How to develop art workshops to foster artistic expression and creativity: Using Inspiration-based Learning as a framework for creative education

岡田　猛

Takeshi Okada

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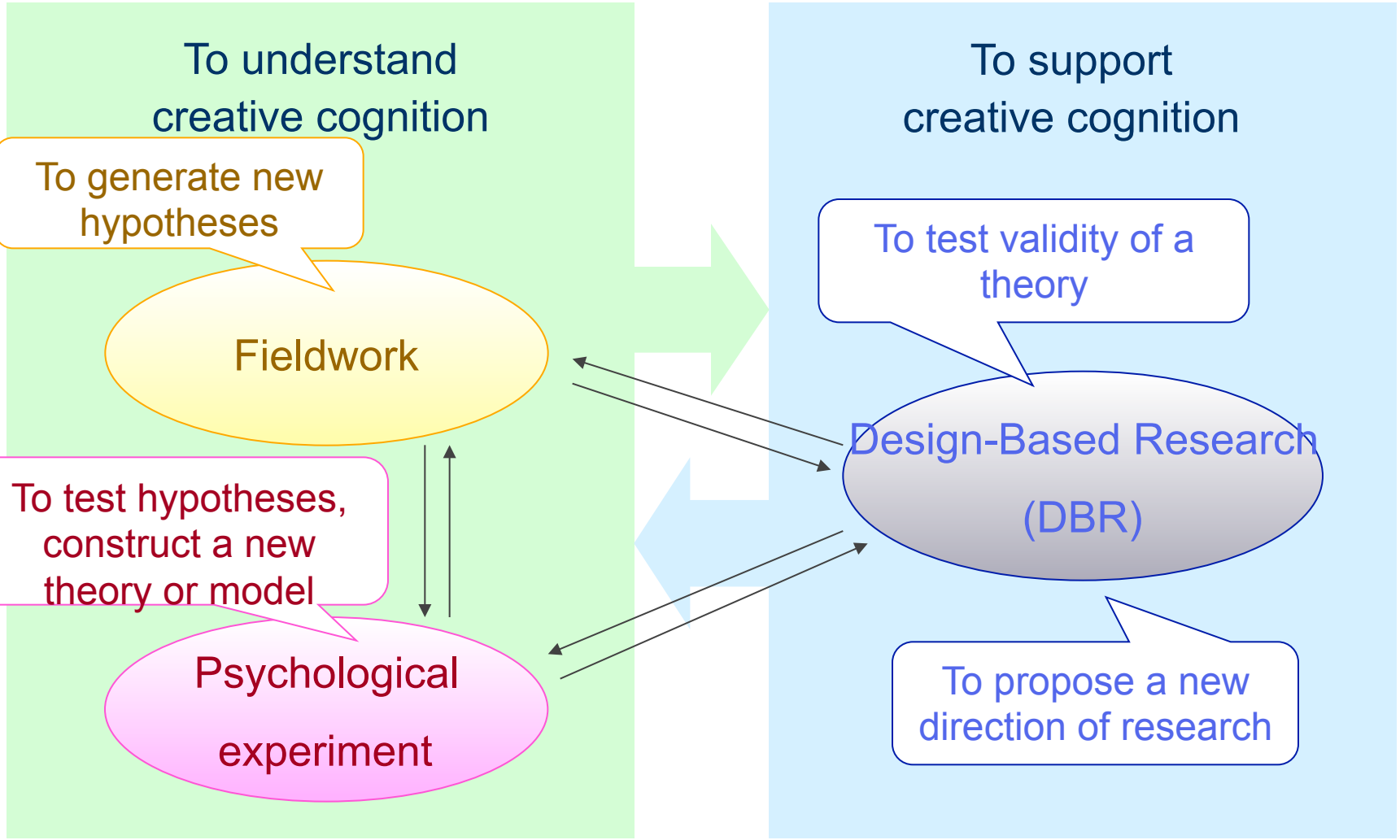
Our framework for studying creativity



Our lab's research in the past 10 years

- Research on artistic creativity
  - A coordinated set of field studies (Creativity and Inspiration Processes of Artists, CIPA) that follow the creative processes of 30 artists and 50 dancers. Some over the course of years. (Interviews, field observations, and field experiments)
    - e.g., Interviews with 30 artists include 13 male & 4 female elder artists, 8 male & 5 female young artists. 8 - 12 hours per person.
  - Psychological experiments with undergraduates and dancers.
  - Design-based research on artists', dancers', and actors' workshops and undergraduate courses. Design-based research on exhibition development and visitor studies at two museums.

Creativity matters!

- Creativity is one of the most important assets for citizens in modern society.
  - Creative class
    - People with creative occupations have tremendous amount of economic impact in modern society (Florida, 2014).

Today's talk focuses on the process of creativity.

