Design of Gamified Tool to make workshops Effective

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Abstract. Few organizations have combined workshops with gamification to help to save costs, improve the enthusiasm and output efficiency of participants and reduce various deficiencies. According to the theory of Octalysis, this article proposes Experience-Externalize-Combine-Internalization (EECI model) gamification tool design strategy for organizing concept workshops, and takes a domestic appliance company in China as an example to use the tool in its concept workshop. According to the EECI model, the interaction among participants will promote the externalization of their ideas.

1. Introduction
In organizations like enterprises and universities, people with different positions and backgrounds are encouraged to think and communicate with each other through workshops. Participation and innovation are encouraged to find solutions to problems and propose feasible solutions. However, there are many negative problems in the workshop today:

1) The main forms of workshop is brainstorming, which is widely questioned for problems like production blocking, evaluation apprehension and social loafing [1].
2) How to guide participants to discuss the topics of the workshops in a targeted manner effectively is very important. Therefore, the preparation and hosting of workshops has a great influence on the progress of workshops.
3) Sorting the ideas produced by the workshop will lengthen the timeline of it [2].

Over the past few years, gamification has been a hot topic and has been widely publicized for encouraging users to participate and enhancing positive experience. First, the gamification mode is simple to transplant and can be applied to different scenarios with design; second, the gamification mode has obvious results in improving the enthusiasm and output efficiency of participants; finally, the gamification mode can create pleasant experience in many scenarios.

The workshop is a typical form of group-oriented creative creation, and gamification is a multi-domain applied theory based on the study of games and participant psychology. Combine workshop with gamification could explore a creative working form of the group and study the practical effect of gamification on the stimulation of creative thinking[3].

2. Design Method
Generally, the purpose of gamification is to have a positive effect on human motivation and behaviour. Gamification capabilities can increase participants’ intrinsic motivation in a given activity and affect their behaviour.
2.1. Theoretical Method
The gamification expert Yukai Chou once proposed his own theory of gamification analysis: Octalysis theory. This method mainly introduces the eight classic core driving forces in the process of gamification: Meaning, Empowerment, Accomplishment, Social influence, Ownership, Unpredictability, Scarcity, Avoidance[4]. Game design commonly uses a classic deconstruction game framework, the Mechanics-Dynamics-Aesthetics (MDA) framework (Robin Hunicke, etc.). The mechanism includes the overall result of the integration of all game rules, visuals, sound effects, etc.; dynamics is the interaction between participants and the game itself in the process of experiencing the game; aesthetics includes what the participants get in the dynamic game system (especially emotional experience) [5].

2.2. EECI Model
This article takes a Chinese home appliance company as an example to conduct the gamification tool design experiment. Through multiple surveys of participants, organizers and creative evaluators, existing problems were analyzed and summarized from the company's previous workshop processes and results output. The main problems include three aspects: 1) Duration of the workshop Control; 2) the creation of the workshop atmosphere; 3) The enthusiasm for distributing creative ideas weakens with time.

Based on the analysis above, combined with the core driving forces of Knowledge creation and conversion mechanisms related to the purpose of the workshop according to the Octalysis theory and the MDA framework, this paper proposes Experience-Externalize-Combine-Internalization (EECI model shown in the figure1) gamification tool design strategy for organizing concept workshops. The EECI design method has the following characteristics: 1) open and free constraints; 2) meticulous emotional hints; 3) Continuous and in-depth interactive participation; 4) Full coverage of external stimuli. According to the EECI model, the interaction among participants will promote the externalization of their ideas.

![Figure 1. EECI model](image)

3. Design process
The design process of the gamification tool in this paper is shown in figure 2.

![Figure 2. The design process of the gamification tool](image)
3.1. Prototype Design

This gamification tool consists of 9 stitched layouts, creative collection cards of different colors, three kinds of cards and other accessories. Nine plates can be spliced into a complete layout in the order of nine squares. Eight of the layout are divided according to traditional functions and correspond to the main home business scenarios of home appliance companies. They are named as corresponding creative areas, which can be randomly selected and distributed for use. In order to create a new sense of experience, the 8 creative areas are divided into two travel routes. As shown in figure 3, the bedroom creative areas numbered 1 and 3, the living room creative area numbered 6, and the restaurant creative area number 8 are the same travel route. Among them, the proportion of the lattices of different colors is also the same, but there is a difference in order; the creative area of the study numbered 2, the creative area of the balcony numbered 4, the creative area of the kitchen numbered 5 and the creative area of the bathroom numbered 7 are the same route.

