Applying Interactive Design Artifacts to Design Education

Dan Tilden
Department of Computer Science
Virginia Tech
Blacksburg, VA
tilden@cs.vt.edu

Abstract
The role which “artifacts” play in design, and indeed the nature of such artifacts themselves are notably diverse. During a semester-long case study, we examined a variety of design artifacts and the ways they were able to impact the design process. Applying the knowledge gained, a prototype educative interactive artifact was proposed, one which is intended to teach students in higher education about design.

Keywords
artifacts, design, education, educational games, interactive fiction

ACM Classification Keywords
H.5.m Information Interfaces and Presentation: Miscellaneous

Introduction
To what does the term “artifact” refer, when used in the context of design? Are artifacts physical objects, such as the “wall” of “story cards” presented in [14]? Or are they, as suggested by [1], conceptual-embodiments of “psychological claims in contexts of use”? Do they represent an output of design, useful “for further reflection and development[6]”, inputs to the design process, or some combination?
Among the earlier research dealing with design artifacts is Carroll and Kellogg’s paper, Artifact as theory-nexus: hermeneutics meets theory-based design, published in 1989, which places the design artifact squarely as a conceptual construct, asserting that “HCI artifacts embody psychological claims in contexts of use: aspects of the interface engender psychological consequences and in this sense make claims about the user’s behavior and experience”, and that these claims can function as a medium for the study of design itself\(^1\). However, this concept can also be presented in the form of physical objects. For example, the authors of \[12\] did, placed such “claims” into an interactive, searchable, database, and Wahid et al. printed them onto a set of cards\[16\].

The concept of the design artifact as a cart set is exemplified in a variety of different products. For example, Roger von Oech created a card set entitled the “Creative Whack Pack”, similarly intended to give someone (what he termed) a “creative whack” when one is stuck\[15\]. Continuing in this tradition are the IDEO Method Cards, which are intended to both teach about various design techniques and to inspire\[7\], and Nathan et al.’s “Envisioning Cards”, intended inform the designer about four value sensitive design concepts\[10\]. Artifacts can also be intended as a physical communication medium, such as the “wall” and the “story card”, two such artifacts that “underpin the team’s activity” in agile software development \[14\].

Like the aforementioned claims database, some artifacts are intended to aid designers by providing them with pre-researched “patterns”. Such artifacts include the work of Sapponas et al., who created a database of “pre-patterns” as “structured collections of evidence-based research and design knowledge\[13\]”. Similarly, Lin et al. applied pre-built patterns to user interface design and created a pattern-based builder program for graphical user interfaces\[9\]. In a similar vein, Yahoo Inc. created a free set of design patterns applying to websites, called the Yahoo Design Pattern Library\[17\].

Artifacts can not only inspire design (that is, act as an input to it); they themselves can also result from design. In this vein, Fallman et al. suggest that artifacts represent the physical output generated by a design\[4\]. Fischer’s boundary objects are generally represented as output from design\[5\]. Harrison et al., as well, suggest that design methodologies act as producers for artifacts, useful “for further reflection and development\[6\]”. Building upon this, Carroll, Kellogg and Rossin proposed the notion of a “Task-Artifact Cycle”, in which “A task implicitly sets requirements for the development of artifacts to support it; an artifact suggest possibilities and introduces constraints that often radically redefine the task for which the artifact was originally developed\[2\].” In such a cycle, artifacts would naturally act as both an input to and an output from design.

A Generalized Definition
As we have seen, the roles of artifacts play are quite varied – some are intended to inspire design, others to educate about it, some as part of it, and still others as output from the design. Likewise, in terms of their nature, some appear to lean toward the conceptual, some to the physical, and some a mix of both. As such, a highly generalized definition is required, which allows for all of these variations. With all this in mind, the definition proposed here is as follows: An object, either physical, conceptual, or a combination of the two, that is used to influence or educate about the design process, or as part of the design itself.

The Role of Artifacts in Education
The concept of using artifacts in education is, indeed, not new. For example, the aforementioned design patterns are ostensibly intended to educate the user, as are the claims
databases. Consequently, we believe that via the application of the concepts derived from our work with artifacts, an engaging educational gaming experience based around the concept of teaching design can be constructed.

**Interactive Fiction**

Text-based games, now generally referred to as “interactive fiction[11, 352]”, place the player into a game environment which is both described and manipulated entirely through text. In the case of input, the player must use a set of textual commands, generally in a natural language. These commands are frequently simple imperatives such as “examine the object” or “take shoes”. An early commercially successful example of these games was Zork, first created by Lebling et al. in 1979 [8].

While work has certainly been done on electronically delivered artifacts, such as the aforementioned claims database, the even an iPhone version of the Creative Whack Pack, such systems remain electronic representations of static objects. With this in mind, I feel that the application of the concepts presented in interactive fiction to an interactive artifact set represents a compelling new direction for research into the design artifact. As the set is intended to teach about design, and consequently made up of design-related artifacts, it is referred to as the "Design-Artifact Nexus".

"Design-Artifact Nexus"

In "Design Artifact Nexus", players must navigate a number of varied "scenes". Each scene is intended to teach the player about a particular facet of design – similarly, in some respects, to the aforementioned IDEO Method Cards. It is intended to be used chiefly in higher education, as a supplement to existing course material; the aim is to bring a more dynamic, interesting, and potentially memorable experience to students learning about basic than what they might simply learn by reading a relevant section in a textbook.

**Conclusion**

During our case study, it became apparent that many artifacts were intended to educate users, whether design methods (e.g. the IDEO Method Cards), value-sensitive design (e.g. Envisioning Cards), or existing knowledge generated as output from past design experience (e.g. Yahoo! Design Patterns). Because of is, it was decided that focusing on education proposal would represent a solid direction for a future artifact set. Furthermore, based on past research, it is evident that increased interactivity has proved beneficial to education in some domains, such as programming [3]. By applying the concepts of interactivity and gaming to design-oriented educative artifacts, we feel that education of concepts in the design domain can be improved.

**References**


