Motivating, Enhancing and Accelerating Organizational Learning: Improved Performance Through User-Engaging Systems

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In order to improve the effectiveness and speed at which people learn, we need to look at what motivates people to perform in the first place. By introducing the concept of flow, the authors suggest that there are ways to design tasks, goals, and feedback in order to create an optimal learning and work environment for organizational participants. Furthermore, the authors suggest that the level of advanced information technology that exists today is such that rather than focusing on user-friendly systems, we should instead focus on “user-engaging” systems to assist workers in learning, performing, and ultimately gaining the “flow experience.”

What if there was a way to get employees to spend their time and energy learning and mastering the skills they needed to improve their performance on the job? What kind of motivation would this require? And even if we could create such a learning environment like this, is there some way to speed up the learning process? The competitive pressures facing all organizations today mandate that employees improve their ability to learn and assimilate changing information — for example, changing markets and customers, new ways of doing business, information related to new casts of business partners and competitors, and even new organizational structures. Furthermore, the pace of these changes requires that employees be able to not only be more effective learners, but also fast learners. These learning challenges are made even more significant in light of the fact that learning often carries with it a negative stigma of not always being a pleasurable experience. In this paper we suggest that these challenges are in part motivational in nature, and that technology can play a major part in motivating and accelerating learning. To this end, we present key findings in the area of motivation research and offer a specific perspective on motivation — referred to as “the flow experience” — that we believe addresses these challenges. We then offer actionable suggestions with regard to information systems design to improve the likelihood and speed that organizational learning takes place, and in turn improving the overall performance of the organization.

Learning: A Motivation Theory Perspective

Most organizations today understand the importance of and need for learning. Today we speak of “learning organizations,” “knowledge creation,” and the management of “intellectual capital.” Yet, few organizations stand out as examples of how to accomplish any of these effectively. Why is this? For most of us, when we think of learning, we often think of “education” or “schooling.” If asked to place such experiences on a continuum from “I enjoyed my educational experiences” to “I still have nightmares about school,” most people place their personal
experiences in the negative half of the continuum. Especially now when the U.S. is becoming infamous for the low performance levels of its students when compared to other countries in the world1, we find ourselves asking, “Why is there a negative association with learning?” “What is wrong with our educational system?” These kinds of questions not only plague today’s educators; as business executives attempt to cope with the increasing pace of business and competition, the deluge of information, and the challenge to recruit, train, and retain a highly-qualified work force, they too are looking for ways to develop more effective “learning organizations.” Why do such negative predispositions and results relating to learning and education exist? Let us consider the act of learning from two perspectives.

First, think of the typical learning experience within the traditional educational context: a student is required to perform a set pattern of tasks or repeat back a known and expected answer given on a test. Typically, students must work quietly by themselves, in closed-book fashion (that is, no notes allowed). Teachers or instructors usually adopt a stern demeanor while “proctoring” the test (it even sounds painful!). What motivates the majority of students to perform during these learning activities? The grade…a single, alphabetic character that carries with it some sense of achievement, and in many cases, a significant measure of a student’s self-worth.

Now consider learning from another perspective. Consider one of the most voracious, active, fast, and effective learning machines on the planet: the typical three or four-year-old child2. With wonder and amazement (and pleasure), preschool children attempt to learn about the world around them — about songs, animals, language, colors, numbers, letters, etc. — with a seemingly endless appetite. Their language is founded on the watchword “why?” What is the motivation for these young learners to behave this way? Rather than a grade, it appears to be driven by an internal thirst for knowing.

Interestingly, of the two authors’ combined five children, four are “straight A” students that are not enthusiastic about going to school (they were much more enthusiastic Sesame Street viewers). The fifth child? He’s quite enthusiastic about school…preschool that is. What can we learn from these two perspectives, and how can we explain the shift from the wonder and amazement of learning to learning as an almost dreaded activity? To gain insight into these questions, we believe it is helpful to consider education and learning from a perspective offered by motivational theorists. That is, “What makes people do what they do?”

