

The Use of Improvisational Drama Exercises in Engineering Design Education

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Abstract

Teaching brainstorming and other creative techniques to engineering design students has been found to be enhanced by the use of exercises borrowed from improvisational (improv) drama. These exercises, originated by British playwright, director and acting teacher Keith Johnstone, provide a smooth progression of increased experience at brainstorming and firsthand insights into its psychological underpinnings.

Ball Games

The improvisational exercises described here are called ball games. They are easy to teach and also to utilize in group problem solving sessions. They are also flexible, allowing them to be modified to suit different educational and problem solving purposes.

Ball games are best played in an open space that allows a group of ten to fifteen persons to stand comfortably in a circle. While they can be played with as few as two persons, about fifteen appears optimal in a class setting. Larger classes may form more than one circle. Participants should be relaxed and attentive. Stretching, and relaxation exercises are useful warm-up activities.

Ball games all involve playing catch with an imaginary ball. I find the best way to start is to focus on ball handling technique. Thus I created what I call mime ball which is

played with an imaginary basketball. The person with the ball passes it to another person who catches it and then tosses it to another person. Each player simulates the motions and gestures appropriate to the size and weight of a basketball. A two-handed pass, or scooping-style throw and a solid two-handed catch that absorbs the imaginary impact work best. If a group has a hard time duplicating these motions a real ball may be used as a reminder.

The first difficulty with playing imaginary ball is knowing who is supposed to catch the ball. If the intended receiver isn't clearly indicated, players on either side of the recipient will try to catch the ball too. To avoid this, the thrower must establish firm eye contact with the intended receiver before throwing the ball. It also helps if the thrower always makes it clear that he is holding a ball in his hands, that way each potential recipient will know where a ball may come from.

This simple game reveals the key ingredients of subsequent games. All players must be full participants. There can be no spectators. Everyone must attend. This attention is of a special sort. Anxiety, concern, or over-eagerness will botch the game. The correct mental state is one of relaxed attention. Like that of a good shortstop, the best posture is slightly crouched, knees bent, ready to move in any direction with arms hanging loosely at the side.

In addition to attending, everyone must play with the intention of moving the game forward. In particular the passer must intend to have the ball successfully caught by

another person. Eye contact is crucial. If a person doesn't catch the ball, the thrower must continue to assume responsibility for the ball, and throw again. Alternatively, a player on either side of the intended receiver might pick up the "dropped ball" and continue the game. In short, everyone is responsible for moving the game along.

The first improv game is *sound ball*. A player throws as before, with clear passing gesture and eye contact, but this time releases a "sound ball." That is, the thrower makes a sound as he makes the motion of throwing. The sound is complete as the ball is released. As the recipient makes the catching motion she repeats the sound exactly as she heard it. She then quickly turns toward someone else, establishes eye contact, and throws a new sound which comes spontaneously with the gesture of throwing. When a group has this game moving along smoothly, the leader can "throw in" another sound ball, and another. A well-practiced and alert group can keep three or more sound balls going at once.

Word ball follows sound ball. Everything is as before except that words are now tossed instead of sounds. As players become more skilled, eye contact can be established during the throwing motion. The word is said at the moment of release. The recipient catches the word, and with the gesture, repeats the word exactly as he heard it. He then turns and throws a new word to someone else. This word should be the first word that pops into his head after he has caught the previous ball and as he throws his own.

The problems which arise during the playing of these games reveal much about the nature of creative behavior. The first issue, which is by no means trivial, has already been mentioned. Each individual must be willing to play the game. Commitment is needed. Simply understanding the game isn't enough. Students must play the game with the intention of getting good at it, at "getting it."

The players should be relaxed enough to roll with the punches. That is, everyone should be less concerned with getting it "right" and more concerned with moving the game along. For example, players often fail to "hear" a sound or a word clearly when it is thrown to them. There is a tendency to ask the person to repeat the sound so as to get it correct, but this stops the game. It is better to keep the game moving smoothly along. Players should repeat what they heard as well as they can without hesitation. It is even preferable to guess what was said than to stop the action.

