Agile Software Development

SECOND EDITION

The Cooperative Game

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Agile Software Development Series

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AGILE SOFTWARE DEVELOPMENT

A third use of flipcharts as information radiators is to show the results of the project's periodic *reflection workshop* (Figure 3-10). During these one- to two-hour workshops, the team discusses what is going well for them and what they should do differently for the next period. They write those on a flipchart and post it in a prominent place so that people are reminded about these thoughts as they work.

The wording in the posters matters. One XP team had posted "Things we did wrong last increment." Another had posted "Things to work on this increment." Imagine the difference in the projects: The first one radiated guilt into the project room and was, not surprisingly, not referred to very much by the project team. The second one radiates promise. The people on the second team referred to their poster quite frequently when talking about their project.

Figure 3-10 Reflection workshop output.

(Courtesy of Joshua Kerievsky, Industrial Logic, Inc.)

Periodic reflection workshops such as these are used in Crystal Clear and XP projects.

A fourth use of information radiators is to show everyone the user stories delivered or in progress, the number of acceptance tests written and met, and so on. (Figure 3-11).

The systems operations team at eBucks.com constructed a fifth use of information radiators, this time to keep the programmers from pestering them.

Displaying System Status

The programmers kept asking, "Is system A up? Is system B up? Is the link to the back end up?"

The maintenance team wrote the status of each system and link on the whiteboard outside their area. Each day, they updated the status. It looked rather like a ski area posting the status of lifts and runs (so skiers don't keep asking the ski resort staff).

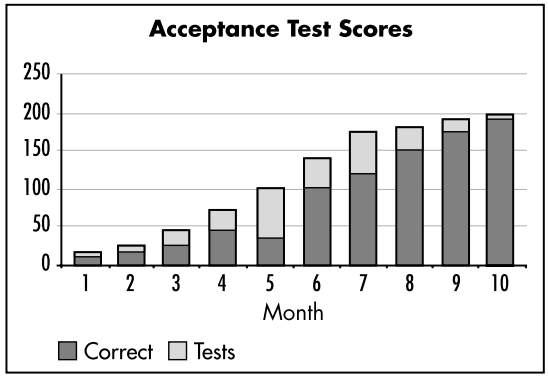

Figure 3-11 Graph showing growing completion.

(Courtesy of Ron Jeffries)

The group at eBucks.com came up with a sixth use of information radiators. This time it was the programmers who created the status displays:

Displaying Work Progress

The programmers were being asked about the status of their work every hour or two, which caused them no end of frustration.

They wrote on the whiteboard outside their office their intentions for the current week. As they completed their tasks, carefully sized to be of the half-day to two-day variety, they marked the tasks complete.

After these boards had been tried by the programmers, several other groups started using them to broadcast their own priorities and progress.

Applying the Theory of Hot Air

People have long applied the above-described "hot air theory of software development."

Gerald Weinberg discussed the damaging effect of removing a soda machine from a computer help-desk area (Weinberg 1998). Thomas Allen, of MIT's Sloan School of Management, discussed the effect of building design on R&D organizations (Allen 1984). IBM and Hewlett-Packard have incorporated such research in their R&D buildings since the late 1970s.

As a result of these and others' work, it seems natural that research and development groups have whiteboards in the hallways or near coffee machines. What we have forgotten, though, is the significance of actually being within sight and earshot of each other.

Here are several examples. The first is from a Crystal Orange project. The second is from a project unsuccessfully trying to apply Crystal Clear. Next comes a discussion of the "caves and common" room design recommended by XP. The final example is a success story from Lockheed's Skunk Works group.

Repairing Design Discussions

On project "Winifred" (Cockburn 1998), the lead programmer announced at regular intervals that design was unnecessary and that code simply grew under his fingertips.

As a predictable result, the young programmers working in the room with him also felt it unnecessary to design. The code looked that way, too.

He eventually left and I took his place. To reverse the situation, I arranged for us to design by having conversations at the whiteboard. After some period of doing this, I started getting questions like, "Could you look at the responsibilities (or communication patterns) of these objects?"

By setting an audible tone in the room and making these design discussions legitimate and valued, the programmers started to converse about design together.