Motivation, or the drive to put forth effort over a sustained period of time on a specific task, has been a research focus for psychologists since the early 1930’s. One particular stream of research focused on motivation not as a global construct, but on the different types of motivation that cause people’s behavior to change (Deci and Porac, 1978). Specifically, they presented the notions of extrinsic and intrinsic motivation. With extrinsic motivation, the mechanism that generates motivation is external to the person. Compensation, performance reviews, recognition, and grades in school are all examples.

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1 The third International Math and Science Study conducted in 1995 and reported in 1997 indicated that while U.S. fourth graders are among the highest achieving students in the world, by the time they reach the eighth grade, their performance in science slides to the middle of the 26 nations participating in the study, and even lower for mathematics. The Cleveland Plain Dealer, June 18, 1997.

2 This is consistent with the view espoused by Peter Senge, author of The Fifth Discipline (1990) who suggests that learning is one of the strongest of all motivational drives in humans.
Intrinsic motivation, on the other hand, refers to motivation that is generated psychologically within the person. For example, the desire for knowledge, the need for control and self-determination, and personal enjoyment are all intrinsic motivators.

Research has shown that this differentiation between externally driven and internally driven motivation is important for learning and performance. Humans have been shown to perform effectively when levels of intrinsic motivation are high. If rewards based on performance are then introduced (in the form of payments, good grades, etc.), the motivation of the individual shifts from being internally driven to the external reward. In other words, intrinsically motivated people become extrinsically motivated.

There are at least two problems with extrinsic motivation. First, extrinsic motivation, unlike intrinsic motivation, is not self-sustaining — performance is maintained only as long as external rewards are continued (in fact, research suggests that the external rewards at a given level are only effective in short-term cases and that they have to be frequently increased for longer-term effectiveness). Second, if the external reward is stopped, humans stop putting forth effort and performance levels actually drop to lower-than-original levels (since the level of intrinsic motivation does not quickly rebound back to original levels). Why do these problems exist with extrinsic motivation? Deci and Porac (1978) and others (e.g., Luthans and Kreitner, 1985) have shown that external rewards are perceived by people to be a form of controlling feedback. That is, if you do a good job, you will be rewarded (high pay, time off, good grades, etc.); if you do a poor job, you will be punished (lower pay, lower grades). People resent this control and this resentment is revealed as an inability to be intrinsically motivated when external rewards are present.

This is not to say that feedback per se is bad. On the contrary, motivation theorists have shown that feedback that is informational (rather than controlling) has a positive effect on intrinsic motivation and work performance (Bandura and Cervone, 1983; Ingram and Bashaw, 1995). Feedback that is positive in nature (“perhaps you might want to think about trying this method”) or provides performance status (“your success rate was 60%”) offers useful information and is superior to feedback that is perceived to be evaluative (“your success rate was 60%…this was the worst in the department”), critical (“you’re a terrible sales person”), or punitive (“you won’t see another raise this decade”) in nature.

Other findings in the literature on motivation are instructive for learning and performance as well. Motivation researchers have shown that setting ambitious goals (versus easy to reach goals, “do your best” goals, or no goals at all) motivate people to expend more effort and achieve higher performance levels (Locke and Latham, 1990). This is also true if people are asked to set their own “self-goals.” Furthermore, Bandura and Cervone (1983) have found the combination of goals and feedback area superior to having either one alone. Finally, Vroom (1964) has shown that motivation levels are higher if people have at least a basic skill level related to the task. In other words, workers need to have enough skill to believe that successful performance is at least a possibility.

Thus, the lesson is clear: if organizations want to develop high levels of intrinsic motivation to learn, as well as the attendant high levels of performance in their employees, they should:

- ensure that at least a basic skill level is possessed in the area of expertise under consideration;
- be aware of, and nurture, preexisting levels of intrinsic motivation,
- carefully consider how external rewards are deployed,
- set ambitious yet attainable goals for their workers, and
- provide feedback that is informational rather than critical in nature.

The resulting “optimal experience” is a strong motivational force that most people have experienced at one time or another.
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researchers refer to these motivational forces as the “flow experience,” and a discussion of how these concepts work in concert is presented in the next section.