The objective is to get into "flow" and act without concern for right or wrong. Indeed, players will find they actually hear better when they aren't worried about being precisely accurate.

The central problem that arises during these games, especially word ball, occurs when the player starts to make a pass but no word comes out of his mouth. The problem isn't so much that there is no word to throw (like magic there is always a word). The problem is that players don't want to throw the word they think of. That is, they want to exercise control over the word, they want to find a good one before throwing.

Just what constitutes a suitable word depends on secondary internal games the player is playing—often some kind of image game. The person may wish to appear smart, creative, witty, imaginative, or even profound. Or perhaps they have another image that they wish to project... macho perhaps, or sexy. On the other hand, they may simply wish to avoid appearing dumb, stupid or perhaps worst of all, ordinary.

Since control is hard to achieve in real time, players will begin to use a defense mechanism known as stockpiling. Stockpiling consists of thinking up suitable words to say while the player isn't "it". This behavior isn't difficult to spot. If a person is trying for a creative image, for example, the result is often words that are strange, wacky or even weird, in the mistaken belief that it will make them appear creative. Stockpiling subverts the game in two ways. It diverts the player's attention away from the other players and the action of the game, and it guarantees that the word passed to the next player will have nothing to do with the context of the game at that moment. The word will ring false and lack the authenticity that comes from being in flow with the group. Improv games aren't about "acting", they are about "being" fresh and honest and on-the-spot. This is what provides their energy and makes them enjoyable, even exhilarating.

It is the leader's job to discourage stockpiling and encourage more productive strategies. This is best done by making sure it is safe for players to behave spontaneously. Laughter is fine, but ridicule isn't. It should be clear that saying something obvious or ordinary is OK. It is more than OK—it is what is desired. People mistakenly believe creativity involves being clever, rather than simply being themselves. It is OK to repeat something that has been

heard recently, or said before. Five spontaneous “mashed potatoes” is better than one slow “Gila Monster.” It should be made clear that defensive strategies designed to maintain control are only natural. People use them all the time. To overcome them, players should be encouraged to engage someone’s eyes and start the motion of throwing even before they have a word. The action itself helps a word come to life.

In *concept ball*, images created by combining two or more words are thrown. The image need not be imaginative: “shivering swimmers” is as good as “blue bongo drums.” (As I write these examples it is hard to not be clever!) Spontaneity is still the goal. The same is true for *theme ball*. Here the group agrees to a theme before beginning. Then all the words or concepts thrown relate to this theme. Example topics might be “The Fourth of July” or “Things I’ve Done Today.”

Brainstorming and Improv

If we were to change the name of theme ball to *problem ball*, it is clear that this progression of exercises has led up to a brainstorming session. The rules for group brainstorming are: 1. Defer Judgment; 2. Piggyback and Leapfrog; and 3. Go for Quantity. Deferring judgment requires not criticizing ideas as they are stated. Piggybacking refers to building on the ideas of others. Leapfrogging means jumping over a person’s idea to generate another. Going for quantity requires throwing out ideas quickly, leapfrogging and piggybacking freely without getting bogged down in lengthy discussion. The desired mental state is subconscious flow, accessing unedited ideas directly from one’s stored experience. While the goal may be more focused on a desired result, this is the same mental state fostered by the improv drama exercises we have been discussing.

Perhaps one of the hardest things for an engineer to do is not to test ideas at the same time as they are expressed: “Oh that won’t work.” The expression “defer judgment” really doesn’t go far enough—it is too passive. During the agreed-upon brainstorming session participants should gleefully abandon judgment. Further, they should wholeheartedly embrace others’ ideas with enthusiasm and encourage seemingly stupid extremes. The phrase “defer judgment” almost sounds conciliatory, like telling someone it is OK to think loose, to be themselves, but later we will apply judgment and return to normal, to “get real.” Being

our creative selves shouldn’t need to be an unnatural state. Even in our daily lives we could all use more balance between the two equally useful states of mind of intuition and logic. Problem solving requires both fresh ideas and informed judgment.

