Scenario Development as a Teaching Strategy in
Two Different Design Fields

Cindy Beacham and Neal Shambaugh

COMMON
GROUND

Scenario Development as a Teaching Strategy in Two Different Design Fields

Cindy Beacham, West Virginia University, WV, UNITED STATES
Neal Shambaugh, West Virginia University, WV, UNITED STATES

Abstract: Scenarios provide a teaching strategy to promote reflection on design tasks. Carroll (2000) defines a scenario as a written description of a setting, an intervention designed to improve upon an existing situation, and the results of that design. Scenario descriptions envision a continued cycle of design and reflection, and reduce the time between the two, what Carroll calls the task-artifact cycle. Two cases of scenario use are described in an interior design course and an instructional design course. Summarized are the similarities, differences, and recommendations scenarios as a teaching strategy.

Keywords: Scenarios, Design Thinking, Instructional Design, Interior Design, Task-artifact Cycle, Reflection

Teaching Design as a Design Problem

AN ONGOING CHALLENGE for any educator is deciding how to assist students in their learning. Educators must first be clear as to the range of learning outcomes, or What do students need to learn? Such a question prompts educators to make decisions as to the scope of a curriculum, which may involve knowledge, skills, and affective learning (e.g., aesthetic, appreciation). Educators usually have the freedom to decide how this curriculum is taught.

Across design education are three long-term questions that influence the scope of what is taught and learned; namely, What is design? How to think like a designer? How to design? Newcomers to any design field must grapple with the inherent dilemma of defining design. How educators define a design discipline frames the curriculum and how it is taught. How novice designers define their design field frames how they view design, a design process, design thinking, and their role with clients and constituents. Design thinking, while different across specific disciplines, invites professionals to frame design education as a set of competencies. Such competencies also drive a design curriculum and consequently what students attend to. The how-to question involves the application of competencies and resolution of the many design dilemmas between designer and client, and designer and process.

A more local concern of design educators is the design experience itself. Formal design education occurs most commonly in the course setting across x-number of weeks. The question of how to assist students in their learning still applies at the course level. Two of the realities faced by students, as they grapple with design definitions, processes, and applications, is that their design decisions have implications, that the context of their decisions provide tension with their view of the problem and response. Another aspect is more pragmatic, that even in a formal course setting, one's design response requires time for review and revision. A design educator, who understands the scope of what is to be learned, grapples with the design of an educational experience to help new designers (Schön, 1987). This paper describes how scenarios in two design education fields, interior design and instructional design, were used to help students experience how context mediates design and how to speed up the design-review-revise cycle.

Scenarios as a Learning Activity

Scenarios are common thinking tools for many education fields and corporate settings where information is missing or the future is uncertain. The use of multiple scenarios provides people with a range of results and pictures the implications of different actions (Schwartz, 1991, van der Heijden, 1996).). Scenarios are provided for the users. However, scenarios can be envisioned and written by the users or students in the cases described here. Carroll (2000) defines the use of such a scenario as a written description of a setting, an intervention designed to improve upon an existing situation, and the results of that design. Scenario descriptions envision a continued cycle of design and revision, and reduce the time between design and revision, what Carroll calls the task-artifact cycle. Scenario descriptions may be used at different times within the design process, depend-

ing upon the context of the design and the sequencing of design events.

For design educators student-developed scenarios serve to couple design thinking with design reflection to produce a design decision. Design thinking drives the intent to address a need. Reflection, meanwhile, is thinking about the implications of one's design. The outcome of this coupling is action, or subsequent design decisions. Scenarios provide a teaching strategy to promote reflection on design tasks in a wide variety of design contexts (Schön, 1983). They create a context for a project or provide opportunities to explore various approaches to a problem in order to allow for reflection and appropriate choices. Student exposure to scenario development may be limited to one encounter, or repeated levels of involvement may occur depending upon the instructor's desired outcome. They provide an opportunity for invested conversations to occur.

Scenario use in courses for two different design fields is described, including student learning, student perceptions of scenarios, and future scenario use. The implications of scenario use for design education will then be discussed.