Flow: Seeking Optimal Experiences

Consider a rock climber in the process of scaling the vertical 2,000 foot face of Yosemite Park’s famous Half-Dome. Asked what she was thinking during the climb, she responds, “It’s hard to put into words… it was just me against the mountain.” Next, consider the image of a violinist in the midst of performing a violin concerto. Her eyes are closed, her face taut with the effort, almost “feeling” the music. When asked how she does it, she says that she’s not sure, that she “loses herself” in the music. Finally, consider a hall-of-fame basketball player making his seventh three-point basket during a game. If asked how he performs at such high levels night after night he responds, “I don’t know, I guess I was just in the zone.” All of these experiences illustrate what Mihaly Csikszentmihalyi (1988; 1990) has referred to as “flow” or “optimal” experiences. With these experiences, people find themselves in a psychological state where they are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable and/or engrossing that they will do it even at great cost, for the sheer sake of it.

How do we realize these optimal experiences? Csikszentmihalyi’s research suggests that the following requirements must be met for flow to occur (it is instructive to note the similarity of these “flow” requirements with the list discussed earlier):

- The learning or practice of a skill takes place
- Immediate feedback on performance is present
- The task presents a challenging yet attainable goal
- A measure of self-control is possible (the person’s destiny is in his or her hands)

The presence of clear, challenging goals serves to provide direction for the participant, while the presence of immediate feedback eliminates any opportunity for daydreaming or focusing on “off-task” activities. For example, people are much more focused exercisers if they set personal goals for themselves and their stationary bikes, rowing machines, etc. provide feedback related to speed, heart pulse, or calories burned. Together, goals and feedback allow people to concentrate or immerse one’s self in the task completely. In so doing, people often report that concern for the self disappears, and that often their perception of time is altered. For example, our violinist may remark that a 24 minute concerto seemed to last just a few minutes, while our basketball player may comment that when he’s in the zone, everything seems to occur in slow motion.

Perhaps most important to the concept of flow is that the challenge facing the person must be closely matched to the skill level possessed by the participant. This skill-goal match can be seen in Figure 1.

As can be seen in the figure, if the challenge presented is perceived to be significantly greater than the skill level possessed, a person may find themselves in region A. Here, rather than an optimal experience, a person’s experience is characterized...
by frustration and anxiety over poor performance and perhaps ultimately results in the person giving up. Alternatively, if the skills possessed outstrip the challenge presented, a person would find him or herself in region B. Here, the person’s experience likely is characterized by boredom, inattention, and again degraded performance. Fortunately, there are prescriptions that can be followed for people that fall out of the flow zone. For region A, attention to increasing skills should be given (lessening the challenge, once attempted, is not a fulfilling alternative in this case). For region B, the challenge needs to be gradually increased. Csikszentmihalyi also maintains that in order to realize personal growth, increases in both the skill requirements and challenges presented must occur (thus moving higher up the flow channel) in order to remain in flow. Changing one component without the other pushes the person out of flow.

The concept of flow is an appealing one as we consider the challenge of improving organizational learning and performance. In the following section, we take the concept of flow and present suggestions relating to how information technology might be designed and deployed to foster the flow experience, and in so doing, improving the learning and performance of the individual, and the organization in general.

**Technology-Assisted Flow: Motivation to Learn Through Engaging Information Systems**

Utilizing information technology (IT) as the foundation for improved organizational learning and performance will only be successful to the extent that the technology gets used. The IT industry is littered with “successful” IT implementation efforts that ultimately resulted in systems that end-users refused to use, or at best used in a limited and noneffective manner.

We believe that if IT systems are going to be embraced by end-users (whether internal or external to the organization), they need to be more than just “user friendly”—they need to be “user-engaging.” In other words, software applications need to be satisfying and compelling to use; perhaps designed to create and foster the “flow experience.” Although we seldom if ever see these applications in the workplace, we are all familiar with such engaging systems: today’s video games or arcade technology.

How many of us have witnessed young children or teenagers (perhaps even adults?) who were actively engaged (in the zone?) while playing video games? It is common for such “game players” to voluntarily (often at great expense) learn and master newer and more challenging video games (consider the concept of graduating to new levels or “worlds”). Not surprisingly, recent research indicates that an individual’s brain activity is much higher during the playing of video games than when watching television. What if organizations were able to design information technology solutions that were equally engaging? We believe that not only would such systems be actively used by end-users, but also those end-users could experience active learning, could be coaxed into providing meaningful information, and could collaterally improve their work performance.

