From Just-in-Case to Just Enough: Redesigning Software Training Materials According to the Principles of Minimalism

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Abstract: Learning new software applications can be daunting enough for some adult learners but when confusing materials are added to the mix it can increase to their frustration. This paper explores whether the use of minimalism in the redesign of these materials could help improve the usability of an existing course.

Introduction

In the attempt to provide thorough training in the use of a proprietary software system used by financial advisors to perform analyses of clients' portfolios it appears that the training created was, in fact, overkill. The intent of these materials was to provide a comprehensive training experience for the advisors, but instead of helping the advisors learn the system, the training materials appear to be a hindrance. The training materials consist of a 90-page reference guide and an online course. The manual provides comprehensive documentation of the system. The online course is divided into three 30-45 minute modules targeted to beginning, intermediate and advanced users. The manual and the online courses provide much "just in case" information. Comments have been received from the advisors that indicate that they are intimidated by the manual and even though it has a table of contents and index, the users say it is difficult to find the information needed. The chief complaint about the online courses is that they take too much time to complete and retention is poor. Could using the minimalist model to redesign these materials increase usability of the reference manual and improve retention for those completing the online courses?

What is Minimalism?

Minimalism, sometimes called the minimalist model, is an instructional design approach by John M. Carroll that focuses on creating effective training materials and user guides to support computer applications. Minimalism focuses on the need to create materials that build on learners' past experiences and knowledge. Minimalism is learner-centric as opposed to instructor-centric. "It is in the constructive tradition of Jerome Bruner's discovery learning and Jean Piaget's genetic epistemology" (Leonard, 2002, p. 129).

Carroll derived the minimalist model by observing the problems encountered by new users of computer applications in a controlled environment as they tried to work with the instructional and user materials that supported the applications. His basic assumption was that adult learners have "low tolerance for being guided through a process in detail and for having to read through a great deal of content before performing a set of tasks" (Leonard, 2002, p. 130). Developing content within the minimalist model means creating a concise set of task-oriented information that allows the learners to get up and running quickly on the computer activity they need to perform on the job (Leonard, 2002).

Carroll (1984) found that teaching materials often overwhelmed the learner, learners by-passed reading materials in an effort to get the computer to do something, learners ignored what they didn't understand and proceeded to the next lesson, and screens were not observed because learners were busy looking at training manuals. Carroll developed the minimalist approach to instructional design in an attempt to solve these problems by cutting verbiage, adding more tasks and hands-on activities, anticipating learners' errors, and allowing learners to guide their learning activities (Carroll, 1984).

> Our strategy in developing training designs was to accommodate, indeed to try to capitalize on, manifest learning styles, strategies, and goals. We were struck by the observation that training

material itself often precipitates learning problems. We became committed to minimizing the obtrusiveness to the learner of training material - hence the term *minimalist.* (Carroll, 1990b)

Minimalism tries to support what the users feel they need in order to learn (Carroll, 1990a). New users of application systems are trying to use a tool they have been led to believe will help them do their own work. They are not learning for learning's sake (Carroll, 1990b). In minimalism, training should involve real tasks. "If learners want to undertake a particular activity, letting them try to do it is perhaps the best design step we can take" (Carroll, 1990b).

The minimalist approach has its origins in the study of people's learning problems with computer systems, and its foundations in the psychology of learning and problem solving. When applied to technical documentation such as manuals, online help, and performance support components, it can make learning to use a computer application more efficient. The minimalist approach is based on what people do spontaneously to find meaning when learning something new. It supports the rapid achievement of realistic goals from the start. It emphasizes the importance of designing for error recognition and recovery as basic instructional events (Pemberton, 1998).

"The Minimalist philosophy gambles on the expectation that if you give the learner less (less to read, less overhead, less to get tangled in), the learner will achieve more" (Carroll, 1984, p.125).

