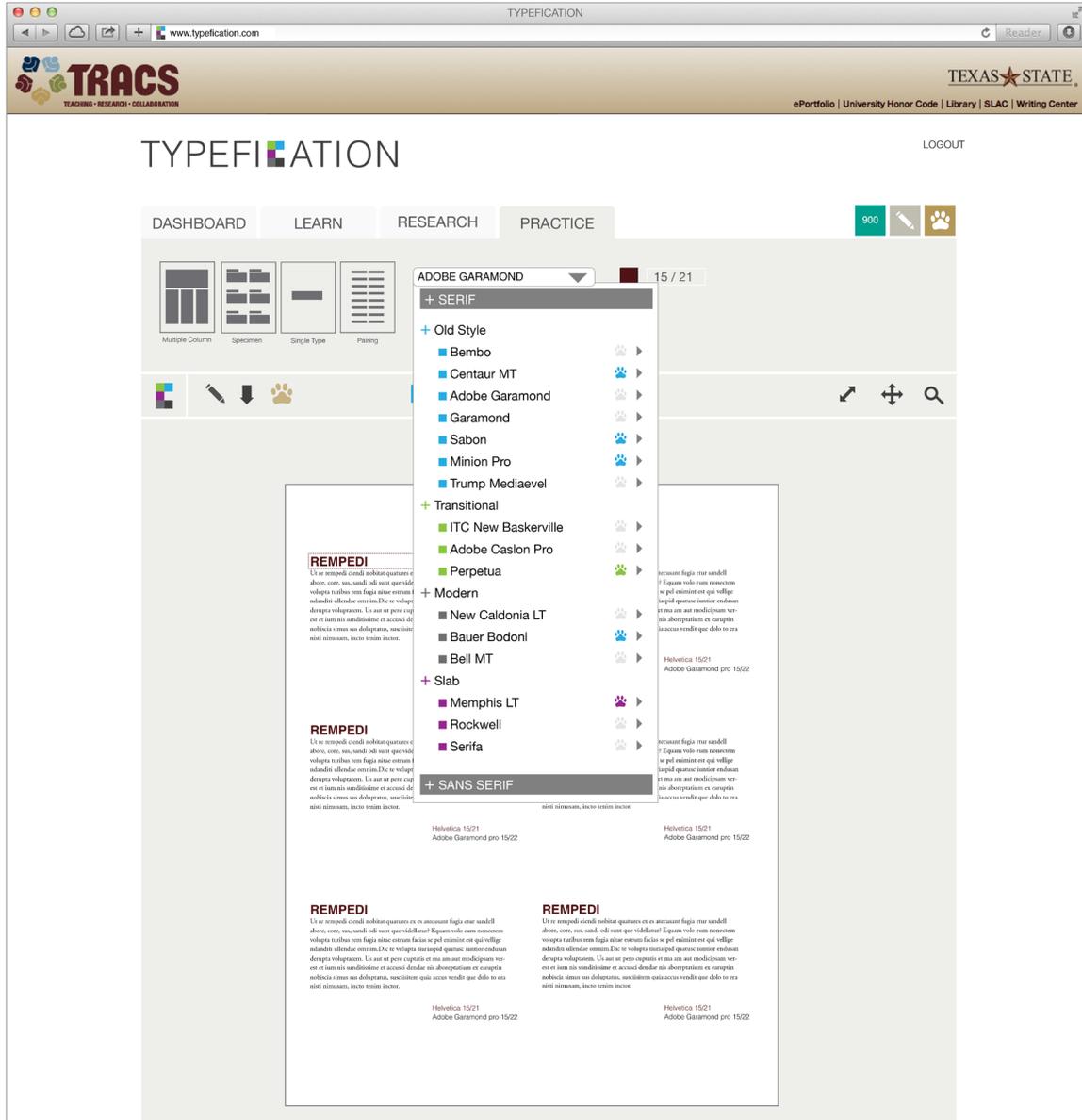


Figure 23. Practice section mockup: Typeface dropdown menu.

Results through Focused Discussion and Testing

Two sessions were held with five different undergraduate DNCD students from the Texas State University CD program. Session one consisted of two sophomores and one junior; session two consisted of two seniors. Both sessions began with a general discussion on CD typographic education, including problems they have with using type, a walk-through of their typeface selection process for a project, preferred typefaces, where they purchase/acquire typefaces, and opinions and experiences learning basics in their Typography I courses. After the initial discussion, each mockup of the *Typefication* was presented, and each feature was discussed with the students for feedback on potential problems or uses.