Colocation is considered a critical element in Crystal Clear, a light methodology for small teams. (See "Crystal Clear" on page 357.) A rule of Crystal Clear is

that the entire team must sit in the same or adjacent rooms, in order to take advantage of convection currents of information and osmotic communications.

Crystal Un-Clear

"Pat" asked me to visit his Crystal Clear project. When I arrived, he wasn't at his desk. The secretary said he was with his teammate.

I offered to go to that office, but she said, "You can't. There is a combination lock in the hallway over to that section."

"!! . . . ?"

Each time a team member wanted to ask a question, he had to stand, walk across the hall, punch in the lock combination, and walk to the teammate's office. Clearly, this team was not getting the benefit of osmotic communication or the low cost of information transfer. Fortunately, changing the team seating was a simple matter to arrange.

Caves and Common

The "caves and common" room arrangement recommended in XP makes use of all three information-exchange mechanisms. It is shown in action in Figure 3-12 and is diagrammed in Figure 3-13.

"Caves and common" is very effective, but as Tom DeMarco correctly warns, it can easily be abused to become just a programming sweatshop. Therefore, not only the room layout is described in this section but also the social presuppositions that accompany its use: a single project team, good team dynamics, and provision for both private and project space.

The phrase *caves and common* refers to the creation of two zones in the room. The "common" area is organized to maximize osmotic communication and information transfer. For this to make sense, the people in the room must be working on the same project. It is perfect for XP's single team of up to 12 people programming in pairs (Figure 3-12).

Figure 3-12 The RoleModel Software team at work.

(Photo courtesy RoleModel Software)

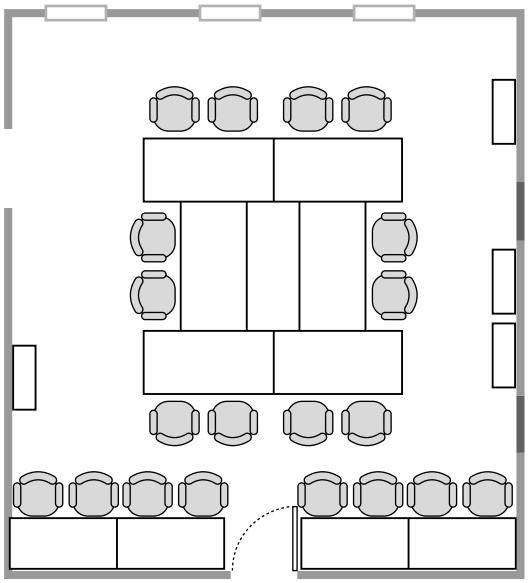

Figure 3-13 The "caves and common" room layout used at RoleModel Software.

(Picture courtesy of RoleModel Software)

The "caves" portion of the room is organized to give people a private place to do e-mail, make phone calls, and take care of their need for separation. In RoleModel Software's office, private workstations are set up along one wall (Figure 3-12). At Evant, a table came out from the walls on two sides of the room.

People who have worked in "caves and common" facilities say that there needs to be ample wall space for whiteboards and posted flipcharts, and two more types of rooms for the team to use: a food-preparation room and areas for small discussions to take place.

You can see from the picture that while the "caves and common" room is very efficient for transmitting information, it is also very efficient for transmitting coughs and colds. People who work in this sort of room encourage their colleagues to stay home if they don't feel well and to return after they have recovered.

You can also see that it is drafty (in an information sense): The people sitting in this configuration should really *need* to overhear each other.

Finally, you can see that it is very effective as long as the morale of the group is good. If the social chitchat degenerates into negative chatter, the highly osmotic communication again magnifies its effect.

Skunk Works

It is useful to compare the above discussions against a group performing classical "engineering," one of the most effective aero-engineering groups: Lockheed's "skunk works" team. This team achieved fame for its rapid development of a series of radical new airplane designs in the second half of the 20th century, under the guidance of Jim Kelly and his successor, Ben Rich. Ben Rich wrote about their experiences in the book *Skunk Works* (1994).

Rich highlights that, among the rules of the group, Kelly insisted on people taking accountability for decisions from design through testing, and on their sitting close together. The following quotation is from that book:

> SKUNK WORKS ROOMS
>
> "Kelly kept those of us working on his airplane jammed together in one corner of our [building] … My three-man thermodynamics and propulsion group now shared space with the performance and stability-control people. Through a connecting door was the eight-man structures group. …

Henry and I could have reached through the doorway and shaken hands.