Principles of Minimalism

An overview of the four major principles of minimalism and their corresponding heuristics is shown in the table below. These are "guides for thinking about instruction rather than prescriptions to be followed strictly" (Van der Meij & Carroll, 1998).

Principle	Heuristic
1: Choose an action-oriented approach. People trying to learn a skill are eager to act, to do something meaningful. Minimalist instruction is always action oriented.	**1.1: Provide an immediate opportunity to act.** Minimalist instruction designers must invite users to act and support their action. Give the reader less to read but more to do. **1.2: Encourage and support exploration and innovation.** Users should always feel in control of their activities. These are not unguided explorations. Strive for a balance between open-ended activities and meaningful projects. Use language which invites users to explore. Consider users when offering suggestions. Focus on student evaluation more than expert evaluation **1.3. Respect the integrity of the user's activity.** The moment-to-moment goal of the user may be unsophisticated and short-term.
2. Anchor the tool in the task domain. An application is a tool to achieve an objective for which the application is designed. Non-minimalist instructions are often written as if the tool were the user's objective. Instruction tasks are selected from the core tasks of the application domain.	**2.1: Select or design instructional activities that are real tasks.** Instructional activities should be instantly recognized as genuine, but they may be modest. Users must have prior experience of the task domain. **2.2: Create components of instruction that reflect the task structure.** Use headings to convey many procedural elements of instructional tasks. Headings also help users locate information for reference purposes.
3: Support error recognition and recovery. Learners spend 25-50% of time making and recovering from errors. Reducing mistakes and aiding detection diagnosis and recovery will reduce frustration. Provision of error information takes a special place in	**3.1: Prevent mistakes whenever possible.** The best way to remedy some mistakes is to prevent them, by including hints in the manual, by rewriting sections, or by blocking. **3.2: Provide error information when actions are error prone or correction is difficult.** Recovery from errors can be by reconstruction or correction. Reconstruction implies recovering from a backup state. Correction

Minimalist instruction; more is better. User mistakes help the learning process.	implies fixing without backtracking. **3.3: Provide error information that supports detection, diagnosis and correction.** Detection can be triggered internally or externally. In diagnosis the user decides what type of error was made. In correction the user sets a new goal. Minimalist instruction manuals support all these processes. **3.4: Provide on-the-spot error information.** Error information should be as close as possible to where wrongly executed actions happen. Users exploit and explore error correction out of curiosity.
4: Support reading to do, study, and locate. Readers do not systematically process instruction from start to end. Sometimes they read to study, sometimes read to locate, but mostly they read to do. A small group will read the manual from cover to cover. Others start at the beginning but abandon it for random browsing. Another group uses the manual as a last resort when stuck. Avoid giving the manual a massive appearance; minimize the content.	**4.1: Be brief; don't spell out everything.** Users are not seeking explanations for their own sake. Create chapters of two to four pages that take a short time to work through. Omit information that is easily inferred. Don't give full screen information. Brevity communicates that the task is not difficult and stimulates users to think and use prior knowledge. **4.2: Provide closure for chapters.** Chapter independence is not possible, but chapter closure helps. Provide a home base for starting and ending tasks. Repetitions often concern fundamental tasks.

Table 1: Principles and Heuristics of Minimalist Instruction
(Graham, 2000; Van der Meij & Carroll, 1998; Van der Meij, 2003).

Rationale for using Minimalism in the Redesign of Materials

The audience for the training materials is adult learners. They are not learning for learning's sake; they are attempting to learn to use a software tool that can help them as they strive to serve their clients. The learners are generally engaging in "just in time" learning. They are accessing the manual or viewing the online course in order to prepare to use the system or find the answer to an issue they are facing that needs to be resolved if not immediately, then certainly in a timely manner. These learners are also busy professionals, many are running their own business and don't have a lot of time to spend on training activities. Karapnuik (1998) offers a nice summary of Knowles' theory of andragogy, adult learning.

