

The role of beauty in learning

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The concepts of aesthetic experience and beauty in learning

A beautiful learning experience is one that stimulates--and then satisfies--a desire for new knowledge or skill. The desire could be already existing and active, or latent and in need of stimulation. It might also be newly discovered in the context of a big question or challenge offered by a teacher or situation. A teacher's role is to bring the desire into the foreground of a learner's mind, making it a compelling curiosity and drive to learn. Then the teacher has to fulfill the promise of this offer by creating the conditions that allow a compelling effort toward mastery or deep understanding that the learner might grasp, grapple with and resolve. The effort is half the beauty.

That, in essence, is the narrative skeleton of the role of beauty in instructional design. It might be fleshed out in a thousand different ways, but the logic will always be similar.

This is not a new approach to teaching. In fact, I am merely describing what many good teachers and trainers already do. Also, I am not proposing to ignore existing learning theory. In fact, I will close with examples that apply several prominent pedagogical models that allow for an aesthetic perspective. In doing so, I hope to show that I am not advocating for (nor completely rejecting) an "anti-systematic," or purely intuitive and artistic approach to design, noted as one possible postmodern response to traditional information systems design (Coyne, 1995). Rather, I am proposing something more aligned with the idea of "guerrilla design" (Wilson, 2017), a willingness to challenge conventional perspectives as a habit of good practice in order to broaden our understanding of what we do, and similar also the idea of "conceptual flexibility" (Yanchar & Gabbitas, 2011), which seeks a middle ground between eclecticism and orthodoxy to bridge the theory-practice divide. I also hope to reinforce the call to rediscover the instructional theory framework for instructional design (Honebein & Reigeluth, 2020).

What might seem unusual is the perspective. We typically view teaching in rational/positivistic terms (with the goal of effective and efficient learning) and try to reduce it to a science, when it is really much more. We would like to distill principles that apply in any situation, but this may be a misguided endeavor. Not pursuing a science of learning would be a lost opportunity, but science alone is deficient in describing what happens in a learning experience. Increasing concerns to include beauty and aesthetic experience may inspire teachers to emphasize new aspects of their teaching. It may suggest new goals and strategies for achieving them.

Nearly all seasoned educators will agree that teaching is about inspiring hearts as well as minds. It is about stimulating engagement, calling for creative thinking, building confidence, and even helping others develop their identities (Anderman & Wolters, 2006; Roeser, Peck, and Nasir, 2006). It is also about showing the beauty inherent in a discipline. For example, teaching

meteorology is full of opportunities for creating awe about atmospheric wonders and natural threats, as well as the elegance of scientific explanations and equations. Weather products that depict surging and swirling atmospheric flow patterns are beautiful in their own right and inspiring to learners. This is more than what we usually refer to as a cognitive approach to teaching. It is also aesthetic. Explanations of any sort, in particular, are objects of beauty. Depictions of knowledge offer the most compelling and satisfying of symmetries (*some concept = some explanation*).

The profession called “instructional design” arose from the intention that it would share many goals and processes with other design professions--creating products for effective and enjoyable use, considering user perspectives and needs in the design process to ensure these outcomes, and using formative evaluation and iteration in the process of creation due to the inherent complexity of human and natural systems. Yet, even many that call themselves instructional or learning designers are reluctant to acknowledge the aesthetic qualities in what they create, even though nearly all other design professionals consider aesthetics of high importance in their work. This observation has been made before (Parrish, 2005), but it was done without exploring the concept of “beauty” and how it plays into learning experiences. Beauty has seemed a potential authorial black hole, a maelstrom from which there was no return to logical analysis and practical perspective. But here I do not want to shy away from the persistent connection of aesthetics and beauty, although I want to stress their distinction as well. Beauty might best be thought of as the stimulus, target, or result of an aesthetic experience, but not necessarily the thing that defines or encompasses it. It is more the feeling that compels it and provides its reward.