In each creative area, in order to give the participants a subtle emotional cue in detail and create a creative atmosphere that resonates with them, this gamification tool specifically simulates the real scene environment in visual performance and portrays the products associated with the scene, integrating it into the scene space as a background. Participants will accept the guidance of the atmosphere of the creative area they are in when they are thinking[7].

In the design process, based on human-computer interaction, design psychology and other theories, the size ratio, font size, visual performance, etc. of the prototype were thoroughly studied, and the volunteers tested many times to ensure that the tool played a normal auxiliary role in the workshop process.

Figure 3. The Layout of the gamification tool

The role of the creative collection card is to help participants express their ideas more clearly and completely, and facilitate the subsequent ordering and sorting of the workshop output. It is the externalization stage in the EECI model. The way to guide the collection of ideas for creative cards includes scenario problem descriptions based on Point of View (POV) writing techniques[8] and
creative expression logic based on How Might We (HMW) analysis methods[9]. The prototype design of the card is shown in figure 4.

![Card Prototype](image)

Figure 4. Creative collection card

### 3.2. Card Principle

The results of the study show that unrelated concept combinations are related to the source of innovation. The multi-directional stimulation of the outside world will promote the divergence of thinking. According to the characteristics of the workshop, this gamification tool mainly focuses on cards interaction. Cards are mainly divided into three categories: character cards, prop cards, and stimulation cards.

The content of the character cards is derived from the consumer map data provided by the user research department of the home appliance company. It is mainly divided into seven groups according to dimensions such as age, background characteristics, life attitude and consumption awareness, such as the new backbone, the traditional middle class, etc.

The main role of prop cards is to enhance the interaction and sociality between participants, promote the progress of the workshop and add fun. Prop cards are mainly divided into three categories: First, progress related cards. Second, social interaction related cards. We can refer to the prop card design of games such as Monopoly to add fun to the workshop and create a relaxed atmosphere [8].

The main purpose of stimulating cards is to stimulate the divergent thinking of participants by displaying knowledge and information from outside. There are various types of stimulating cards, and they are updated and supplemented with the times [9]. In the design of this gamification tool, a total of three types of stimulation cards are divided:

1) TRIZ card. The theory of TRIZ (theory of inventive problem solving) was proposed by Altshuller GS on the basis of analysis and research of 2.5 million patents in various countries around the world. As shown in Table 1, the three priority criteria include conducive to immediate solution, design occasions and cost reduction guidelines [10].

| Order | Conducive to immediate solution | Conducive to design occasions | Conducive to cost reduction guidelines |
|-------|---------------------------------|------------------------------|---------------------------------------|
| 1     | (35)Transform to physical/chemical state | (1)Segmentation | (1) Segmentation |
| 2     | (10)Prior action | (2)Extraction | (2) Extraction |
| 3     | (1)Segmentation | (3)Local conditions | (3)Local conditions |
| 4     | (28)Replacement of a mechanical system | (4)Asymmetry | (6)Universality |
| 5     | (2)Extraction | (26)Copying | (10)Prior action |
| 6     | (15)Dynamicity | (6)Universality | (16)Partial or excessive action |
| 7     | (19)Periodic action | (7)Nesting | (20)Continuity of useful action |
| 8     | (18)Mechanical vibration | (8)Anti-weight | (25)Self-service |
| 9     | (32)Change the color | (13)Inversion | (26)Copying |
| 10    | (13)Inversion | (15)Dynamicity | (27)Disposable object |
2) Insight cards. Based on recent product developments and key event news in various industries, extract word frequencies, tap technical relevance, and summarize trends. Insight cards are stimulating cards that are constantly updated and advancing with the times. According to different industry areas, they are divided into expansion packs for the main body of gamification tools, which can be used in workshops with different themes.

3) Revelation card. Contains two aspects of content, composed of 32 design thinking guides and 48 cards that awaken emotional resonance. The difference from the other two types of stimulating cards is that the inspiration card tries to use common sentences and daily logic to stimulate the thinking of participants, give them inspiration, and clarify the direction of divergence of thinking[11].