We offer the following observations with regard to video game and arcade technology, and suggest that given our earlier discussion on theories of motivation and the flow experience, organizations might wisely consider incorporating some or all of these characteristics into their IT systems to improve user-engageability:

*Engaging systems are highly graphic and animated.* Even very early video games utilized simple animation rather than relying on text (remember Pong?). In instances where text might suffice, video games instead use symbols, icons, and action figures. Today’s systems should seek to incorporate similar levels of graphic information and animate them where possible. For example, Microsoft Corporation’s latest version of Microsoft Word® word-processing software permits users to select from a series of animated characters — from animated paper clips to an Albert Einstein look-
alike — to serve as agents to help users learn the system. Not only does this provide mild entertainment, but also subtle movements from animated characters instinctively draw the user’s attention to the animated character. This animation, coupled with the context-sensitive nature of the help facility, keeps the user’s attention on the task at hand (getting assistance, learning new skills), rather than moving to off-task mental processing (i.e., daydreaming).

**Engaging systems present a challenge to the user.** Not to be confused with systems that are challenging to use, engaging systems typically issue a challenge to the user and dare them to take up the challenge. As earlier alluded to, goal and motivational theories suggest that rather than easily attainable goals, stretch goals serve to compel people to increase efforts to achieve the goal. Furthermore, as end-users become more proficient with the system, the level of difficulty (and hence the challenge) increases — video-based opponents become stronger, more agile, and present challenges to the user at a faster pace. Whether they realize it or not, video game designers are appealing to the intrinsic motivational drive in us which responds to the issuance of an ambitious “stretch” goal.

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Imagine going to the driving range at night to practice hitting golf balls in the dark. You’d have no idea about how you were doing until you came back the next morning (and had the unenviable task of retrieving and recording your results and trying to map the results to your golf swings the previous night). Not only would golf this way be less enjoyable (were we in “the zone” or not?), the practice would also be much less effective. What about our concert violinist mentioned earlier being forced to practice her music without being able to hear the music? How helpful would hearing a recording of her efforts at a later time be when compared to real-time hearing? Would there be any chance of entering the flow state during these kinds of practice sessions? The reader might feel these are ridiculous analogies. But how ridiculous are they when compared to the practice of having employees wait months for their annual performance reviews? Flow experiences are derived in part from the combination of challenging goals and immediate feedback. For example, video games tell users in real time how they are doing in their efforts to achieve the goal. Medical students, students taking MBA entrance exams, and driving students now take many of their tests from computer-assisted instruction (CAI) workstations that provide instantaneous feedback on their performance. The potential for intranet-based multimedia training holds further promise for this kind of engaging learning. Not only do students prefer it, goal theorists have found that when provided instantaneous feedback on performance, subjects will exert more effort to achieve their objective. Exercise equipment (as referred to earlier) with performance indicators are an example of using feedback for improved performance, e.g., beating the clock or “virtual” opponent, improving a personal best, etc.

**Engaging systems put the user “in” the experience.** Through the use of increasingly realistic simulations, headsets, and interactive “power gloves,” users are now able to exist in “virtual reality.” Interactive Pictures, Inc. (IPIX), is a multimedia software company that has developed a photographic process that allows anyone to create non-distorted, “steerable,” 360-degree pictures from two back-to-back photographs taken from a fish-eye lens camera. These computer-based pictures can then “surround” someone sitting at a terminal.
and by moving the mouse permit the user to look around (i.e., “steer”) and infinitely scan any 360-degree panorama. This cost-effective computer-photographic process brings new meaning to the term “being there.”

**Engaging systems store performance results for later analysis and comparison.** With the use of “high scores” lists, users know how they stack up against all other users that have been issued similar challenges on that particular machine. This feature allows users to determine if new work (or in this case play) strategies work over the long term. In essence they are forced to reflect on their performance. This reflection process is crucial to learning (Johnson and Johnson, 1989). In addition, such high score achievers are often granted free games. This type of feedback is purely information in nature; there is no critique offered. Again, these qualities serve to keep users “coming back for more” in an effort to better their relative performance.