Let's come back to the narrative of the role of beauty in learning and compare it to the experience of art. A logical analysis might look like the sequence below. This description is derived from the concept of aesthetic experience as proposed by John Dewey (1934/1989), but influenced greatly by his work on a theory of inquiry processes, like those used in the sciences, (Dewey, 1938/1991):

1. A felt need, tension, or puzzlement created by an indeterminate situation--a question or an unexpected composition that requires discernment
2. Engagement and focus on tangible elements or mental constructions, driven by an anticipation of valued outcomes
3. Complications arising in the situation that deepen it, and which further the need for intent action and observation
4. An ongoing reflection on how observations might suggest the outcome
5. A consummation that unifies the experience, which is a reward that the effort was worthwhile

Note the active role of the experiencer in the experience described. All successful works of art share this logical and narrative structure, as well as many works of everyday life, including learning. One might include in the category of everyday activities things as diverse as completing an arduous hike, planning and working a garden, cooking a complex dinner, and

traveling to a destination never before visited. Now let's compare art and learning using this structure.

1. A great work of art draws us in through tension. In visual and musical arts, it is often a compositional tension--an ellipse, or a visual or musical expectation to be met. In narrative works, it is more obvious--a normal situation is turned on its head and requires resolution--the hero goes on a journey or quest; a stranger comes to town and upsets the balance. In learning, it takes a big question or issue (Doyle & Bozzone, 2018), a puzzling non-intuitive demonstration, an elegant explanation, or an awesome natural event to trigger tension.
2. Engagement in the arts is not hard to understand. A good work draws our attention to study it in detail or just let it wash over us. We might be asked to understand its composition or to enjoy the sensations it creates within us. In learning, engagement can be similar. But too often teaching does not become tangible and remains aloof or tedious. It does not immerse learners in situations that demand the knowledge and skills they are being asked to learn.
3. A good work of art takes time to grasp due to increasing complications. A good story is plotted to slowly reveal its characters and their mysteries, and to augment those mysteries. Music might use the drive for sonic resolution to return to the tonic, or key note, established in a musical phrase, or it might set up a rhythm whose pattern is slowly revealed or made more complex. A good learning situation is full of naturally occurring complications. Learning any discipline raises many challenges for learners to resolve, especially if teaching uses authentic cases and offers opportunities for practice. Practice is especially good if it uses increasingly complex problems to solve, at both whole-task and part-task levels (van Merriënboer, 1997).
4. A good work of art is one that hints that it will offer answers to the puzzles it raises. A painting has a frame that contains the puzzle, although contemporary art often seeks to break out from the frame into the world. A good film offers foreshadowing or clues, or follows genre conventions that the audience knows it can count on. The best films violate these conventions to a degree to add complexity, but still offer some sort of resolution, even if simply to reinforce the complexities of life. Teaching can offer the promise of resolution through good demonstration, coaching and feedback along the way. Opportunities for practice provide experiences that show that success is possible.
5. Consummation or resolution is almost the same for art and learning. The experience offers either comprehension of how diverse elements fit together or understanding and appreciation of the complexity of the experience, as well as exhilaration that the complexity is not as chaotic as it first seemed. Consider a good game, for example. The reward of a game is not unlike that of a difficult, but achievable course at school or task on the job. Consider a case study or simulation and the resolution brought about by knowing the outcome, as well as the reward that the learner feels if they have anticipated it.

Why might instructional designers and teachers speak so little about the aesthetics, or beauty, of a good learning experience? Two reasons may contribute to this silence.

The first is that we often consider aesthetics and beauty as frivolous or superficial things, and we know that teaching and learning are serious matters. However, the definition used here will show that beauty can be a critical part of a successful and rewarding life.

The second is that “beauty,” in particular, is a very slippery, open concept, and has been used in so many different ways that make analyzing it a muddled affair. Fashion models on the covers of magazines can be beautiful, a gracious gesture of generosity can be beautiful, a landscape can be beautiful, a bird in flight can be beautiful, a mathematical equation can be beautiful, an RGB satellite image can be beautiful, a thunderstorm or winter snow storm can be beautiful.

The concept of “beauty” has had endless philosophical explorations (e.g. Mothersill, 1992; Beech, 2009). These have led to no consensus on a definition, especially when beauty is considered a judgement about a person or an object, such as a work of art or a place. This inevitably ends in a subjective versus objective tug-of-war. If not everyone can agree what makes something beautiful, is it a phantom quality?

For all the effort, an objective definition seems impossible to achieve. What ultimately emerges is that beauty is a quality of subjective experience, and not a quality of a thing. But what sort of experience?