In the traditional workshop process, the role similar to the above card role is often played by the host or the organizer’s staff, the participants are not highly autonomous, and there is not much interaction between participants. As for the gamification tool, the cards are randomly drawn by the participants themselves. From these characteristics, the card design principles of this gamified tool are the three core driving forces in the Octalysis theory: empowerment, ownership, scarcity, unpredictability.

3.3. Mechanism Design

This gamification tool has a variety of usage mechanisms, regardless of the number of people and locations, and is not limited by the cooperation or competition mode within the group. Here, the author gives two examples of usage mechanisms:

One, a competitive workshop for a specific technology. Participants select the corresponding section according to the draw result. The participant with the smallest draw number needs to bear the responsibility of the game host, and guide other participants in an orderly manner during the game and regulate their behavior. Each participant selects a creative collection card that represents his own color, and randomly selects a card from the character card as his initial substitution identity.

Participants each have a coordinate chess that represents their progress in the workshop. The starting point of the coordinate chess is the start of their respective plates. From the participant as the host, the dice are rolled clockwise to start the workshop process. Each person advances the corresponding number of steps according to the number of dice rolled, and performs different tasks in different colored grids which on behalf of different tasks.

When the first participant who has accumulated 5 stimulus cards appears, he needs to press the ringer and participants enter the creative writing time for 10 minutes. When writing ideas, participants need to note the matching creative area number, target person number and reference stimulus card number for subsequent data collection and analysis to optimize the card’s function and frequency of use. The written ideas are pasted on their respective white boards. After the end of each writing time, the stimulus cards in all participants’ hands are cleared, and other types of cards are kept. Each participant participates and starts the workshop process from the current coordinate position, repeating the above steps.

When the grid of the participant's creative area is finished, the participant can choose another participant to exchange the scene and start again from the Start of the scene. After four rounds of creative writing time, the game enters the creative sorting stage. All existing ideas are classified according to the division of the creative area. Participants can briefly introduce the ideas they have written; all participants vote for their favorite ideas once to select the Best Creative Award. Eventually, the game will produce an Idea King with the most creative output and a Best Creative Award that gets the most likes to be rewarded.

Second, a collaborative workshop for a specific scenario. Participants are mainly in a cooperative relationship, each person has a dice, and they are together in a creative area. The workshop process under this mechanism is divided into two stages, namely the divergent output stage mainly based on POV writing techniques and the creative focusing stage mainly based on HMW analysis methods. Before the workshop starts, the participants first draw the character card, and then need to substitute the character's identity and characteristics. Participants in each round roll their own dice, advance in
the same creative area according to the numbers displayed by their dice, enter different color grid areas to perform different tasks, and freely record their divergent ideas (externalization). After 60 minutes, enter the middle discussion stage, participants exchange ideas and combine (combination). After 30 minutes, enter the 40-minute creative focus stage and write your creative ideas on the collection card (internalization). The last 10 minutes are used to vote for the best ideas in the group.

In the traditional workshop process, the process needs to be promoted by a dedicated person, and the time needs to be accurately calculated, and one person will affect the thinking of all participants; the traditional workshop follows the principles of free talk, deferred judgment, prohibition of criticism, pursuing quantity. In this gamification tool, participants master the progress of their workshop process, and the progress can be quickly fed back to the participants. It has given participants a considerable degree of independent choice space, forming a free constraint; active interaction with other participants[12]. The mechanism design of this gamified tool is the practical application of the four core driving forces in the Octalysis theory: Meaning, Accomplishment, Social influence and Empowerment.

4. Conclusion
This article proposes Experience-Externalize-Combine-Internalization (EECI model) gamification tool design strategy for organizing concept workshops, and takes a domestic appliance company in China as an example to use the tool in its concept workshop. Through the design and development process of gamification tools in this workshop, the authors summary that the EECI design method provides participants with a more immersive and communicative thinking environment. This method has the following characteristics: 1) open and free constraints; 2) meticulous emotional hints; 3) Continuous and in-depth interactive participation; 4) Full coverage of external stimuli. The EECI model gamification tool design strategy indicates a feasible direction for future research in this field.

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