Because

1. Creative products are produced as results of creative processes.

2. We need to design environments to foster people's creative process when designing creative education.

“Surprise” as a key feature in creative process

- Feeling of surprise (or feeling of personal discovery) plays an important role in creativity in scientific discovery, design, and artistic creation.

A case of scientific discovery

- Dr. Hideki Shirakawa received

Nobel prize in chemistry in 2000.

- In around 1967, an exchange student in our laboratory tried to compound polyacetylene, but he reported that the experiment was not successful because the pressure gauge remained unchanged. (The student possibly mistook quantity of catalyzer and made a thicker one than usual, or, failed to control the number of agitation.) Shirakawa looked into the reactor vessel carefully and found a thin film on the surface of catalyzer solution. Originally, powdered polyacetylene was supposed to be compounded, so, the thin film was an unexpected result. By not ignoring it as an experimental error and by studying the cause of the generation in the detail, plastic which conducts electricity was generated. (Shirakawa, 2001)

Dunbar（1999）

- Observation in molecular biology lab meetings
- 70 experimental results were reported in four lab meetings.
  - Expected results: 22,　Unexpected: 18,　Others:30
- Scientists' discussion

	Expected results	Unexpected
Theory building	33	161
Explanation	9	18

→Scientists actively used unexpected (anomolous) results.

- KEKADA（Klukarni & Simon, 1988）

  A computer simulation model that simulates the process of Hans Krebs' discovery of urea.

  This model uses surprising results (anomalous data) to make scientific discoveries. When an expectation is violated, this system tries to explain the anomalous data.

A case of design

- Suwa & Tversky (1997)
  - Architects use unexpected discovery and develop new ideas when they draw idea sketches.

Artistic creation

- Takagi, Yokochi, Okada (2013)

  A contemporary artist used a surprising experience as a source of analogy to develop an art concept for his new artworks.

Sources of surprise

A surprise could occur

1. When people encounter results different from their expectations. (feedback)

2. When people encounter someone or something that brings contradiction to their preconceived ideas (often on the unconscious level). (inspiration)

- Inspiration has a critical role in creative activities.
  - Artists are often inspired by stimuli in their environment and create new artistic expressions.
  - Scientists are often inspired by other scientists' research articles or research presentations and conduct new studies.

- Inspiration is the phenomenon in which people become motivated, experience new emotions, entertain new images and ideas for a new activity when they encounter someone or something outside of them.

- In this talk, we focus on inspiration in artistic creation.

Designing creative education

- We need to design educational programs (such as workshops) utilizing inspiration so that learners can develop creative abilities.
- We propose Inspiration-based Learning as a framework for designing creative education.

What is Inspiration-based Learning?

- Inspiration is a key mechanism for creative learning.
- Inspiration-based Learning is a method to learn how to be creative through encountering someone or something outside of oneself, experiencing feelings of surprise or discovery, and utilizing such experiences to create new works.

- This is a way of exploratory learning that utilizes a leap in problem space search (discovery of a new problem space or a new frame) through encountering something outside of one's world.

- Understanding the target correctly is not necessarily important for inspiration. Instead, the types of feelings, images, and ideas people entertain during an encounter are the important features of inspiration.

- In this sense, though we do not deny the role of correct understanding, it is different from the most prevailing framework of learning, i.e., "correct understanding and memorization" of a target phenomenon.

- It is different from learning from just reflection on one's action such as "reflection in action" (Schön, 1983) and "learning by doing"(Anzai & Simon,1979) , although such aspects are also included.

- Lucky encounters with the outside and effective use of such experiences are the key features in Inspiration-based learning. It is a way of exploratory learning in which learning is not to achieve a fixed goal but to search for new ways by setting new goals and new problem spaces.

- Inspiration includes feelings of surprise or discovery as an essential element. Therefore, Inspiration-based Learning involves not only cognitive processes but also emotional processes.

- Though acquisition of ideation skills and expressive techniques has been strongly emphasized in research studies on creative learning, Inspiration-based Learning puts emphasis also on the process of input for creation.

Designing for a creative education program using Inspiration-based learning requires the following:

1) Effective encounter with something outside of oneself in order to experience feelings of surprise or discovery

- encounter with inspiring others
- constraint modification (Takagi, Yokochi, & Okada, 2013)
- Improvisation
- ,,,

Designing for a creative education program using Inspiration-based learning requires the following:

2) Utilization of the feeling of surprise

- attention
- reflection
- analogical reasoning
- generation of new goals
- ,,,

Designing for a creative education program using Inspiration-based learning requires the following:

3) Participating in creative activity and effective social interaction

- support for active participation of creative activity
- support for social interaction and appreciation of/from other members
- ,,,

DBR with multi-methods

- As a methodology for such designing, we adapted Design-based research (DBR) by combining fieldwork and experiments as multi-methods.
  - Design based on research and Research by designing.
- Picking up an ecologically valid and important phenomenon with fieldwork, and uncovering mechanisms behind the phenomenon with experiments, we conduct DBR to develop educational programs. The approach to combining multi-methods depends on the target learning phenomenon.