Crispin Sartwell (2004) helpfully offers six different “names of beauty,” or concepts of beauty, based primarily on subjective experience and drawn from diverse cultural conventions. These are “longing,” “bloom,” “holiness,” “ideal,” “humility,” and “harmony.” I feel that these all have essential things in common, but I will focus on “longing” because it is the one Sartwell assigns to my own cultural background and the one that speaks to me the most. Sartwell also feels that longing underpins the other “names of beauty” with its reference to beauty’s insatiable nature—it can sustain, but never satisfy. Similarly, one can see that each of the six concepts are relevant as essential elements of learning. Learning is never an end, but a movement whose importance always grows as it closes in on its goal. New learning always points to the benefit of more learning.

Viewed as longing (a somewhat old-fashioned word describing a deeply held and persistent desire), we can see beauty as embedded in all our most valued experiences, including learning. Because we can long for many different things, many things can strike us as beautiful.

People often learn in order to gain admittance to a profession, which offers financial security, social status and personal identity, which are things we all long for. But people also long for knowledge in itself, to understand the world they live in, to live a good life, and to have skills that help them negotiate the challenges of life and work. As these challenges grow more complex, learning helps to restore a sense of order. People long for knowledge for its inherent rewards as well as its tangible rewards. For this reason, beauty as longing is worthy of educators’ efforts to stimulate it through their designs for learning. In fact, stimulating and delivering results that satisfy a longing might be the most important thing a teacher can do, because this is what can

engage both hearts and minds and lead to potentially transformative learning experiences (Wilson & Parrish, 2011).

It may seem counter-intuitive, especially because teaching is often based on an information-delivery paradigm, but teachers and trainers should be striving to design experiences that not only offer more to learners, but demand more of them as well. Learning experiences that strive for significant impacts should challenge learners to solve problems, conduct investigations, analyze cases, strategize courses of action, or construct knowledge through personal projects. These challenges are what can bring out the beauty of learning a discipline.

Beauty should be a goal of instruction when we strive for high levels of personal development, if not always. Learning experiences that are compelling lead to learning that stays in the minds and actions of learners and primes them to become lifelong learners. During such experiences, action is the source of learning--a personal, intentional action--and not simply giving or receiving knowledge. This is certainly not a new argument, but one that demands repeating in a stubborn culture that continues to view knowledge as a thing transferred from expert to student rather than something freshly constructed by each learner.

The rest of this paper will provide brief examples of the use of beauty as a design element in my own work as an instructional designer. I expect that readers will recognize that they can share many other examples of methods to create a sense of beauty in their teaching.

Promising pedagogical methods for doing so include *case-based*, *inquiry-based*, *game-based*, and *project-based* learning. Each of these have been the subject of significant research into learning and instructional design theory (see references for each in the next section). They have most often been studied in terms of their cognitive foundations, but in the next section I am concerned with their aesthetic affordances. Cognitive and aesthetic viewpoints are not in conflict, but complementary. In the broadest sense of aesthetics, all human activities, including intellectual ones, have aesthetic potential due to the challenge, engagement and rewards they can bring. I need to stress that I am not arguing that traditional instruction cannot appeal to a sense of beauty. The best essays, lectures and seminars can lead to similar experiences when they draw in readers or listeners to discover a new topic or to view it in a new way. When they stimulate and then satisfy a desire to learn they are functioning similar to more overtly active learning methods. This requires significant skill (Woodard, 2021). The essays of the late Stephan Jay Gould are excellent examples of artistic, effective and traditional learning experiences (Gould, 1994).

CALMet Participants: Please pause or stop here and reflect about your own teaching or training. What are the things you do in your practice to instill a longing, to gain higher engagement and anticipation of rewarding outcomes? What do you do to bring out the beauty inherent in your discipline? What do you do to bring out the beauty of the experience of learning? What more could you do?

Share these in the discussion forum. Continue reading only if you have time and interest, or revisit the paper after the conference.

Examples of the use of beauty in learning design

Case-based Learning: [Polar Lows Ungava Bay 01 December 2000](#)

Cases have been argued as one of the basic ways we structure knowledge for making decisions (Kolodner & Guzdial, 2000, Schank et al., 1999). We recall experienced or learned cases to provide guidance for taking action when we encounter problematic situations. Research has shown that professionals that are required to make critical decisions rapidly, like fire fighters, use their repertoire of cases to guide them in new situations.