At this point the reader may be somewhat skeptical of the power and effectiveness of arcade technology applied to the workplace given that the end-users and stakeholders are typically busy business professionals rather than teenagers with idle time. In the next section we offer empirical evidence that suggests arcade-like systems can be used in the business arena and can indeed engage business professionals.

**The Laser Tag Experience: Business Professionals in the Arcade**

As part of a seminar on organizational learning, the authors arranged for approximately 40 upper-level technology managers from a variety of Fortune 100 companies to participate in “laser tag.” Much like “capture the flag,” laser tag allows teams to compete against each other by firing optical lasers at each other while ultimately attempting to find and destroy the competing team’s “home base.” Teams must also seek to avoid being “hit” by opponent lasers (being hit by an opponent’s laser temporarily disables your ability to operate your laser). The authors arranged this exercise in part for recreation, but primarily to better understand how engaging systems affected human-system interaction, the motivation for business professionals to interact with the technology, and the potential for individual learning as well as group learning to occur through the use of such technology.

As the participants waited in America’s largest shopping mall at the entrance of the laser tag center (dressed in button-down shirts, ties, skirts, etc.), comments ranged from the cynical — “This is ridiculous; what if someone I know sees me here?” — to the incredulous — “I can’t believe I’m going to do this!” However, once the exercises began, the participants (remember, we were dealing with both male and female business professionals) quickly became completely engaged in the task. Why the high level of engagement? In addition to being a relatively entertaining task, we found that the laser tag system generated this kind of response because it embodied all of the previously mentioned characteristics of engaging systems. First, the exercise was animated. The participants, with their daring leaps and rolls across darkened mazes as they attempted to hit the enemy and destroy their opponents’ home base, supplied their own animation. Second, the exercise offered a significant challenge (the participants couldn’t just walk up and destroy the enemy base…an opposing team was trying their best to destroy them and prevent it). Third, it offered real-time audio, visual, and sensory feedback (backpacks that supplied power to the laser guns made noise, flashed, and vibrated immediately when hit). Fourth, the users were completely immersed “in” the experience. Finally, through a wireless connection to a central computer, the individuals’ “hit-rate” as well as how many times they were hit was tabulated and scored for each individual and team thus providing performance results for later analysis and comparison of performance strategies. It was indeed “user engagement” at its finest, and was able to create a flow experience for most of the participants (most reported that time was distorted; it “flew by”).
Engaging Systems, Learning, and Performance

Engaging systems applied in the workplace context can offer the ability to quickly gauge the success or failure of a given performance strategy, and thus could enhance learning. For example, in the laser tag experience, the authors were curious if an individual, “every man/woman for him/herself” strategy was better than a team-oriented, “I’ll cover you, you cover me” approach. The participants and we quickly learned that the individual strategy was superior to the team strategy in the short-term. The point here is that the technology enabled us to quickly measure success and failure and monitor positive or negative developments over time (would the team strategy ultimately become the superior strategy over time as teams learned how to work together effectively?). This real-time learning is an example of that required by businesses today as they struggle to respond to dynamic market environments.

A good example where arcade technology could be applied to create engaging systems in an organization is the “call center.”

Engaging Systems in Real Life

Given the findings in the laser tag experience, what can be said about the development of engaging systems for practical business use? In this section we outline some hypothetical as well as some in-use systems that support the notion of the importance of user engagement.

The Video Arcade Meets the Call Center

A good example where arcade technology could be applied to create engaging systems in an organization is the “call center.” Call centers, with teams of telephone and computer terminal-based customer representatives, are many times the first point of contact that an organization’s stakeholders — the customers and other business partners — have with the organization. Call center technology provides customer information (e.g., name, address, business relationship with the organization, customer histories, etc.) to call center representatives often in the time between when a customer calls the organization and the call center representative picks up the call. Given that: 1) much of the customer caller’s information could be represented by a combination of animated text and graphics (graphic/animated interface), 2) the challenging goals of timeliness and quality of service — the key measures of call center performance — are present, and 3) the system can be designed to immediately provide response time metrics as well as conduct touch-tone or automated voice-response surveys of callers about their level of call satisfaction with the service experience (real-time feedback for real-time learning in the form of modifications to service practices), it is possible that call center information systems could be designed to achieve a flow experience for customer support representatives while learning, assisting customers, and improving their overall performance. Furthermore, this response time data and customer feedback could be stored for later performance analysis, thus permitting the organization and customer representative to learn what customer support practices are most effective over time. Ultimately, it appears that call center organizations could benefit from user-engaging call center systems.