Design-Based Research (DBR)

- Barab (2014), The Cambridge Handbook of the Learning Sciences 2nd edition.

  originated from “Design experiment” by Brown (1992) and Collins (1992)

- A method to study learning in natural environments that are designed and systematically changed by the researcher (not a fixed “cookbook” method; it is a collection of approaches.)

- Advancing theory and impacting practice are the goal.

Design-Based Research (DBR)

- The successive iterations of design, practice, test, and revision are intended to play a role similar to that of systematic variation in experimental studies.
- Compared to experimental studies, it is insufficient in strict identification of factors, but it may offer more useful knowledge regarding how to implement a particular variable or theory within the context of complex real-world practice.
  - In complex environments, experimental studies are awfully time consuming and often impossible to conduct.
- This is an approach gradually scrutinized in successive iteration of practice and design including implicit factors of the field.

Design-Based Research (DBR)

- It proceeds not only from researchers' point of view but also engaging that of various stakeholders in practices.

Our research projects in today's talk

- Fieldwork
  - A case study on a Chinese-Ink painter's drawing process
- Experiments
  - Copy and creativity
- Design Principles based on the fieldwork and experiments.
  - Deep encounters with something outside of one's own viewpoint.
- Design-Based Research(DBR)
  - Museum studies. Art appreciation through dancing.

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A field study of a traditional Chinese ink painter's drawing process

Takeshi Okada

Collaborator: Sawako Yokochi

Yokochi, S., & Okada, T. (2005). Creative cognitive process of art making: A field study of a traditional Chinese ink painter, Creativity Research Journal, 17, 241-255.

Outline of this research project

Participant:

- Mr. K. Suibokuga (Chinese-ink paintings) painter. (61years old, 18 years of experience as painter)
- Mainly draws on Fusuma (sliding doors) in Buddhist temples.
- Has exhibited paintings at museums in the USA and France in addition to many places in Japan.
- Has a special style of drawing. He improvises his drawing in front of audience by incorporating lines drawn by the audience into his picture.

- Period of observation:

  From May, 1998 to 2001.

- Data:
  - Process data of a *fusuma* drawing in temple X.
  - Data from a field experiment.
    - Eight pictures with lines and eight without lines.

Goal of this study

- With a case study based on observations, interviews, and a field experiment, we describe the drawing process of a *Suibokuga* painter and offer some insights for future research.

Features of his drawing processes

(1) His mental image of the picture is gradually formed while he is drawing.

(2) He draws in a fairly patterned way. However, lines that the audience drew or he accidentally drew on the paper create new constraints for his drawing and force him to create new patterns.

(3) He often moves his brush in the air before he actually draws lines on the paper.