The case-based, self-directed online learning module titled Polar Lows: Ungava Bay, was developed by the COMET Program in 2004 for weather forecasters who face critical decision making during the rapidly evolving phenomenon in high latitudes known as “polar lows,” which bring severe winds, rains and snow. Ungava Bay, where this case takes place, is in the far north of Canada. (The module can be found at https://www.meted.ucar.edu/training_module.php?id=144. Note that the use of Flash programming can limit usability in some browsers.)

Case-based learning can be highly engaging due to the natural narrative that unfolds in the case and due to the longing to know how it will turn out, along with the enjoyable detective work that is demanded. The design of Polar Lows places additional demands on the learner (and offers them control) due to its learning object-oriented design that first asks for diagnostic and then prognostic decisions based on data products, such as satellite imagery and atmospheric temperature and moisture soundings, and only then recommends the learning-object resources that provide background knowledge for guiding those decisions. The learning objects provide information such as the formation mechanisms of polar lows and atmospheric conditions that drive the evolution and movement of the system. In other words, the design reverses the traditional explain-how-and-then-practice approach. The case is composed of a Case Overview that sets the background context, a Case Challenge that contains 8 different decision points, and, only at the end, a Case Summary--a traditional explanatory lecture regarding the case.



Learners can study the recommended learning objects and submit their diagnostic and prognostic decisions whenever they feel ready. They then receive detailed feedback on their likely correctness, and can choose to do additional study before moving on to the next decision. The case is a complex one, with non-intuitive complexities, introducing a few surprises that require creative thinking. The final Case Summary makes sure that the learner takes away the key lessons of the case, without ruining the beauty inherent in its exploration and discovery.

Polar Lows has been used in nearly 500 online sessions, and won a 2004 Brandon-Hall Excellence in Learning Gold Medal Award. A similarly case-based learning module, *Ocean Effect Snow: New England Snow Storm, 14 January 1999*, has been used in over 850 sessions.

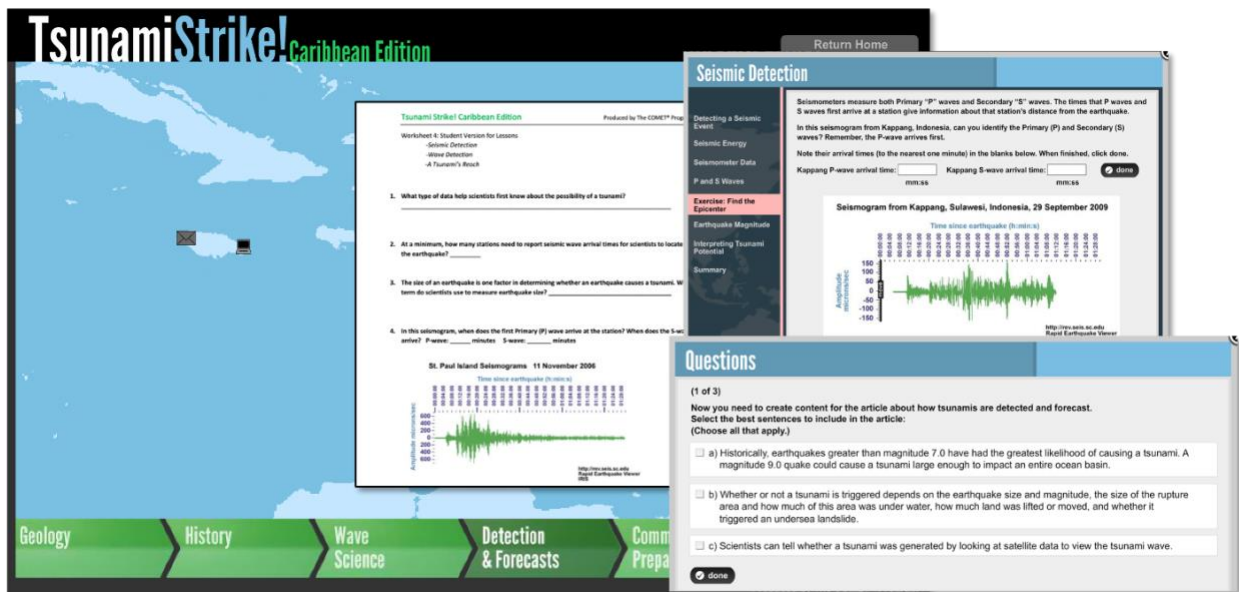
Inquiry-based Learning: Tsunami Strike! Caribbean Edition

Inquiry-based learning asks learners to behave like researchers, methodically investigating a body of knowledge or evidence to come to conclusions. Instructors that use this strategy might introduce questions, problems, or hypotheses, or tell stories of problematic situations that will naturally engage students' curiosity. They then ask learners to follow a process of inquiry to resolve the indeterminate situation. Problem-based learning is a popular form of inquiry-based learning (Hmelo-Soéver, 2004; Savery & Duffy, 1996).