Knowles posits that adults are self-directed and expect to take responsibility for decisions. Therefore, adults can be expected to take responsibility for their own learning. Instruction for adults needs to focus more on the process and less on the content being taught. The designer of adult learning must keep in mind that adults need a valid reason to learn something, they learn experientially, they often approach learning as problem-solving and they learn best when the subject they learn can be immediately applied. (p. 3)

The minimalist model was developed to support adults learning technical information and it supports the theory of andragogy. Minimalism anchors instruction in the task domain which means that instructional activities are created from real tasks. This allows learners to focus on the content, the "how to" of software instruction, and apply it to a real world application to their work. Minimalist materials use an action-oriented approach and provide an immediate opportunity to act which correlates to adult learners' need to immediately apply what they've learned. Minimalist materials support error recognition and recovery and are designed to support 'doing" which supports experiential learning. Ginns, Hollender, and Reimann (2006) reviewed the minimalist instructional design model and found that across a broad range of instructional domains, adult learners using materials designed according to minimalist principles outperformed those who learned using a traditional system-centered approach. "Minimalism is a natural approach for those seeking a rapid path to productivity, while using a new system, device, software package, or technical concept" (Mkpong-Ruffin, Germany, and Seals, 2006, p. 1354).

Minimalism in Online Training Materials

Pratt (2001) was trying to "identify which instructional models could be adapted for use in an online setting" (p. 376) and found that minimalism could be used even though it was designed for training manuals, not online instruction. "Minimalism's 'less is more' approach is directly applicable to the limited availability of screen space in online instruction" (p. 377). Din, Karim, and Osman (2004) used the minimalist approach when designing instructional materials for a computer mediated communication tool and found it proved to be a means for student-centered activities. They found "the minimalist approach of introducing computer mediated communication … as a complementary process to assembling students' experiences in their reports and posting it to the system have promoted students' thinking skills" (p. 1149). Mkpong-Ruffin, Germany, and Seals (2006) experimented with using a minimalist tutorial to teach key object oriented programming concepts and found that their overall planned target levels were met. The majority of the participants thought the tutorial was easy to use and the information included was sufficient. The participants were also able to retain the information presented. Amiel and Cline (2003) conducted a study in which participants used an online tutorial designed using minimalist principles and found that the tutorial was an effective method of learning. Their participants were able to use the tutorial to complete each benchmark task. "The results of this study indicate the principles of minimalism provide a strong framework for the design of self-instruction" (p. 2631) and the participants were positive about the experience.

Extreme Makeover: The Proposed Solution

Using the minimalist model, the materials would be broken into task-based chunks so that advisors could access only the information needed without having to wade through a plethora of information that is unimportant to them at the time. In the redesign of the manual, the amount of reading could be reduced to just the essential steps needed to perform the tasks. The current manual could also be divided into two or three manuals so that new users are only presented with the information appropriate to them and experienced users are not forced to wade through material they've already mastered. Another alternative would be to change the format from a traditional manual to one based on online help. The online course could be broken into task-based mini-modules. The advisors could then spend a few minutes viewing the information needed instead of being forced to sit through the entire course. The existing courses would be retained so that any advisors who wanted to see the "big picture" instead of only focusing on the task at hand would still be presented with that option. Users of both versions would be surveyed to compare satisfaction with the two versions. The advisors would also be given the choice of whether to access the written materials or the demos of the tasks being performed, or both. An iterative development cycle will be used in which advisors will be contacted to review the design and content to provide feedback so that the final materials support the usage of the system and meet the advisors' instructional needs.

Conclusion

The audience for this course is busy professionals who are trying to learn to use a new software tool while managing their business and serving their clients. They don't want to browse through a large manual or sit through a course to find just the information needed to get them started using the system or find the answer to a problem they've encountered. Since the minimalist model was create to serve adult learners who were learning to use computer applications it makes sense to use this model in the redesign of the materials. Even though minimalism was initially used in developing manuals and instructor-led classes, evidence shows it can also lend itself to the development of online support materials, such as help systems and courseware.

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