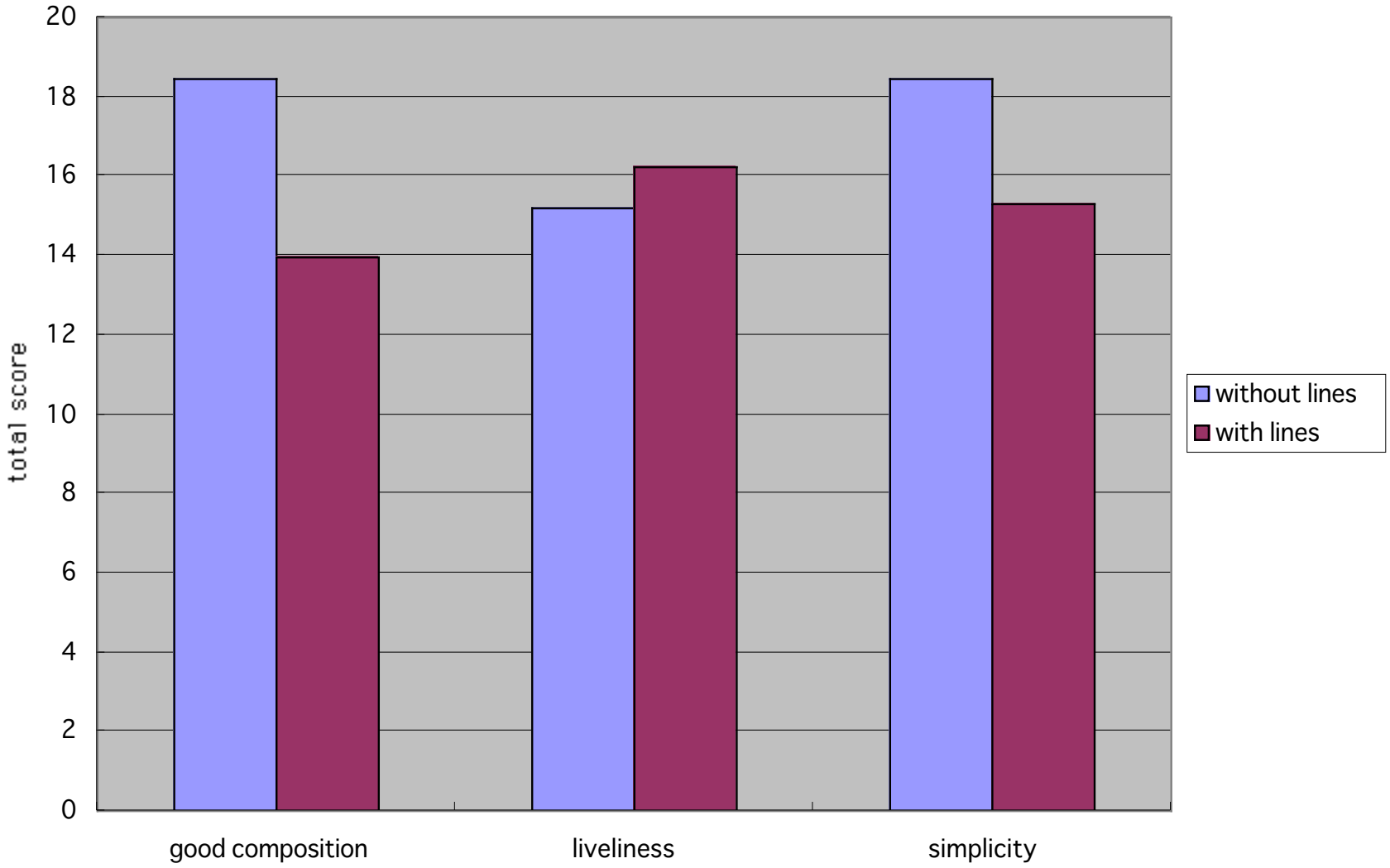
Lines that the audience drew create new constraints.

- drawing an object starting from lines the audience drew:

Field Exp. 9.3 out of 15 lines

→ The lines trigger (or constrain) his drawing.

- We asked 20 undergraduates to rate the impression of the paintings in each condition using a semantic differential method (7-point scale).


20
18
16
14
12
10
8
6
4
2
0
total score
good composition
liveliness
simplicity
without lines
with lines

- His pictures in which he incorporates the audience's lines have more dynamic compositions than the ones that he drew in an ordinary way.

- Incorporation of others' lines

=>*Emergence of new patterns*

- **Interview**

"With others' lines, I have to incorporate the others' world into my world. (deleted). I have to use them with my lines. (deleted). Seriousness! I enjoy playing this game in earnest. There is not just myself. I am eager to draw in this way. Yes. I am highly motivated with this way."

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How do examples inspire innovation?

The effect of imitating artwork on beginners' creative drawing processes

Takeshi Okada

Collaborator: Kentaro Ishibashi

Ishibashi, K. & Okada, T. (2006). Exploring the effect of copying incomprehensible exemplars on creative drawings. Proceedings of the Twenty-eighth Annual Meeting of the Cognitive Science Society, 1545-1550.

Okada, T. & Ishibashi, K. (under review).

- Goal: To investigate the role of inspiration in the artistic creative process. We pay special attention to imitation (copying) as a way to be inspired.

- It has been suggested that viewing or imitating an example has a negative effect on creativity (e.g., Design fixation by Jansson & Smith, 1991; Lowenfeld, 1957).

- However, many famous artists created their artwork through imitation.

- So, active imitation of other's artwork could stimulate artistic creation.
- But, no empirical study has been done on this issue.

We assume that imitation of others' artwork affects people's artistic creation processes as follows:

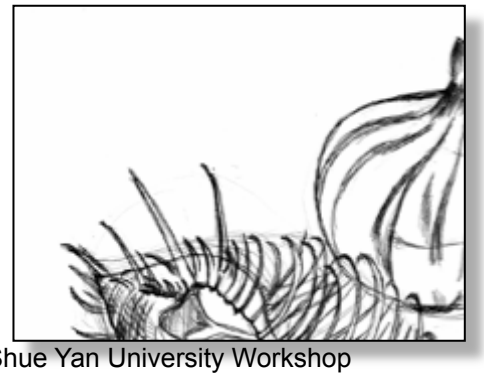
- When people imitate other's artwork, they try to interpret it using their own framework.
- When they imitate artwork that does not match their framework, their framework is challenged. Therefore, the power of the framework would be weakened (constraint relaxation).
- They try to understand the artist's intention by comparing it with their own. Such a process would force them to reconsider their own framework and contribute to the construction of a new framework (new perspective).