Car Buying in Virtual Reality

A second example of engaging systems occurs in the auto industry. Innovative software companies are now merging the engaging characteristics of virtual reality technology with sales and promotions systems for car dealerships. These systems allow prospective car shoppers to view models of cars on high-resolution display terminals. If the shopper would like to see the car in a different color, the system instantly repaints the screen with the particular model in the selected color (highly graphic). Computer based photographs (including
the 360-degree panorama pictures mentioned earlier) permit the car shopper to view the car from different vantage points (including the 360-degree view from the driver’s seat), and by moving the mouse, look around and zoom anywhere in or around the passenger compartment. By keeping a running total of the price of the car based on the options selected, (instantaneous feedback), the customer has the flexibility to select and deselect options while staying within his or her price point. Finally, the feature that really adds “sizzle” to the system centers around a video camera which scans a picture of the customer while they use the system and then puts a virtual image of the person (complete with their face) sitting inside the car so that the customer can see how good they look behind the wheel! Overall, an engaging flow experience for the customer.

If this system sounds nice for the customer and an effective way to market automobiles, it is nothing compared to the information the system provides the car manufacturer. As shoppers select and deselect colors and features, the system continuously tracks those options across all dealerships that are most popular or least popular, those features that are the last to be deleted before purchase, those feature or package combinations that are considered to be a trade-off for potential buyers, as well as how the tastes of consumers change over time (long-term feedback for later analysis). Some systems reveal the power of inquiry: When options are eliminated, the system responds with, “I see you have eliminated option XYZ. What were the factors that led to your decision to do this?” Without these systems, information that normally falls silently on the showroom floor (and that market researchers would die for) is now available to automakers to learn the changing tastes and requirements of customers in order that they may better satisfy demanding customers with products they truly desire.

Engaging Learning Through Multimedia

Computer-based training (CBT) employing multimedia technology (e.g., video, graphics, sound, etc.) provides an excellent opportunity for the development of engaging systems to aid in learning. For example, a large mass-merchandise retailer is using multimedia CBT systems to train customer service employees. On their computer screen the trainees are presented with video-based customers that have “taken a number” and have been waiting in the customer service line. The CBT system then prompts the trainee with options like: a) “Next?” b) “Could I help customer number 42?” If the trainee chooses option a) and a customer approaches the trainee (on the screen) out of turn, another irate customer’s face fills the screen screaming, “why don’t you call the customers in numeric order!!”

State driver’s licensing bureaus are also using CBT technology. When the screen shows an automobile driving in front of the trainee, the system tells the trainee, “You are travelling at 50 miles per hour. How many car lengths should you leave between you and the car in front of you?” If the trainee enters too small a number, the system not only lets the student know that they were wrong, but the video goes on to show the trainee colliding with the car in front of him or her.

In both examples, the use of multimedia serves to enlist emotion as well as multiple senses to show the trainee the consequences of his or her action. This heightened informational feedback makes learning much more effective.

Conclusions

In this article we have presented some of the more important findings in the area of motivational research. One concept — the flow experience — was found to be a coalescence of these findings and was introduced as a psychological state that could provide an optimal learning and performance experience for a person.

We believe that organizations should seek to develop systems that by design enhance the probability of achieving flow experiences and are thus more effective as a result of their ability to
engage users. By presenting them with significant challenges and offering real-time learning opportunities, people that are more engaged by the system will be more likely to embrace and learn from the system, ultimately improving performance as a result of using the system. We offered several system characteristics derived from observations of the video game industry that organizations may want to incorporate into business information systems to achieve higher levels of “user engageability.” Finally, we presented examples of what engaging systems might look like in the workplace, as well as evidence that suggests that knowledge workers in today’s businesses are willing and able to achieve “flow experiences” through information technology.

References


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