Experience, Engagement, and Shikake

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Abstract

Shikake provides an interesting way to trigger behavior change in various contexts. However, the way a Shikake triggers behavior is a complex process. We may become interested in a Shikake because it unambiguously supports some of our abilities, it is fun, or just by following other people's behavior when they are interacting with it. Similarly, the outcomes of the interaction can greatly vary from sustainable learning to vanishing curiosity. Nonetheless, each time we interact with a Shikake, we experience the world around us. Consequently, the quality of the mental effort and the quantity of the behavioral effort the Shikake triggers determines our level of engagement in an event. Here we present a psychological design framework that connects Shikake triggers, experience, and behaviors in an engagement space. The contextual focus is on education and learning. An experiential level inspection reveals both conscious and unconscious perceptual pathways, which are especially crucial to understand when learning behaviors are triggered. The framework provides heuristics of what to consider when studying, evaluating, and designing engagement in human-environment interaction processes from a trigger to the resulting experience and behavior.

Introduction

For many scholars, experience is a buzz-word whose meaning is hard to capture, yet it is essential in order to understand very basic human-environment and human-technology interactions. People are experts in experiencing the world around them. Nevertheless, the concrete everyday experience has overwhelmed scholars who seek out a scientific and objective interpretation of internal psychological processes. Thus, subjectively multidimensional approaches that depict the experiential process have been ignored, although they are just what are needed in order to explore the thick subjectivity of the human experience.

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Here we present and refine the *experiential cycle* approach (Takatalo 2011), to describe how experience evolves in an active human-environment interaction process. Then, we create an engagement space and integrate the experiential cycle in it. Within the engagement space we use the experiential cycle approach to demonstrate the levels of engagement in different environmental events, especially in an educational context. Shikake as trigger for behavior change is implemented in the engagement space thus formed. The aim is to provide psychological insight for the design of the Shikake triggers for both implicit and explicit behavior change to solve problems and to learn.

Experience

The experiential cycle (figure 1) is based on the perceptual cycle presented by Ulrich Neisser (1976). The perceptual cycle concerns human information-processing, such as learning, understanding and planning. The perceptual cycle provides a generic and simple information-processing description of human-environment interaction, albeit lacking the necessary psychological multidimensionality. In order to emphasize the multidimensionality of experience, all three psychological subsystems – *attention*, *awareness* formed by the trilogy-of-mind entity that includes cognition, emotion and motivation, and *memory* were integrated into the perceptual cycle (Takatalo 2011). The result was the experiential cycle, which takes into account the *energizing*, *striving*, and *sustaining* of our perception and cognitive processes as we perceive and experience the world around us. The experiential cycle is psychologically sustainable and it reveals a wide array of fundamental psychological characteristics to advance our understanding of an experience. The experiential cycle provides both the theoretical backgrounds and the methodological requirements for studying conscious experience.