Scenarios in an Interior Design Course

Course Features

The use of scenarios is relatively commonplace within interior design courses, however they are often created by faculty and used only as a backdrop for assignments but are not incorporated as a part of the learning strategy. The undergraduate interior design capstone studio (Contract Design 2) has taken a different approach and incorporated the creation and reflection of scenarios by students into the capstone activity. Students enrolled in this Contract Design 2 class have completed all previous coursework in interior design and are in their final semester of study prior to graduation. As a capstone course, expectations in this class are high and students must perform at a professional level to demonstrate mastery of their subject. They are also expected to display critical thinking and problem-solving skills commensurate with their academic level. As a result of the higher level expectations, scenario use was implemented to provide a method of expression for many of these skills.

One semester-long project is assigned for this studio experience. Students work individually and have 15 weeks to design and present their final project. Submissions required throughout the semester follow the standard contractual design process. Students have 5 deadline dates throughout the semester when they submit 1) programming information, 2) schematic designs, 3) design development details, 4) construction documentation, and 5) portfolio re-

views. Since 2006 an advocacy issue has been used to frame the project context and students have been asked to "design an interior space that would promote global peace". The assignment was introduced at the end of the Fall semester prior to the capstone class to provide "thinking time" for students to begin incubating ideas. Students return for Spring semester having spent time during their break thinking about the assignment and are ready to move directly into the project activities.

Scenario Use

Most students begin the semester with a very general idea of the people they want to "help" with this project. Classroom discussions are conducted about issues related to peace, and students grapple with the idea that peace has many definitions and is seen differently by different people and cultures. Additionally, they struggle with how spaces can affect global peace, and if an interior environment can effectively support this grandiose idea.

Students are asked to write a short description (scenario) of their project including their client, the users, the purpose of the space, and how the environment will promote global peace early in the semester. While students do not have explicit experience in writing scenarios, they are familiar with using scenarios from each of their previous studio courses. Scenarios are typically provided to define project parameters in design studios. Part of the expectation is to use this scenario writing experience to explore the wide variety of information required to "define" the client and the context of the project. Initial student descriptions are typically general, clients are not well defined, and the relation of the project to global peace is fuzzy. The one area often seen to have the most clarity is the user of the space, presumably because this is the area with which they have the most experience in controlling. Based on reflection and feedback, the scenario is continually refined to contain the appropriate information to proceed with the project. This part of the project helps students become more familiar with the types of information they must collect in future work to support successful design decisions. With the user and context defined in the initial scenario as the foundation, students move forward with the research requirement of the project.

One primary requirement of the project is that the design must be "evidence based". Evidence-based design uses research as a foundation for design decisions, and to inform the designer regarding valid considerations for design approaches (Hamilton, 2006). Within the 15-week semester, students do not have time to conduct original research and apply the findings to a project. Consequently, students are re-

quired to discover and use existing research at each phase of the project to inform their design decisions, and to help them clarify their thinking regarding all aspects of the project. Students explore research on many topics as they struggle to grasp the broad areas that impact peace. Some of these topics include peace organizations, specific issues contributing to peace, laws and regulations, individual people, and data specific to their chosen context such as spiritual spaces, women's shelters, and educational facilities. As students learn more about the population they want to serve with their projects (as identified by their users in the scenario), their vision of the project begins to become more concrete. At this point, upon completion of the first phase of the project, students are asked to revise their scenario to more closely align the narrative with their project approach.

The scenario becomes a vehicle for clarifying their thoughts and for updating the project parameters based on research and "reality" issues as they design. For example, students typically begin with a scenario that describes a design project requiring a much larger facility than they are able to design given the parameters of the project (spaces must be no larger than 15,000 square feet). Through the act of creating schematic designs and conducting research on design requirements for specific types of spaces, the scenarios change to reflect a more reality-based view of the project. These changes manifest in a variety of forms. Some students decide to change their client and context altogether. But at this stage, the changes are more often spatially-related and usually include focusing services more tightly or reducing the types and number of services offered by the client to reduce square footage of the space. One space that is often removed from facilities is a gymnasium type of space. Interestingly, the need for an indoor gym is a common item initially identified in programming. Once students understand the spatial requirements for this type of amenity, it is often removed and square footage is made available for spaces more relevant to the specific client. Throughout this process, the scope of the project often changes significantly. Without research, reflection, and scenario writing, these changes would proceed unexamined and undocumented. Finally, students are required to present their final work, and justify, both verbally and in writing, their design decisions based on the elements described in the scenario, and research that guided their approach.