Next, the DNCD students worked together to solve three of the classification game paper prototype sample tasks: (a) place an old-style bowl from the selection onto the showing old-style stem (see Figure 24); (b) place transitional foot serifs on to the M (see Figure 25); (c) match up the correct typefaces of each A that are all within the same classification (see Figure 26). Using the research and testing method “think-aloud-protocol” (Martin & Hanington, 2012), groups were encouraged to discuss their process of selecting. Each individual then separately performed three similar tasks on the web-based prototype (see Figures 27-29). The games were discussed, and each DNCD student filled out an online survey to provide feedback.

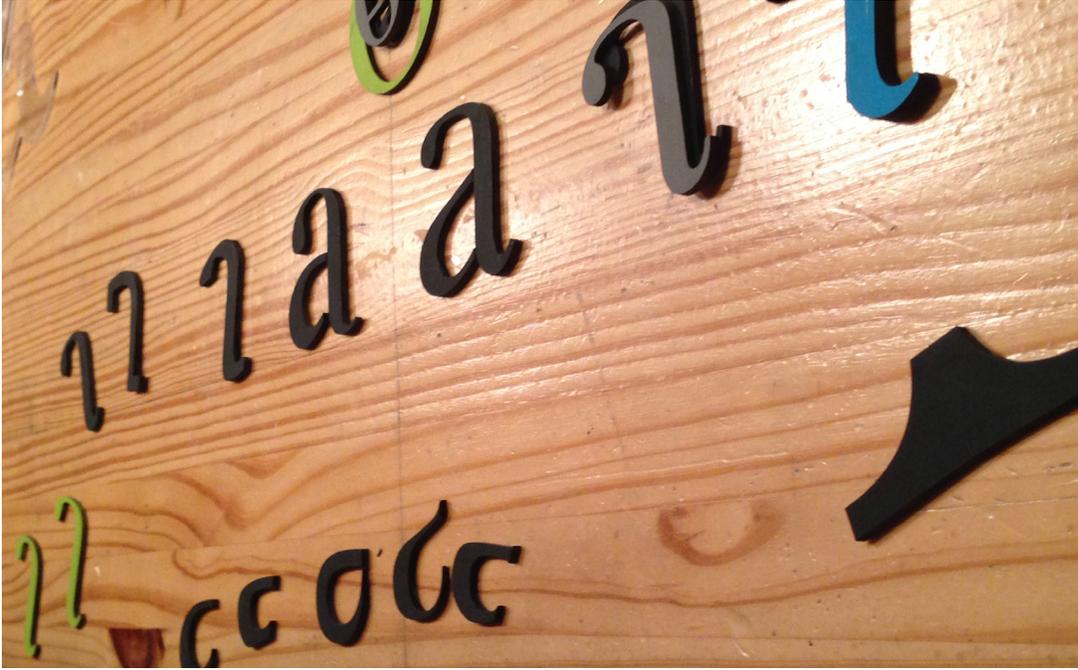


Figure 24. Classification game paper prototype.



Figure 25. Classification game paper prototype testing.