Art-lay people's beliefs about painting

- Painting is to depict what they see.
  - They evaluate realistic paintings as good pictures.
    - (Cupchik & Gebotys, 1988; O'Hare, 1976)
  - They often draw realistic sketches.
    - Even if beginning students are asked to draw their own original drawings, they drew only in the realistic style. (Ishibashi, 2003)

  ⇒ This tendency constrains their ways of drawing.

- Therefore, we assumed that people have a "realistic constraint" as the default value.



Outline of this study

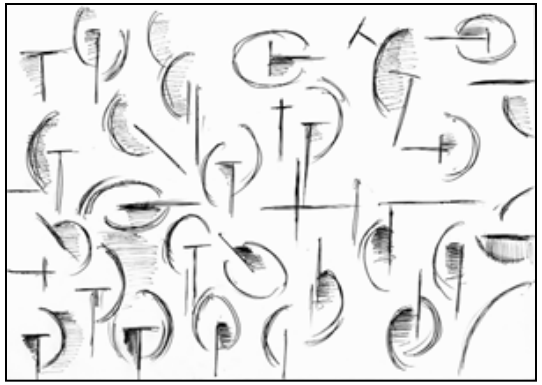
- Exp. 1 To investigate the effect of imitation of artwork on artistic creation.
  - Is artwork produced after imitation more creative?
  - If so, is it caused by the process that we assumed?
- Exp. 2 & 3 To investigate the factors of interaction that affects artistic creation.
  - What kind of artwork has the creative effect when imitated?
  - What kind of interactions including imitation and others have a creative effect?

Exp.1
Does imitation affect artistic creation?
: analysis of product

Outline of Exp. 1 (Okada & Ishibashi, under review)

- Participants
  - 30 undergraduates (non art majors)
- Task
  - We asked them to draw their original drawings using objects such as a pine cone and a pepper.

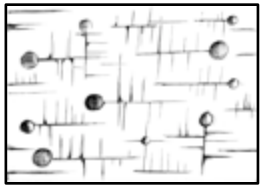
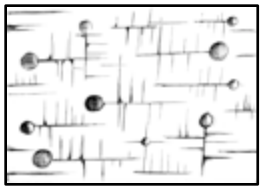
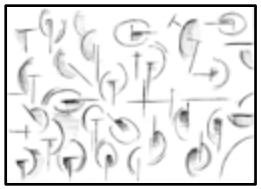
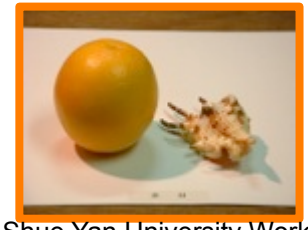
- We asked some of the participants to copy an unfamiliar abstract drawing.



Experimental design of Exp.1

- Condition (between) x period (within)

☐ order was counter-balanced

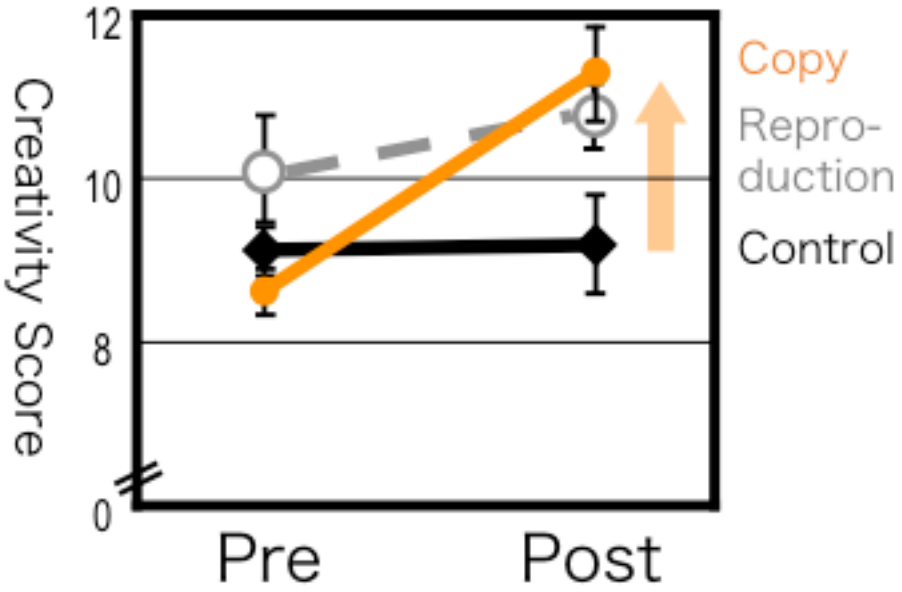
condition	Pre (1st day)	Intervention (2nd day)	Post (3rd day)
Copy	original drawing 	2 Copies  	original drawing 
control	original drawing 	2original drawings  	original drawing 
Re-production	original drawing 	2 Copies  	model's style drawing 

Result of performance

- Experts' rating
  - Two artists independently evaluated drawings.