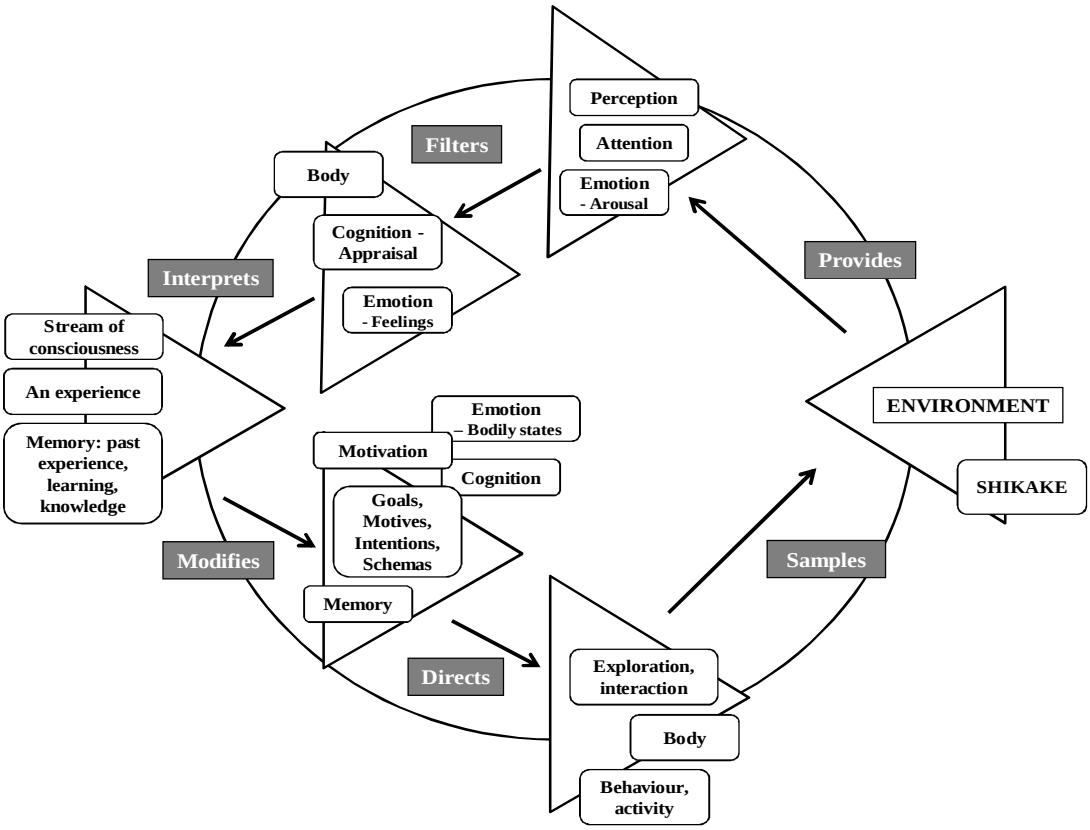


Figure 1. The experiential cycle (Takatalo 2011).

The experiential cycle starts with motivation, which means releasing a mental source of energy and switching on a pattern of behaviour to satisfy a need (Laming 2004). Usually, our motives and goals *direct* our environmental interactions and explorations. The stronger the motivation to achieve a goal, the more energy is invested in the pursuit of that goal. Emotional arousal, that is, the degree of activation in an organism, is a well-known indicator of our level of intensity and alertness. Arousal can be described on a continuum from deep sleep to high excitement, and is considered an important component of human attention (Posner and Boies 1971). Together, arousal and attention enable us to *sample* our environment and act according to the best practices that would lead to the satisfactory achievement of the goal. Following the motivational hierarchy of goals, the attention-arousal pair guides our perception and keeps the focus on interesting and meaningful environmental stimuli, *filtering* out the irrelevant ones. That is why we perceive and focus our attention on stimuli that motivate and interest us. Without such a mechanism, in the middle of so many environmental stimuli our minds would be in a state chaos (James 1890). Only relevant and meaningful perceptions are given attention and enter into consciousness, thus becoming *interpreted* representations.

Cognitively, we recognize these representations and relate them to each other and to the goals and schemas stored in our memory (Loftus and Loftus 1976). This interpretation process is enhanced by the attachment of emotional labels to schemas (Lazarus 1991). However, it would be wrong to consider emotions merely as passive followers of cognitions; emotions also have an effect on motivation and on the cognitive evaluation of new goals and plans (Novacek and Lazarus 1990). Emotions can interrupt ongoing goals and substitute new ones (Simon 1967). Thus, motives and goals gain emotional value depending on their importance. In addition to feelings, emotions elicit physical changes in bodily states called somatic markers (Damasio 1994). These somatic markers provided by the body affect the experiential cycle. In this way the mind of the perceiver is linked to the body (Damasio 1994). This closes the experiential cycle, in which an everyday stream of consciousness or more definite “an experience” (Dewey 1934) are formed. These different types of experiences occupy the conscious mind and become past experiences and learned knowledge gained our interactions with the world. As such, they affect the future experiences and behaviours by *modifying* new motives.

Within the experiential cycle, the experience gains its "amount", which can be described with the following characteristics: *content, quality, intensity, meaning, value, and extensity* (e.g. voluminous, a spatial attribute) (James 1890). These characteristics provide the focus for the research that concentrates on experience, but they are generic enough to preserve the experiential richness and multidimensionality of the phenomena studied.

The experiential cycle approach has been developed in studies conducted in virtual environments (VE's) (Takatalo, Nyman, and Laaksonen 2008) and digital games (Takatalo, Häkkinen, Kaistinen, and Nyman 2010). Thus, the experiential cycle has mainly used to create a psychological map from an event (e.g., playing a digital game), which has a clear beginning and an end. Such an event is likely to create *an experience* (Dewey 1934), which emerges when an event has an impact on the person who is experiencing it. Moreover, the experiential cycle considers experiences that evolve when we live through events in our lives and interact with objects and other people (Visualthesaurus 2004). In sum, the experience in scope is 1) external, thus, based on perceptions of our external (exteroceptive) senses (primarily audio-visual in digital games and VE's) as well as 2) conscious, in the sense that we actively focus on and interpret the environmental information relevant to us and use this knowledge in formulating our future actions. Thus, experience evolves is an individual's top-down process in which we gather information from our environment, interpret it and use it to construct the reality around us (Janssen and Blommaert 1997). When revealing experiential process we can better understand the concept of engagement and the role of Shikake in it.