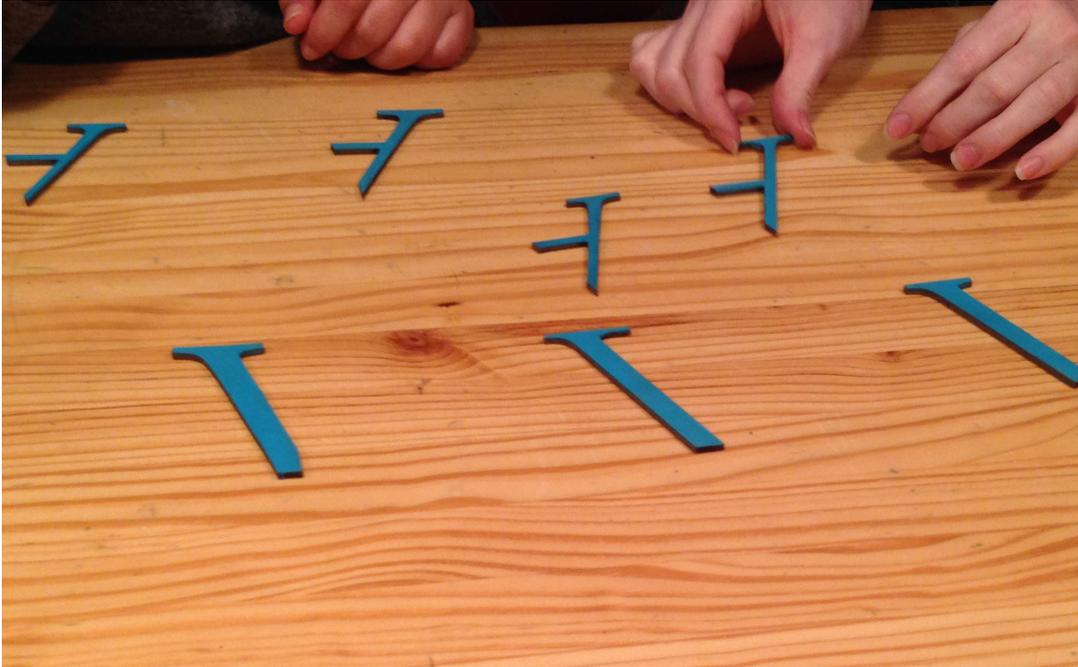


Figure 26. Classification game paper prototype testing.

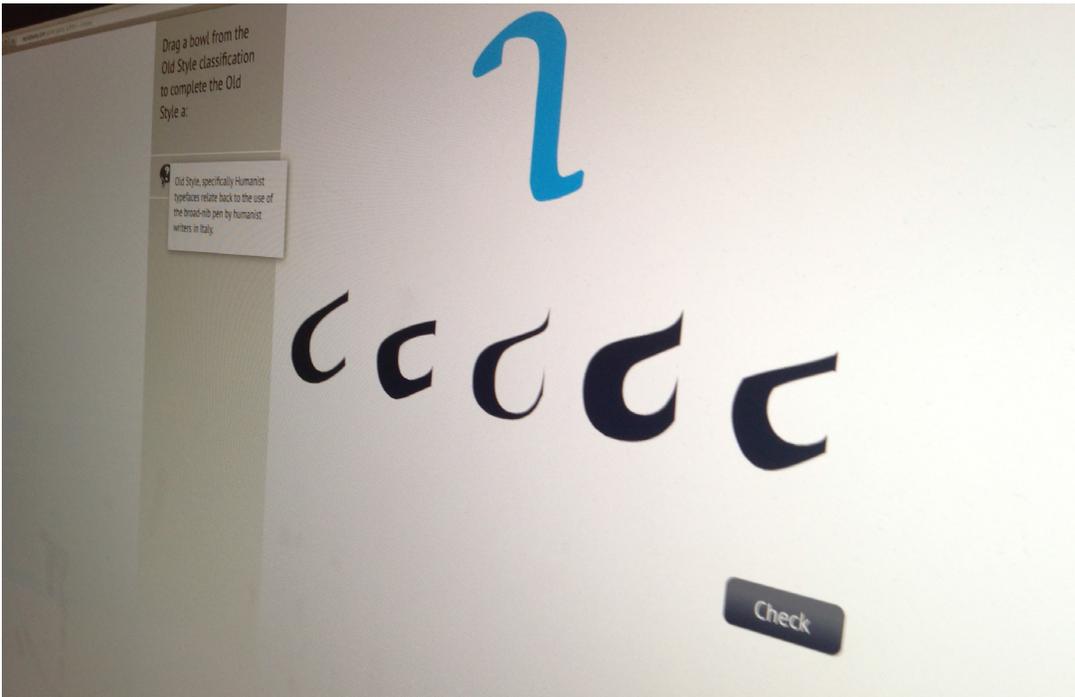


Figure 27. Classification game online prototype testing.