Student Learning

Student learning outcomes for this course center around creating viable designs within a context of advocacy that are research-based. The scenario is a vital part of these outcomes because it is the vehicle

used to document and reflect upon these elements. Students begin with a very general idea that identifies their initial ideas about the project. This first scenario "makes the project real", but also points out the deficiencies in their thinking. Through research, class conversations, and peer critiques, each project becomes more clear and detailed in the students' minds. The classroom becomes a safe space for exploring ideas and receiving feedback on project options. As the project progresses, clarity about clients, users, and the relationship between the spaces and global peace increases, and is reflected in the updated scenarios. Each student must share the "story" behind the project in their final presentation, bringing their scenario full circle and tying it to the learning continuum of the project. Finally, students are required to keep a journal of their semester journey, and are asked to reflect on the development of the project as a final entry.

Student Perceptions

Students guide their own learning in this activity. They create the client, the setting, the user, and the design. Faculty act as mentors and provide a context for the project and directions to keep students on track. As a result of this high level of self-direction, students are typically engaged and invested in this project, and are visibly excited about the outcomes. Some of the comments shared in reflection journals include:

> "I'm totally convinced that as designers we have a significant role in affecting world peace"
> "We can't create world peace in one day, but we can cause change"
> "This project made me realize that the concept of peace extends beyond 'fighting'"
> "We can make change happen! I realize that we can spark change through our designs"
> "Peace when I started was something I could not understand. Since it never happened, I couldn't grasp the concept of global tranquility. Now I see it is less global and more personal. It's about how you can help someone to help someone".

The student comments above reflect the increased understanding of their responsibility to use design and the associated scenarios as an advocacy tool. Obviously students embrace this type of project to different degrees. The course within which this project is situated is the interior design capstone course, so all students understand the critical nature of the scenario in the development of a successful project. With this said, some students are more engaged than others. For example, one student wrote a scenario for a boarding school in Switzerland to serve young

children ages 5-7. While the scenario was clear and the student defined each part of the context well, the design solutions did not reflect a developmentally appropriate design for the age group. In this case, as in others, the scenario itself was understood and ultimately done well, but the subsequent design decisions did not reflect the client and context clearly articulated in the scenario. However, the majority of the projects (approximately 25 out of 28) used the scenario tool to clearly define the client and context, created an initial design approach, then through reseach and reflection, refined both the scenario and the design to more fully meet the client needs in the final project.

Future Use

Based on the apparent success of scenario use over the past 3 deliveries of the Contract Design 2 course, we will continue to involve students in their learning with this method. Opportunities for expanding the process and integrating scenarios with other curricular activities are abundant. Each interior design student is required to study abroad, so using the scenario within the class to create a connection between the abroad experience and the course may provide further integration of experiences. Using scenarios as part of online sharing activities may also improve the thinking and reflection about project development. Additionally, the use of a scenario or scenario sequence over the course of an entire year to create more continuity between coursework may be beneficial, as would using the scenarios to connect students in different courses at the same time. Scenarios as a base providing a common context among students may expand learning, integrate curriculum, and support greater inter-major communication within the program.

Scenarios in an Instructional Design Course

Course Features

Scenarios have been used in a master's level instructional design (ID) course since 2002 (Shambaugh, 2002). In this course students identify an instructional problem of their choice and design a response to this educational need. Shambaugh and Magliaro (1997) is used as the text, which provides the instructional sequence for the course and matches an ID model used for teaching a generalized ID process. The phases of the ID process include Learning Beliefs, Design Tools, Needs Assessment, Instructional Sequence, Instructional Frameworks (teaching, assessment, technology), Prototype, and Program Evaluation. The first two phases in the ID process, Learning Beliefs and Design Tools (principally ID mod-

els), are used to establish the context for the traditional ID process. Design-A-Lesson and Learning Principles tasks help students to reflect on how they currently plan instruction and their views on learning. Students draft a Mission Statement, which is used to assess how students' learning beliefs are being applied in their projects. Students receive an overview on different ways that ID can occur from linear approaches to circular processes, and those designed for newcomers to those designed for expert (Shambauagh & Magliaro, 1997). The reason this survey of model types is done is that students typically view a model that is used for the basis of learning ID and view it as the only way to actually perform ID. Students develop a visual of their own ID model and provide an explanatory narrative (Shambaugh & Beacham, 2003) in order to make their own decisions about what a model should include and how it should work for them.