↓

Only copy group
improved creativity scores.



- Similarity rating between model (abstract drawing) and students' post drawings (7 point scale)
  - Copy group $M = 3.3$ < Reproduction group $M = 5.9$

⇒ Through copying, they learned to draw creative pictures different from the model drawing.

Ⅱ. How does imitation improve creativity?

～Process analyses～

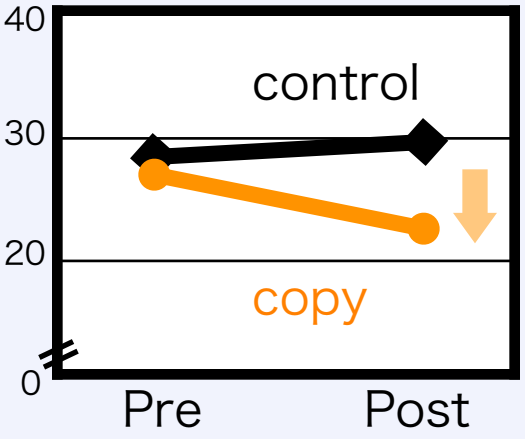
①relaxation of realistic constraint

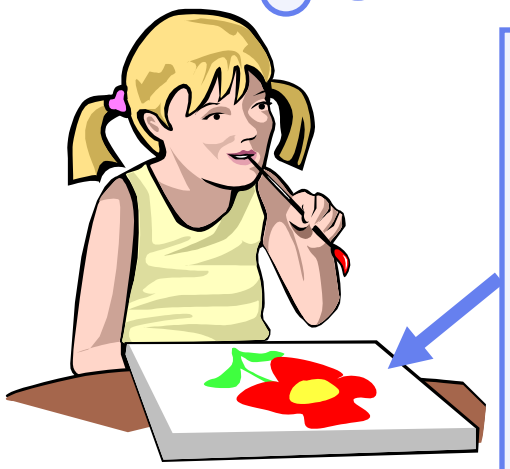
Realistic constraint

(questionnaire)
（e.g.：I intended to depict the exact shape.）

↓

Such intention decreased.



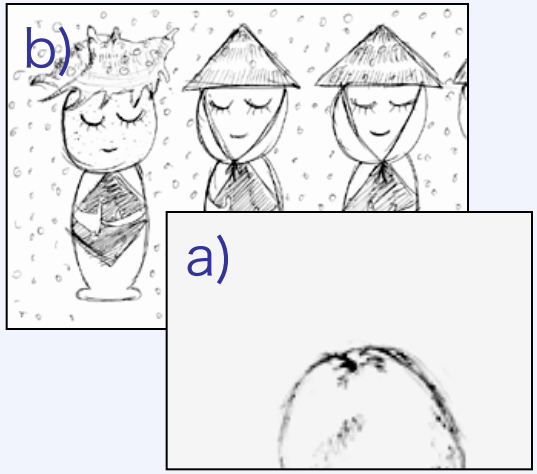


Realistic drawings

a) realistic sketches
b) representational pictures

↓

Such drawings decreased.



⇒Realistic tendency decreased after copying.

②new perspective (analysis of post interview)

Before copy

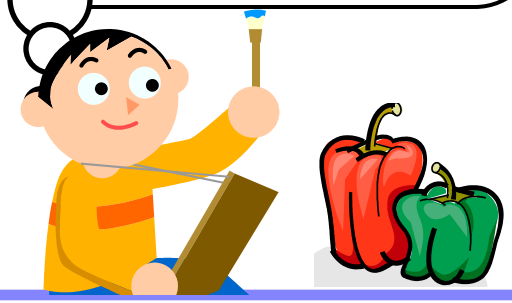
I would like to draw as realistically as I see.

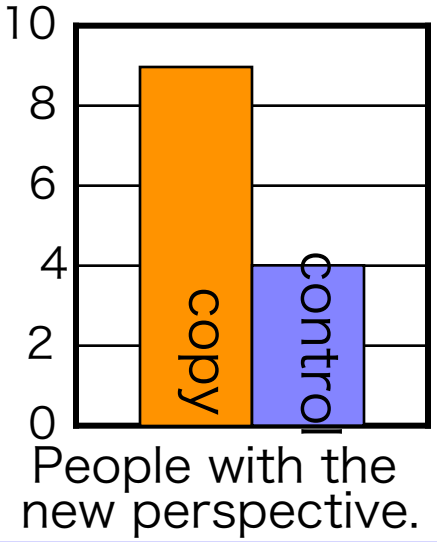
Change of perspective after copying

After copy

Focused on subjective impression of the object

This pepper looks very lively.