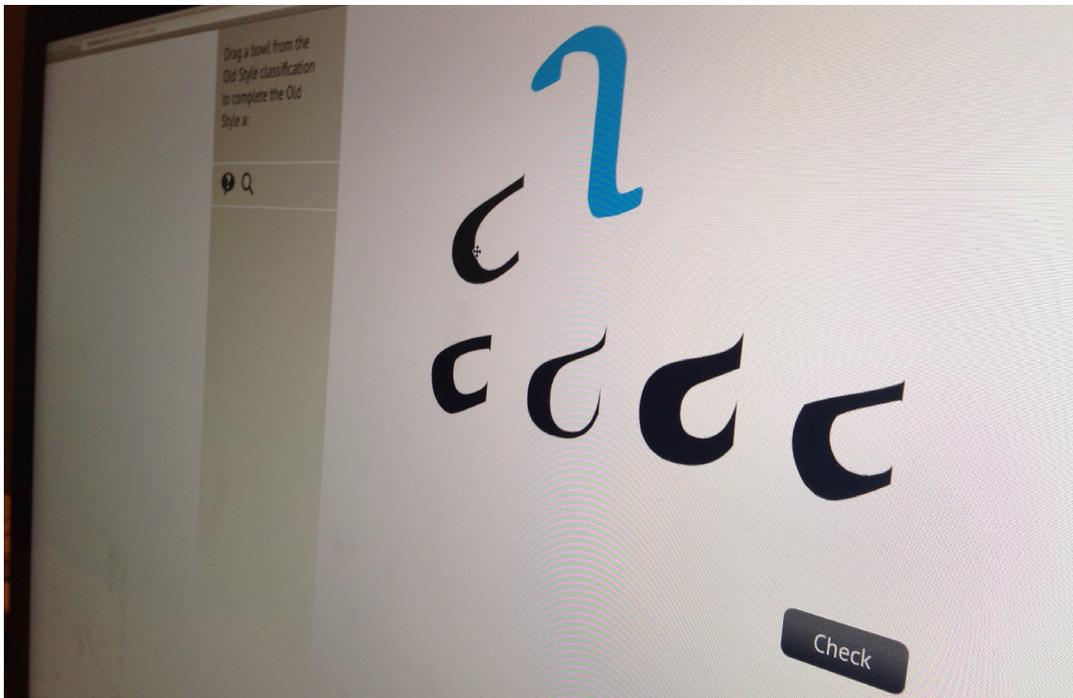


Figure 28. Classification game online prototype testing.

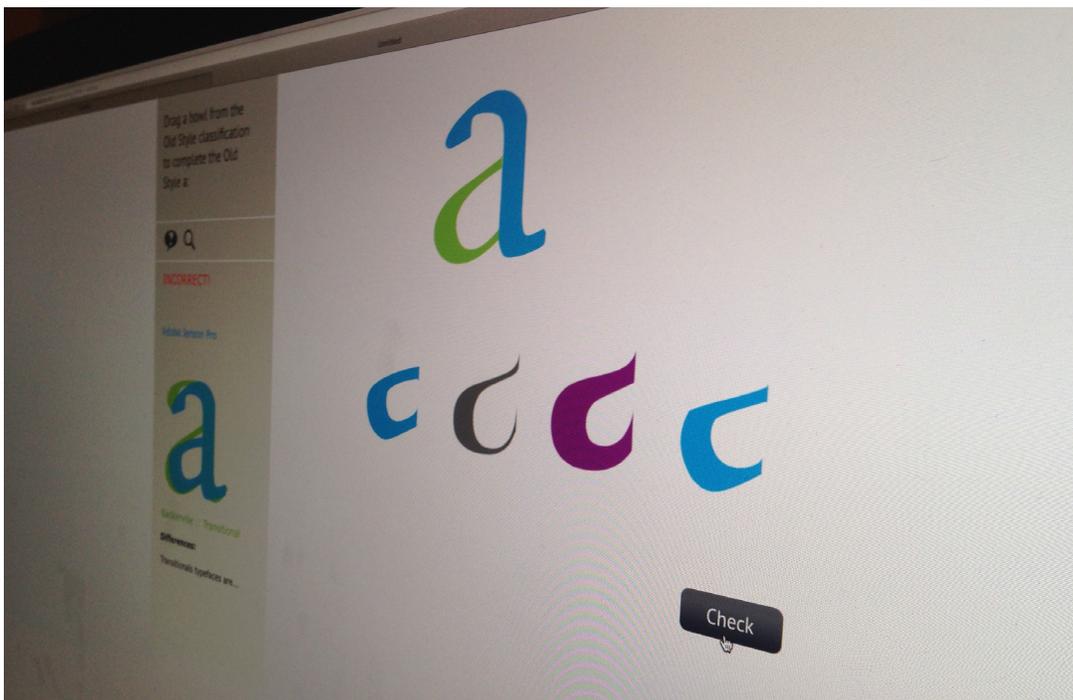


Figure 29. Classification game online prototype testing.