Students identify an instructional need and record their initial understanding of the problem through an Intent Statement. Prior to a needs assessment, students are asked to write a scenario envisioning a successful implementation of the project. The subsequent Needs Assessment phase structures students' research into the instructional problem and options for addressing it. Based on their research in a Needs Assessment phase, students identify goals for their project and revise their original design intent, including a revised scenario description. Students are then introduced to design phases, which included Instructional Sequence, Instructional Framework (e.g., teaching, technology, assessment options), and a Prototype instructional product (e.g., unit, web pages, tutorial, workshop activities). Program Evaluation introduces students to criteria used to evaluate the success of their prototype. During the final week of the course students revise their personal ID models and submit a written self-evaluation of the course and their learning.

Scenario Use

Students develop initial scenarios, revise scenarios, and submit their perceptions of the scenario task. Prior to conducting a needs assessment for their ID project, students develop a scenario description in a class session using work groups composed of individuals with similar projects. In essence, this task allows students to get down on paper "This is what I want to do." This initial group writing and sharing provides students with a draft from which to individually revise and submit the following week. This initial scenario description submission consists of three sections: a "Vision statement" describing a successful implementation of their design, a "Reality" statement

qualifying the constraints on the vision, and "Next Steps" or new design decisions.

During needs assessment, students conduct research on the content to be taught, the range of learners, and the reality of the context (i.e., context analysis). Outcomes of the needs assessment include a revised Project Intent document, which summarizes the major features of the proposed educational intervention, including project goals and a revised scenario. A table is used to summarize the students' instructional problems and overall design strategies. For the educator this table provides a general sense of what students are writing in the initial (pre-needs assessment) and revised scenarios (post-needs assessment). To assess the value of the scenario activity students were asked to record their perceptions of the scenario activity. Two questions were asked: "In what ways did the scenario activity and the re-write help your thinking? How can we make this a better activity?"

Student Learning

From the initial scenario activity, students have written more clearly about what they wanted to accomplish with their project than in their first design activity, which asked them in week one of the course to identify an instructional need and how they would address this need. Student submissions are reviewed for the specific details on how their original intent was revised and how the changes can be implemented. In the "Next Steps" component, students write about adjustments to their original ideas. For example, changing grade level from middle grades to fifth grade based on the person's teaching experience and learner needs in that grade. Several students make critical decisions as to their learners. This has been most common with students who were teachers. These teachers wrestled with this question: Were the learners students in their classrooms or teachers like themselves? Several students wrote about the tensions they felt in their Vision-Reality statements, such as helping their students to learn the content, balancing software skill learning with its use in learning other content, deciding "who are my learners?" and searching for different ways to teach. The forms of the scenario written by students generally involves a first person statement of "this is what I want to do."

The revised scenario description includes shorter scenario descriptions. These revised scenarios, which are submitted after conducting a needs assessment, include details on new teaching or assessment approaches, such as the use of games for teaching multiplication, 3-D geometric worlds, and reflective journals (as opposed to a workbook). Design strategies include specific details on length of the intervention, target learners, and specific activities for the teacher and the student. The form for the scenarios tend to evolve from the "this is what I want to do" to an increasing use of narrative to depict the implementation. These narratives may consist of several points-of-view, including Class Scenarios, in which the scenario described how teaching unfolds. In addition, some scenarios focus on a hypothetical Student Case or Teacher Case, and the specific use of innovative Learning Activities. Some student scenarios focus on both short-term and long-term goals, and are more future-oriented.