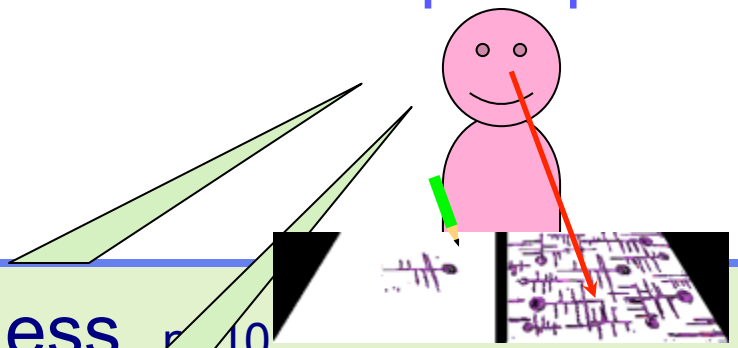




⇒ A new perspective focusing on the impression of the object is formed. However, the content of the impression itself varies depending on each individual.

Copying facilitates the formation of a new perspective.

- Protocol during copying（*n*=10）



Technique level of awareness. n=10

e.g., "The thin shade lines are drawn in equal distance." "This is very dark."

Perspective level of awareness. n=10

a) Formation of a new perspective

Inferring the artist's perspective. *"I think he focused on the spiky parts."*

Subjective interpretation. *"I feel the shell is abandoned and left alone."*

b) Interpretation from realistic perspective *"This is not a leaf."*

⇒Through copying, a new perspective was formed.

Results so far

- Exp. 1
  - Imitation can facilitate artistic creativity.
  - Constraint relaxation and perspective formation are involved.

⇒Deep encounters with something different from their own framework seems to make students aware of the differences between their own perspective and others', and triggers a search for new expression.

Ⅲ. Exp 2 & 3

Factors underlying the effect of imitation

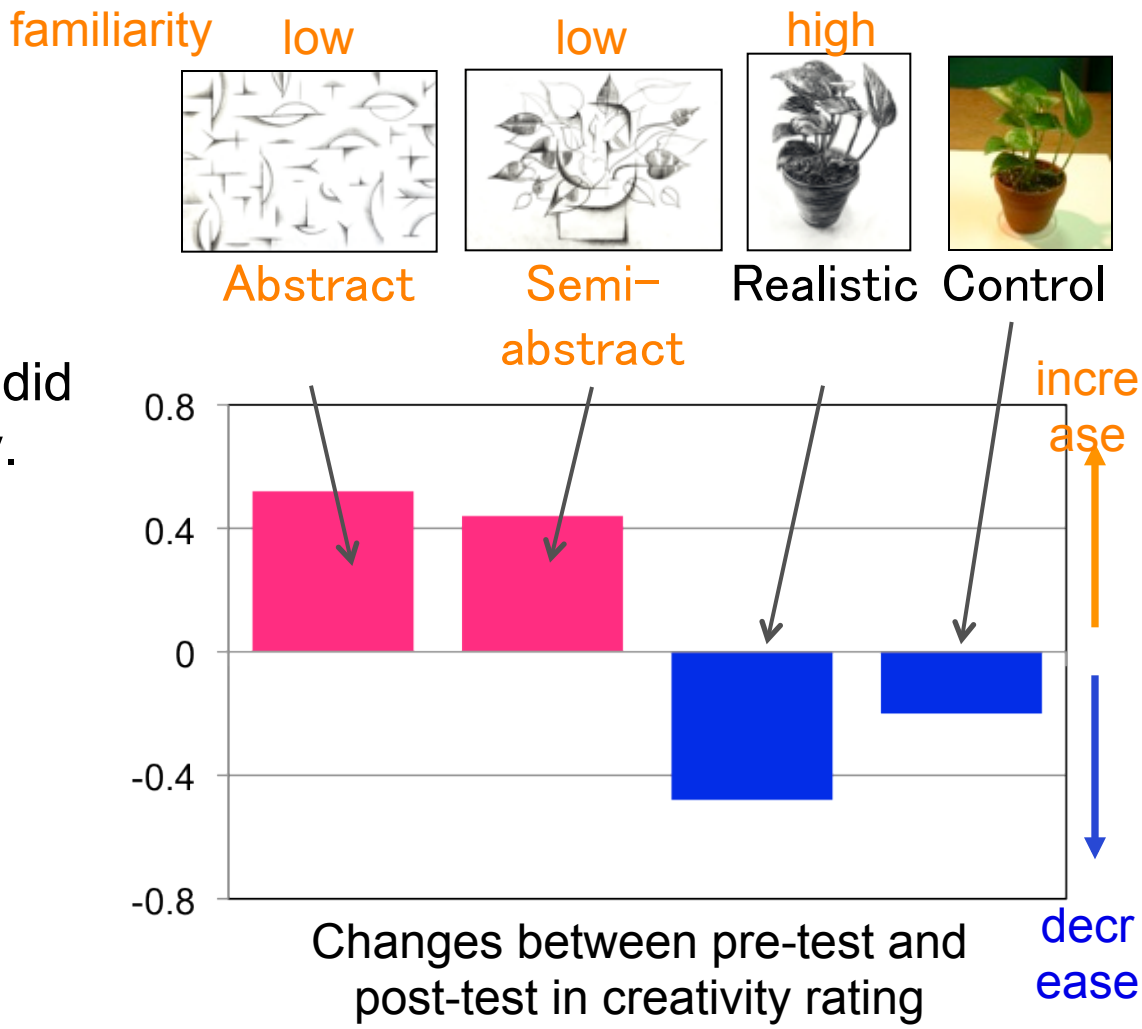
Exp. 2 Procedure

- Familiarity of model × period (Pre, Post)