Engagement

The focus of this study is on how engagement is defined in the fields of digital and serious games, as well as in education and learning. Visual Thesaurus (Visualthesaurus 2004) connects engagement with concepts such as involvement, commitment, and participation. *Involvement* indicates a motivational relationship between a human and an environmental object or event. Involvement includes two distinct, but closely related dimensions: importance and interest (Schiefele 1991). *Commitment* indicates dedication, loyalty, and allegiance. *Participation* refers to a connection to either individual or social activities. Engagement is closely related to human motivation by describing the motivational energy in action (Rickabaugh 2012).

Engagement Factors

Research on digital games has listed psychological factors for engagement. Based on the qualitative interviews and previous studies, Whitton (2011) presents a five-factor model for the learning engagement in games: challenge, control, immersion, interest, and purpose. Some scholars list ingredients of great games that drive engagement in any given context; self representation, narrative, feedback, transparency, teams, economies, ranks and levels, rules, communication, and time pressure (Reeves and Read 2009). Many of the above factors are known antecedents, correlates, or outcomes of flow experience (Csikszentmihalyi 1975). Flow is positively related to learning (Webster and Martocchio 1992), and suggested as a design principle for engagement in educational games (Kiili and Lainema 2008).

Engagement Continuum

Some authors have described the game-play experience as a continuum in which engagement plays a crucial role. Brockmyer et al. (2009) developed a unidimensional measure of engagement, which predicts gaming involvement. The engagement measure was composed of multidimensional concepts such as immersion, presence, flow, psychological absorption, and dissociation describing a "progression of ever-deeper engagement in game-playing". However, concentrating on one "meta-dimension" may hide the unique experiential characteristics related to engagement. For example, presence alone is at least a five-dimensional phenomenon in PC games (physical presence, attention, arousal, role engagement, co-presence) (Takatalo et al. 2006).

There are also different views about the position in which engagement exists in the game-play continuum. McMahan (2003) relates engagement to the so called deep play, in which the gamer reaches a level of near-obsessiveness. On the contrary, engagement has been considered the lowest level of involvement in a game-play continuum, and followed by engrossment and finally total immersion (Brown and Cairns 2004). If the gamers don't have any interest towards the game, they will not engage with it. Because of this, they never become either engrossed by or immersed in the game.

Similarly, engagement is thought to follow motivational interest or curiosity on a Learning Independence Continuum (Rickabaugh 2012). First, engagement leads to enhanced self-efficacy, and then to ownership. In this process, the learner takes responsibility and learning becomes a commitment driven activity instead of a compliance activity. Finally, the learning independence emerges. In this stage, learning is sought, not assigned. Learning serves a purpose, for example problem solving, learning a new skill, enriching an aspect of life, or even individual enlightenment.

Experience in an Engagement Space

Although the temporal and contextual variables in the above studies vary substantially, the studies show that

engagement can be viewed as an active process, which integrates multiple individual events with varying "amount" of experience. Each unique experience is related to different behaviors as described in the experiential cycle. More importantly, each event requires a trigger, such as a Shikake for initiation.

In order to explore the relationship between the trigger, experience, and behavior an engagement space needs to be created. Educational studies (Fredricks, Blumenfeld, and Paris 2004) present three different types of engagement: behavioral, emotional, and cognitive. *Behavioral engagement* refers to positive conduct and obeying the shared rules, effort and contribution to class-room activities, and participation in the institution level activities. *Cognitive engagement* is closely related to intrinsic motivation and includes mental qualities, such as preference for challenges and hard work, self-regulation, and flexibility in problem solving. *Emotional engagement* includes affective reactions, values, and feeling of belonging. Taken together, these three types of engagement create the two dimensions of the engagement space, that is, the *quality of mental effort* and the *quantity of behavioral effort* (figure 2).

Dimensions of Engagement

The quality of mental effort describes the "amount" of experience, its content, quality, intensity, meaning, value, and extensity as described in an experiential cycle. The amount is strongly affected by the orienting content (e.g., a math class) that is experienced.