Inquiry is at the heart of much of our learning, beginning with a question or challenging experience that requires an answer or resolution. The skills required for an effective inquiry are needed in every profession--all professionals need to be able to solve the problems that they encounter and seek information to make decisions. Inquiry requires more than remembering facts, concepts, and principles, it also requires higher-level thinking skills such as critical and creative thinking, analysis and judgment, as well as problem solving and decision making. Inquiry learning approaches generate engagement by establishing a natural drama based on seeking the answer to a question or resolving a puzzling phenomenon--a developing object of

longing. When brought to the foreground of a learning experience, inquiry changes the tone of instruction from passive reception to intentional action, and makes aesthetic experience more likely.

Tsunami Strike! Caribbean Edition (https://www.meted.ucar.edu/training_module.php?id=907), developed by my team within the COMET Program and published in 2012, is designed for middle and high-school learners, who are asked to take on the role of a journalist preparing an article for a news magazine on the potential occurrence and impacts of tsunamis in their island countries. Sixteen multimedia lessons (learning objects) on tsunami science, geography, safety, and history are interwoven as resources the students can use as background for producing the article. The material is aimed at students ages 13-17, helping them learn about tsunami risks in the Caribbean region due to ocean-based seismic and other events, which contributes to curricula in physics, earth sciences, geography, and social science. Reviews and feedback on the articles produced by students requires work by dedicated teachers--this is not a fully self-directed learning experience.



Tsunami Strike! Caribbean Edition, became one of the most highly used COMET Program modules, reaching 2750 user sessions. The space to contribute to the experience given to teachers who employ the module in their courses may increase their desire to use it within their curricula. In effect, an open educational resource that requires local adaptation and inquiry-based learning by students creates an aesthetic opportunity for both teachers and learners.

Game-based Learning: Learnopoly

Game-based learning is not grounded in a single learning theory, but much research has been conducted on the effectiveness of using games and gamification to reach higher levels of engagement and develop complex cognitive skills (Gee, 2013; Myers & Reigeluth, 2017). The

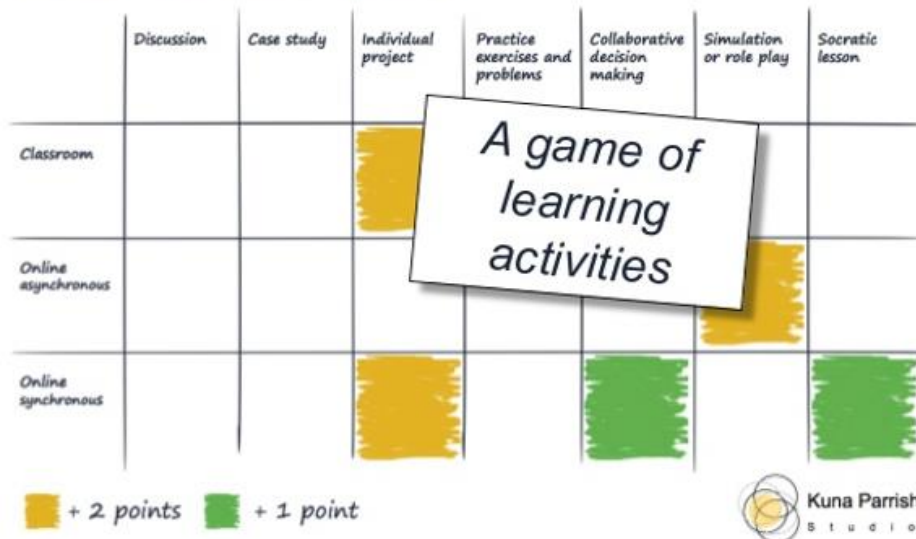
engagement brought about by games and sports offers aesthetic rewards, and successful gameplay can stimulate a sense of beauty (Parrish, 2017).