One reason deferring judgment is difficult is that it implies giving up expertise, which is often the core of professional identity. Our culture in particular encourages a one-dimensional sense of self. We are what we do. We are what we are experts in. Consequently it is exceedingly hard for experts, and particularly rigid or insecure ones, to give up passing judgment on ideas that lie within their domain. Expert is but one manifestation of the image problem mentioned earlier.

We are “safe” within the fortress of our image, and are reluctant to come out—to give up control. Creativity involves risk taking which is another way of saying it requires a loss of control and security. When an activity is under control it isn’t risky. (This attribute of creativity is analyzed at length in another paper in this publication.)

What is the benefit of exercising one’s creativity? Growth. Growth and security are the two shores that humans must navigate between. Being creative requires giving up our adult selves in some sense. It requires accessing our playful self, the child within all of us.

The Improvisation Games described in this paper provide a smooth transition from obvious games that are pure fun, to problem solving games that have a serious objective, but are often no less fun. When a group plays these games successfully in real time without stockpiling, the participants really have no choice but to piggyback and leapfrog. Each person’s mind will instantly either think of a related word or theme, or will be triggered into inventing a new one. Going for quantity is achieved automatically. In short, Improvisational Games provide a fertile training ground for the required mental state for brainstorming.

As we have seen, constraints are easily added to the games already mentioned. In *last letter-first letter* each person tosses a new word that begins with the last letter of the word he caught. It is very hard to stockpile with this constraint. Another is *alphabet ball*, where each word has to begin with the next letter of the alphabet. Play this game often and you will find class members reading the Q and Z entries in the dictionary, stockpiling in a perhaps acceptable form.

The constraints given to games can be more than intellectual, and they can be potentially conflicting. In *attitude ball*, sounds, words, or themes are tossed with an attitude: hard or soft, mean or loving, sad or happy, etc. The receiver must catch both the message and the accompanying attitude. Words and attitude may conflict. “Apple pie” may be tossed with repulsion, “Valentine” with contempt, “Explosion” in a whisper. Clearly the challenge here is for players to be receptive to both the content and the expression.

Gibberish ball is another game requiring careful listening. There is the obvious form where gibberish words are tossed and caught then the receiver tosses a new invented word of her own. In a more interesting form, *gibberish dictionary*, the receiver catches the word while repeating it, but then gives this word a definition before tossing a gibberish word to another player. Another form is *foreign language gibberish* where the leader can change the national origin of the gibberish from Chinese to Italian to Swedish. In addition to being hilarious, this game reveals a lot of unexpected abilities among the players.

By now it should be obvious that ball games are easily invented, and that each one can work on a different skill. All tend to help make the mind more supple and quick. A final example that is particularly challenging is *cross association ball*. This is a version of word ball that requires at least two balls to be in circulation, preferably more. As always the players catch the word tossed to them by repeating it, but the word they pass on to the next person is triggered not by that word, but rather by other words that have been recently thrown by someone elsewhere in the circle. What the player says is based on what is heard off to the side, like paying attention to all conversations at a cocktail party. Groups that are skillful at this game become ultra-sensitive to everything going on within the group. They attend to both their direct interactions and their peripheral vision and hearing.

Summary

This paper has described how ball games borrowed from the world of Improv drama can be used in engineering courses to provide safe and enjoyable experiences which tap the student’s natural creativity. In addition to being fun to play, these ball games give the instructor numerous opportunities to talk about blocks to creativity and to offer suggestions on how to overcome them. The net result is a marvelous introduction to engineering brainstorming. Overall they greatly increase the trust, familiarity, enthusiasm and social skills that are needed to generate creative ideas effectively while breaking down many of the inhibitions that often stand in the way. In addition, many of the techniques can be utilized in their own right as kinesthetic and verbal thinking tools.

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