General Discussion Notes

The DNCD students picked typefaces on initial visual reactions or by choosing from typefaces that they had heard were good. Helvetica and Univers were popular among them all, and all but one DNCD student used “go-to” typefaces—a limited amount of typefaces that students believe would work in most situations. One DNCD had many fonts on a home computer, but still felt limited. While discussing CD typographic education, one DNCD student commented on wanting to understand more about why specific typefaces are suggested and discussed and what makes them good typefaces to be used. Another DNCD student wanted more accessible resources for design.

Feedback on Typefication

All participating students were excited about the potential use of a tool like *Typefication* and thought it would be helpful especially at the beginning of the CD Typography I course. General feedback and suggestions included (a) using the same sign-in as TRACS, (b) listing the country where each typeface was designed, and (c) allowing students to view peer work in a gallery. Storage of resources and the ability to research in a concise way were the favorite aspects of *Typefication*.

Feedback on the Classification Game

All participating students felt the classification game made them pay attention to small details, and found that it was a useful way to learn about the similarities and differences between typeface classifications. Three of the five students liked playing with the physical letters better. Of those three: One would like to play the physical game in class and use the online version to practice at home; another stated that it was fun to talk it out in person, but it was easier to see on the computer. Students generally agreed they

like a mixture of lectures and interactive experiences in the classroom. One DNCD student specifically commented on a preference to learn through interactive games, both physical and digital, because they make things “click.” All participating DNCD students agreed they would play the game online. Two of the DNCD commented through the online survey, that the web-based game is a great way to reinforce material learned in Typography 1, and one commented it would work great as a homework assignment.

V. CONCLUSION

“The only way to recognize successful typography is through informed, direct observation. It takes time, trial, and error to know what works and to lose anxiety over what may or may not seem ‘right’” (Kane, 2011, p. viii).

Digital natives need learning environments that engage them; only with engagement and connection can the DNCD student reach a level of understanding. By providing digital learning tools that organize important theories and content, as well as adding social aspects and content creation, DNCD students can have reliable sources of information to begin with and build upon. Furthermore, by limiting searches through the masses of online content, more time is spent engaging with the material.

Typography is a fundamental aspect of CD, and a developed understanding of it is necessary for the young communication designer’s future success. By developing and fully comprehending the typography knowledgebase, DNCD students will grow into professionals who can analyze, think critically, and apply this knowledge to typographic design—those who can justifiably become a part of the design discourse. Communication design as a profession will improve with more critical thinkers and fewer visual makers. *Typefication* can give DNCD students a focused place to learn, research, and interact with type as well as support higher learning and critical thinking.

This thesis sought to show that digital natives learn differently, and therefore different materials are needed to engage with them to guarantee the best learning outcome. *Typefication*, the online tool that was designed for this research, begins to fill this gap through enhancing the experience of learning fundamental aspects of typography

with an interactive environment where DNCD students can continuously engage with material and make meaningful connections.

Future Research

Beyond more research on the educational impacts of *Typefication*, the tool can be improved through more research into DNCD student behavior. To efficiently test and see the capabilities, a functioning prototype of *Typefication*, including history, type and tone games will need to be developed for testing, and the classification game prototype will need to be improved with more levels and functionality.

A sampling of DNCD students was helpful to guide future design and prototype development. Additionally a wider range of design educators, communication designers, and DNCD students can give more insights on the potential use and implementation of *Typefication*. Having a working interactive website will give the wider range of testers the means to judge what aspects of the tool are useful, enjoyable, and which are not and could obstruct its effectiveness. Future research into the digital native culture, and testing of the tool can lead into a finer understanding of how tools in other areas of design might help better prepare students.

Future investigations will include exploration of the following questions:

1. Can *Typefication* work at other institutions to help enhance CD typographic education?
2. Can *Typefication* help audiences other than the digital native?
3. Can *Typefication* be beneficial as an open resource on the web?
4. What other kinds of games and content can *Typefication* include to enhance CD typographic education?
5. What other areas in CD can digital learning tools help enhance?

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