Games and play are universally used to provide challenging environments for intellectual stimulation and/or physical exercise (Callois, 2001). They also serve a social function, but perhaps foremost, they create a competitive environment (against others, time, or merely conclusion) to stimulate and heighten performance. Their use in education has probably always existed, but has greatly increased during the last three decades. Games offer a safe practice field for life skills, a manner of dramatic rehearsal (Fesmire, 2003), both social and cognitive, and the interest of educators in using games as a serious component for learning has rapidly grown with the support of technology.

One of James Paul Gee's sixteen principles of good game based learning is "Performance before Competence" (Gee, 2013), the proposal that people should be able to gain competence *by* taking action, and not just take action after gaining background knowledge.

Learnopoly is a game designed for developing skills of instructional design for active learning approaches, where competing teams of players race to design learning activities for randomly assigned topics in their professional field, for online or classroom use. The other design constraints are determined by choosing cards and spinning a wheel. Cards decide the type of learning activity that must be designed (discussion, case study, project, simulation or role play, practice exercises, etc.), and the spin decides the delivery mode--synchronous online, asynchronous online, or classroom learning. Teams must develop as many valid, brief learning design descriptions as possible within the time constraints, competing with the other teams to develop the most designs and those judged as most creative and effective. Decisions on "best" designs are voted on by all teams at the end of the session, after each team nominates one of their designs. (A video introduction to Learnopoly can be found at vimeo.com/107759017.)

LEARNOPOLY



The goal of the game is to offer a creative challenge to trainers to use different learning activities for different delivery modes. The game offers a safe and entertaining environment where players are forced to challenge themselves to come up with solutions they might not otherwise do in their current work environments. The game can be played online or in a classroom, and has been used in both formats, resulting in both fun and consternation (consternation can also be evidence of longing), but learning nonetheless. Slides depicting the game play, used to introduce the game online, can be found at https://www.slideshare.net/slideshow/embed_code/37168679.

Project-based Learning: WMO Courses for Trainers

Project-based learning strategies are, in a broad sense, also Inquiry Strategies, efforts to resolve an indeterminate situation by applying new and existing knowledge in researching, designing and constructing solutions (Krajcik & Blumenfeld, 2006). They are also Constructionist strategies (Papert & Harel, 1991), which promote learning through the process of producing tangible, sharable outputs. In project-based learning, students work individually or in small groups to produce products such as a report, plan, poster, presentation, digital media, or model (conceptual or physical). Through projects, students are exposed to new information, develop new mental models and practice skills in the process of completing the project—in other words, in a relevant rather than artificial context.

Project-based learning tasks have many peripheral outcomes as well, such as developing interpersonal skills, commitment and independence. They are inherently engaging due to their aesthetic arc, with beginnings, middles and ends, filled with incremental challenges, like a good story.

The WMO Online Course for Trainers has been offered at least once annually since 2014, with the goal of developing trainer competencies in global, regional and national training institutions. It teaches knowledge and skills required to make informed instructional planning decisions through a process that requires design thinking. So far, it has been offered in 4 languages to a global audience, and has seen over 450 participants achieve successful completion. Because the course requirements include the development of a comprehensive Training Development Plan, the project of the course that requires detailed documentation of each step of the planning process, this number of successful completions is somewhat remarkable.

The Training Development Plan (TDP), based on a template provided at the start of the course, is the glue that ties the course together, although many other activities are conducted during the course through the Moodle virtual learning environment in which it is based. In addition, the TDP is immediately relevant to participant work responsibilities. While many participants have never planned training using the systematic method taught, all will have had to make similar training decisions.

For the TDP, participants are asked to choose a training project for which they are currently responsible, or one they need to accomplish in the near future. The final product could potentially be valuable for participants' work, leading to a new or improved course design. Developed incrementally starting in the first week, the plan and the planning process compel learning and stimulate a longing for the complete picture of the training that will result. The project is challenging, but incremental production and feedback makes it doable and rewarding for nearly all participants.

Conclusion

This paper has explored the concept of beauty and the role it plays in instructional design. It has concluded by describing four designs for learning experiences that were grounded in proven learning strategies that demand the deep engagement of learners. They were discussed as effective because they required learners to construct knowledge during creative processes of problem solving, decision making, and production of products. These activities are at the highest levels of cognitive engagement, but can also reach the dimensions of aesthetic engagement and a sense of beauty.

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