The quantity of behavioral effort can be roughly divided into *intrapersonal* and *interpersonal* activities, which vary in quantity of both participation and connection. In the context of learning, the continuum of intrapersonal activities includes observation, exploration, interaction, reflection, contribution, ownership, and independency or even mindful and spiritual enlightenment, for example. The interpersonal continuum includes compliance, following, communication, endorsing, co-operation, collaboration, leadership, and collective intelligence, for example (Groundwire 2012; Rickabaugh 2012).

Engagement space is filled with numerous events. These events require triggers that motivate people to act and experience the world. Shikake presents an example of an external, environmental trigger. Depending on the situational context, trigger, and previous experiences, people allocate both mental and behavioral effort towards the event. This process is described in more detail in the experiential cycle.

For instance, in school, the behavioral effort is likely to change in time. This change is largely affected by the way individual class-room events are experienced. In a motivating event, the quality of the mental effort is high. In

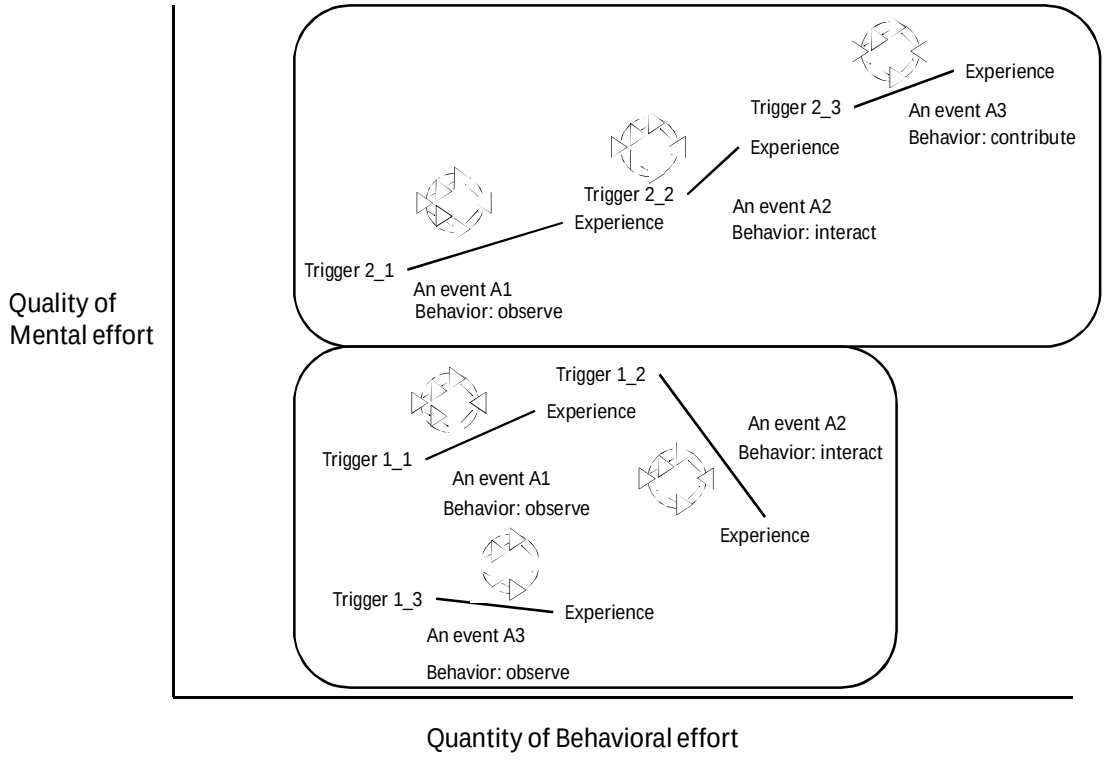


Figure 2: The engagement space showing the same sets of events (A1) with two different sets of triggers (Triggers 1 and 2) leading to different emotional and behavioral outcomes and levels of engagement.

such events, pupils allocate attention resources more intensively, are more willing to sustain hard work, seek challenges and have positive feelings towards them. Feelings of enjoyment and even flow in an individual event are likely to increase motivation to put more behavioral and mental effort towards the challenges in an event, and to engage it also in the future.

When enough such events are experienced and much mental and behavioral effort are allocated to them, people become committed and totally engaged. At an interpersonal behavioral level this is seen as creating active collaboration, taking leadership, or being an active part of a collective intelligence. At an intrapersonal level, committed pupils take ownership, act independently and intrinsically, and are driven by the joy of discovery and enlightenment.