Student Perceptions

Students report that the scenario activity gives them an opportunity to visualize and re-evaluate their original ideas, to "edit the dream," as one student wrote. Several students wrote about the value of talking in class and then rewriting their notes to link ideas, throw out others, and articulate the words for the instructional problem. One student commented that the task "made me really push myself to identify resources and constraints," while others commented that the scenario "helped me to think more deeply and to think about the activity differently." The group activity where students paired up to discuss each other's vision for their project reported the value of "bouncing ideas off of another," that the conversation "sharpened my own sense of what I am doing." An interesting comment worth noting was that "I viewed the project from the *outside* and having to tell others helped me to think more about the details."

Future Use

Based on the analysis of the initial scenarios, students wrote more clearly about the instructional problem than earlier attempts and identified specific intent that became goals for their ID project. As students generated goals prior to a needs assessment, these initial goals could be used to structure their subsequent analysis activity. An interesting question is to what extent should needs assessment be modified or even eliminated? This option may be worth considering in actual development work in which team members employ scenarios in a continual cycle of design-reflect-reframe. However, the value of needs assessment as a tool in an introductory ID course to learn more about content, learners, and context still appears useful (Smith & Ragan, 2005).

One student asked that scenarios be implemented earlier than the fifth week of the course. One possibility for future ID instruction would be to forefront a scenario in class sessions to help students experience each phase of instructional design. A multimedia counterpart to the scenario might be considered for use out-of-class or online use to simulate collab-

orative design-reflect-reframe activity. Wiki use has been pilot tested over several deliveries of this course and the results have been that group activity would benefit most from an online Wiki site, while solo projects invited less useful feedback, as the peers were not invested in the projects of others (Shambaugh, 2003).

Another adjustment for future use would be to increase the use of scenarios in design teams. This might be effective if a class-based instructional problem or case study is used for ID instruction. Scenarios as design artifacts provide for designer reflection and dialogue (i.e., participatory design) through ongoing cycles of designing, reflecting, and reframing of the design problem based on growing understanding of the instructional problem and awareness of options and realities. One implication of scenarios is that some aspects of design decisions will be made explicit, while other aspects remain implicit and one may be unsure as to which occurs in these descriptions. Acknowledging that scenarios are limited by their incompleteness, they may still provide rich descriptions of the complexity of design work and how the designer views the problem and subsequent design response. Students seemed to value the activity. One reported that "when we start sharing, our thinking becomes clearer and additional ideas surface." Another student commented that the task forced her to admit that she needed to think more about the problem and during the re-write identified new ideas or places to search. Such statements suggest that the scenario merits consideration as a learning activity, particularly when connected to needs assessment phase of instructional design.

Implications of Scenarios Use for Design Education

Novice designers tend to propose a solution to an instructional problem without a clear understanding of the problem (Shambaugh & Magliaro, 2001). However, reflective critique of these decisions is frequently removed from design activity. For example, in classroom settings in which instructional design or interior design is being taught, students typically hand in design work and make revisions based on instructor feedback. This traditional form of learning activity, however, distances students from thinking about responsive design decisions, those that directly impact learners. Development work, involving teams of designers, users, and developers, typically involves periodic or benchmark reviews, but these may be limited to specific technical features of the work without appraising the overall potential of the design to address learner needs.

Interior Design

Interior design students often find themselves in a reactive mode when receiving project assignments from faculty, or project information from clients. It is important to help them understand their role in interpreting information and moving beyond given data to provide creative suggestions and designs. By using scenario development, students learn to inform themselves through stories that continually evolve through a project.

Scenarios are not static, but change continually. This change reflects the continual learning and adjusting necessary to create successful design projects as a student or professional. A pro-active approach to learning, interpreting, and designing, as provided by scenario creation, gives a designer more opportunities to present options that reach beyond the scope of a given project. This approach also provides different contexts within which to perform work. For example, students begin to understand their ability to incorporate advocacy and education into their projects, which ultimately helps their clients and possibly a much larger population.

Instructional Design

Used in an ID course, scenario construction becomes a learning task within different phases of ID. In this way, ID novices build on what they know and reflect on the design *as* they design. For example, on the basis of a scenario description of a proposed educational intervention during needs assessment, novice designers will be asked questions and prompted to learn more about the instructional problem. From what is learned from needs assessment, students revise their initial scenario description, which is the basis for subsequent questioning, reflection, and design moves. Thus, scenarios provide a tool to envision a learning situation and what might occur in these envisioned settings. Scenarios provide an application of the situated perspective, that "… learning [is] a continuous, life-long process resulting from acting in situations" (Brown, Collins & Duguid, 1989, p. 33).