"... I was separated by a connecting doorway from the office of four structures guys, who configured the strength, loads, and weight of the airplane from preliminary design sketches.... [T]he aerodynamics group in my office began talking through the open door to the structures bunch about calculations on the center of pressures on the fuselage, when suddenly I got the idea of unhinging the door between us, laying the door between a couple of desks, tacking onto it a long sheet of paper, and having all of us join in designing the optimum final design.... It took us a day and a half...."

"All that mattered to him was our proximity to the production floor: A stone's throw was too far away; he wanted us only steps away from the shop workers, to make quick structural or parts changes or answer any of their questions."

Every project team should be on a quest to reduce the total energy cost of detecting and transferring needed ideas. That means noticing and improving the convection currents of information flow, getting the benefits of osmotic communication, watching for sources of drafts, and using information radiators. The end goal is to lower the *erg-seconds* required for team members to exchange information, whatever constraints their organization places on their seating, and with or without technology.

Jumping Communication Gaps

To make communications as effective as possible, it is essential to improve the likelihood that the receiver can jump the communication gaps that are always present. The sender needs to touch into the highest level of shared experience with the receiver. The two people should provide constant feedback to each other in this process so that they can detect the extent to which they miss their intention.

Modalities in Communication

Imagine a simple discussion at the whiteboard. How many communication mechanisms are at play? Consider these 11:

Physical proximity. Standing about one meter from each other, the people detect minute visual cues, tiny movements of eye muscles to overall muscle tension.

The speaker may move closer to indicate aggressiveness or enthusiasm. The listener may move closer to indicate interest, agreement, or the desire to speak; or, the listener may move away to indicate fear, disagreement, or the need to think privately for a moment. The speaker and listener manipulate their relative distance to express various emotions and stages of agreement, disagreement, aggressiveness, trust, and distrust.

The signals vary across cultures and personalities, but the signals are both present and used.

Three-dimensionality. The people notice visual parallax, or 3D information.

The parallax shift of the visual image is lost when the same people talk over a video link, even if they are similarly close to the camera and screen.

Smell. Smell is one of those senses that is unimportant to some people, very important to others, and important but subconscious to many.

One person reported that she can often sense sublimated fear and distress, probably through sense of smell. It certainly is the case that those cues are available at the whiteboard and are lost in remote communications.

Kinesthetics. Many people use kinesthetics (sensation of movement) to help them think and remember. The speaker might use it to help construct a new explanation or to help improve the building of a question.

Touch. One person touches another on the shoulder to mean "Don't feel threatened by this discussion" or perhaps "This is really important" or "I have something to say."

Touching is part of the overall manipulation of proximity and personal space. In some cases there are objects to touch whose feel is important to the conversation.

Sound. In the simple use of language, a speaker emphasizes points with colorful adjectives, exaggerations, metaphors, and the like.

Besides that simple use of language, the speaker uses pitch, volume, and pacing to differentiate and emphasize ideas in a sentence.

Visuals. People communicate through gestures as well as words, often making a point by gesturing, raising an eyebrow, or pointing while speaking.

The people may wave their hands to make shapes in the air or to accentuate the speaking. They may raise an eyebrow to indicate questioning or emphasis.

Again, they use pacing to differentiate and emphasize ideas—for example, moving rapidly over obvious parts of a drawing and slowing down or pausing for effect at less obvious or more important parts.

A person also draws on the whiteboard to present (particularly spatially oriented) information for the other to consider. The drawings may be standardized notations, such as class or timing diagrams. They may be loose sketches. They may even be squiggles having no particular meaning, whose sole purpose is to anchor in a public, static location the thought being discussed for later reference.

Cross-modality timing. One of the most important characteristics of two people at the whiteboard is the timed correlation of all of the above.

The speaker moves facial muscles and gestures while talking, draws while talking and moving, pauses in speech for effect while drawing, and carefully announces key phrases in time, while drawing lines between shapes.

Cross-modality emphasis helps anchor ideas in the listener's mind, enhancing the memory associations around the idea.