The level of engagement may also change into another direction, especially if class-room events do not elicit qualitatively high mental effort, that is, they are experienced badly. After a bad experience, the trigger plays a crucial role. If the trigger is not capable of drawing enough interest and attention to support reflective and rich thought processes, pupils' mental and behavioral effort stays low.

The Two Visual Pathways

The experiential cycle describes experience as a top-down process, in which environmental information is interpreted and reflected consciously. Such "slow" processing of environmental stimuli provides explicit and structural guidance for actions (Kahneman 2011). However, depending on the trigger, among other things, an unconscious and "fast" experiential process may start. This bottom up process provides implicit and ecological guidance for automated operations of actions (Engeström 1997). Research on human vision and perception has recognized these respectively as the ventral and dorsal visual processing streams (figure 3).

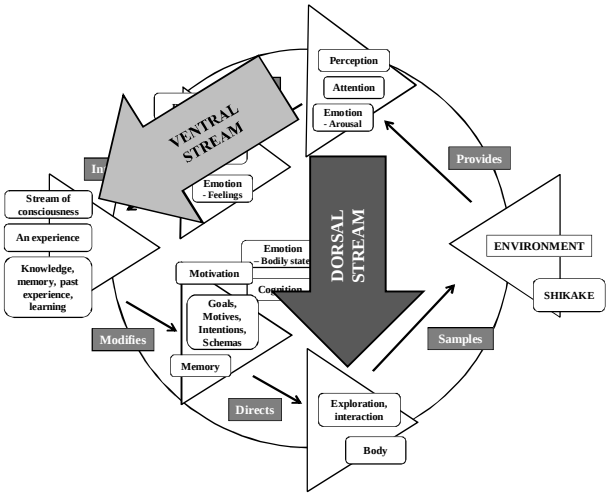


Figure 3: The two different visual pathways demonstrated in the experiential cycle (Takatalo 2011).

The ventral stream is related to perceptual representations such as recognition, planning, and memory. On the other hand, many human interactions are controlled by the dorsal processing stream of the visual system. Evidence from fMRI studies suggest that the dorsal stream processes, which control movements, are not accessible to consciousness (Milner 2012). In practice, this means that dorsal stream processing is quick, and automatic fine control of movements occurs without conscious thought. Similar findings about ecological and unconscious guidance of intrapersonal behaviors have been made (Kihlstrom 1996). For example, social judgments (attitudes, impressions) and compliance are considered to be mediated by unconscious processes. Thus, it is important to understand how the trigger employed affects the one who perceives it, in order to be able to design desired experiences and behaviors. In addition, understanding the different nature of the two information processing streams is crucial in selecting the methodology to evaluate the experiential and behavioral outcomes of the chosen triggers.

Triggering Learning

In general, people face events with certain motivational, cognitive, and emotional antecedents. These psychological factors determine the originating point of the trigger within the engagement space. In an educational context, we can assume that pupils participate in class-room events at least at the compliance or observing level. Thus, designers should be able to provide them a set of triggers that would increase their quantity of behavioral effort from interaction and communication to reflection and collaboration with each other and taking responsibility for their own, independent actions towards their learning initiatives. Positive and meaningful feedback from such activities would lead into high quality and meaningful experiences.

In many learning situations, slow reflection is preferred over fast experimentation (Kahneman 2011). In this way the resulting behavior and experience both support the problem solving outcome. A good starting point for designing successful pedagogical scripting that includes such triggers is to relate them to gamification guidelines that reach beyond simple badges and scoreboards (Reeves and Read 2009). Triggers embedded in ranks, levels, teams, transparent rules, an interesting narrative, challenging time pressure, and timely feedback are likely to enhance communication and help to maintain a flow-like experience. These in turn have a positive effect on both self-efficacy and learning.

The experiential cycle within an engagement space provides ideas and timing for the empirical data collection in order to study the effects of the Shikake in education. Depending on the educational phenomena and experimental resolution in scope (e.g., individual-social, milliseconds-years), the quality of mental effort can be captured with either objective psycho-physiological or measured with subjective qualitative and quantitative methods. The quantity of behavioral effort can be tracked from the level of body movement to the group behaviors. Mapping mental and behavioral data collected from the participant's interaction with the Shikake, the Shikake can be placed in the right spot in the engagement space and its effects on the participant can be better evaluated. This enables designing better Shikake, which can, for instance, support effective and engaged learning.

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