One of the difficulties of studying teaching interventions is the inherent conflict between teaching and research, or studying one's teaching. As all students were afforded the opportunity to write a scenario description, it is difficult to know to what extent the intervention can be attributed with improved design decisions. The baseline for comparison are the developmental research studies conducted on this course from 1994 to the present and summarized in Shambaugh and Magliaro (2001). During this collaborative work, we observed student difficulties with clearly expressing the instructional problem while they designed. Students have mixed performances

during needs assessment, some rather resistant to the complexity of the activity, while others had difficulty in taking the data derived from the needs assessment and incorporating their findings into their subsequent design decisions. The scenario strategy was tried to prompt student thinking and reflection on design tasks during design activity. Although scenario descriptions were implemented prior to the design phases of the course, we found that students responded to the ID process on the basis of their initial design intent. Peer sharing and online critiques are two ways to help students learn from others and both speed up and improve their design revisions.

Across Both Design Courses

Many commonalities exist when evaluating the use of scenarios in different types of design courses. These commonalities occur at the educator level, the course level, and the student level. Each has different implications for learning, but all are beneficial to the individuals engaged in the experience.

If design thinking and design processes are valuable in any design field, then educators need to look at how this type of thinking, competencies, and practice are addressed across course and practicum experiences, and overall program requirements. Design educators must see curriculum as a holistic system as opposed to a set of linear experiences. By using scenarios to consider how students experience design thinking across courses and experiences, educators can create consistent, continuous learning opportunities.

The design of courses may include scenario development not only by the students, but also by the educator. Scenarios can help educators think through vital elements of a project or activity, and may also provide students with greater clarity in exploring the context of a project. Different views of a problem or challenge may be evaluated, and different methods of problem-solving may be explored.

From a student standpoint, scenarios allow designers to rethink a design process for specific problem-solving situations and contexts. Changing, reorganizing, and visualizing options in a scenario format gives a chance to try new possibilities in a safe environment in a relatively short period of time. The exploration of more possibilities provides the chance for greater success in the final design. Scenarios are also helpful in speeding up the Design-Reflect/Review-Revise cycle. Academic settings are typically bounded by a 15-week semester or 10-week quarter system, causing scheduling concerns with regard to learning opportunities. The use of scenarios addresses the de-coupling of reflection from design. Scenarios record an envisioning of an approach or tentative solution and record our human tendency to move straight to a solution. Designer-constructed scenarios, tapping existing experience and information, provide condensed descriptions of proposed solutions to instructional problems. Scenarios, according to Carroll (2000), are concrete in that they propose a solution, but are also flexible as they are incomplete and easily revised. Scenario descriptions communicate a vision of intent in the context of what the designer knows. Analysis of the scenario, or claims analysis as labeled by Carroll, provides a means to evaluate the solution and improve upon it. Additionally, by creating and revising scenarios across a learning activity, students are being encouraged to reflect more fully on the design task with which they are engaged.

Conclusion

This paper has identified and discussed two separate uses of scenarios within academic design courses. Each has unique reasons for use and somewhat different expectations of outcomes, but both achieved the same goal: student engagement and deeper reflection on the learning process. Student perceptions of the activities support the use of scenarios to give deeper meaning to academic tasks, and to allow for greater investment (and ultimately learning) within a bounded academic timeframe. The use of scenarios may be expanded to increase the benefits across programs, and may also be expanded to create stronger interdisciplinary ties among different disciplines.

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About the Authors

Dr. Cindy Beacham
I worked as a corporate designer, construction manager, and project manager prior to my work in academia. I have been teaching at the college level for over 15 years, and my teaching areas include contract design, codes and construction, and design theory and concepts. My research interests include design pedagogy, developmentally appropriate design for children, and sustainable design. I am also a co-author of a textbook on interior design professional practices.

Dr. Neal Shambaugh
I have been a radio announcer, training program consultant, and video producer. I have taught in higher education for 14 years. My teaching areas include educational psychology, instructional technology, and teacher education. My research interests include novice problem solving, instructional design, and visual literacy. I am the co-author of two books on instructional design.

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