	Pre-test (day1)	Intervention (day2)	Post-test (day3)
abstract	Draw one's original style of drawings with natural materials as a motif 	 copy	Draw one's original style of drawings with natural materials as a motif 
Semi-abstract		 copy	
realistic		 copy	
control		 Own drawing	

Exp. 2　Familiarity of model

- Creativity of drawings
  - Low familiarity group increased creativity.
  - High familiarity group did not increase creativity.
    - (contrast analysis)



⇒ Copying unfamiliar artwork improved creativity.

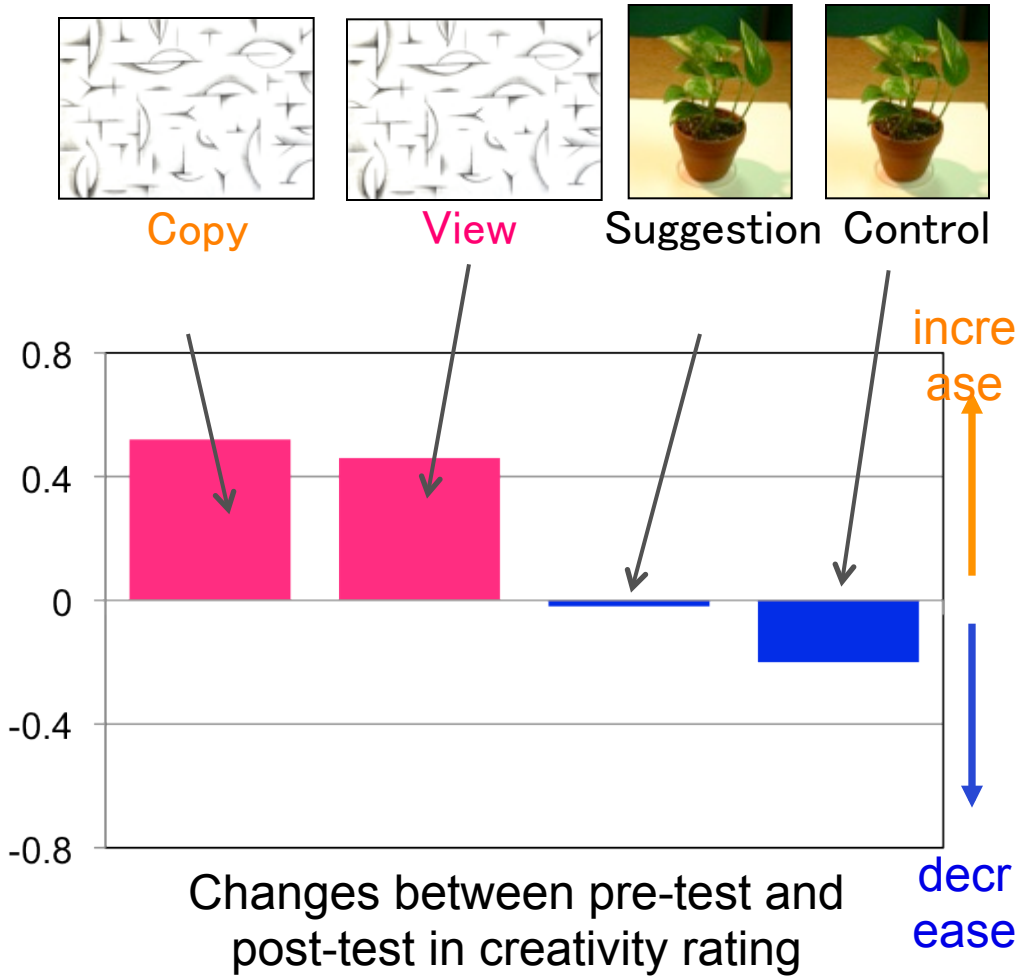
Exp. 3　procedure

- Way to interact with model x period

	Pre-test (day1)	Intervention (day2)	Post-test (day3)
copy	Draw one's original style of drawings with natural materials as a motif 	 copy	Draw one's original style of drawings with natural materials as a motif 
view		 view	
suggestion		 Own drawing + suggestion	
control		 Own drawing	

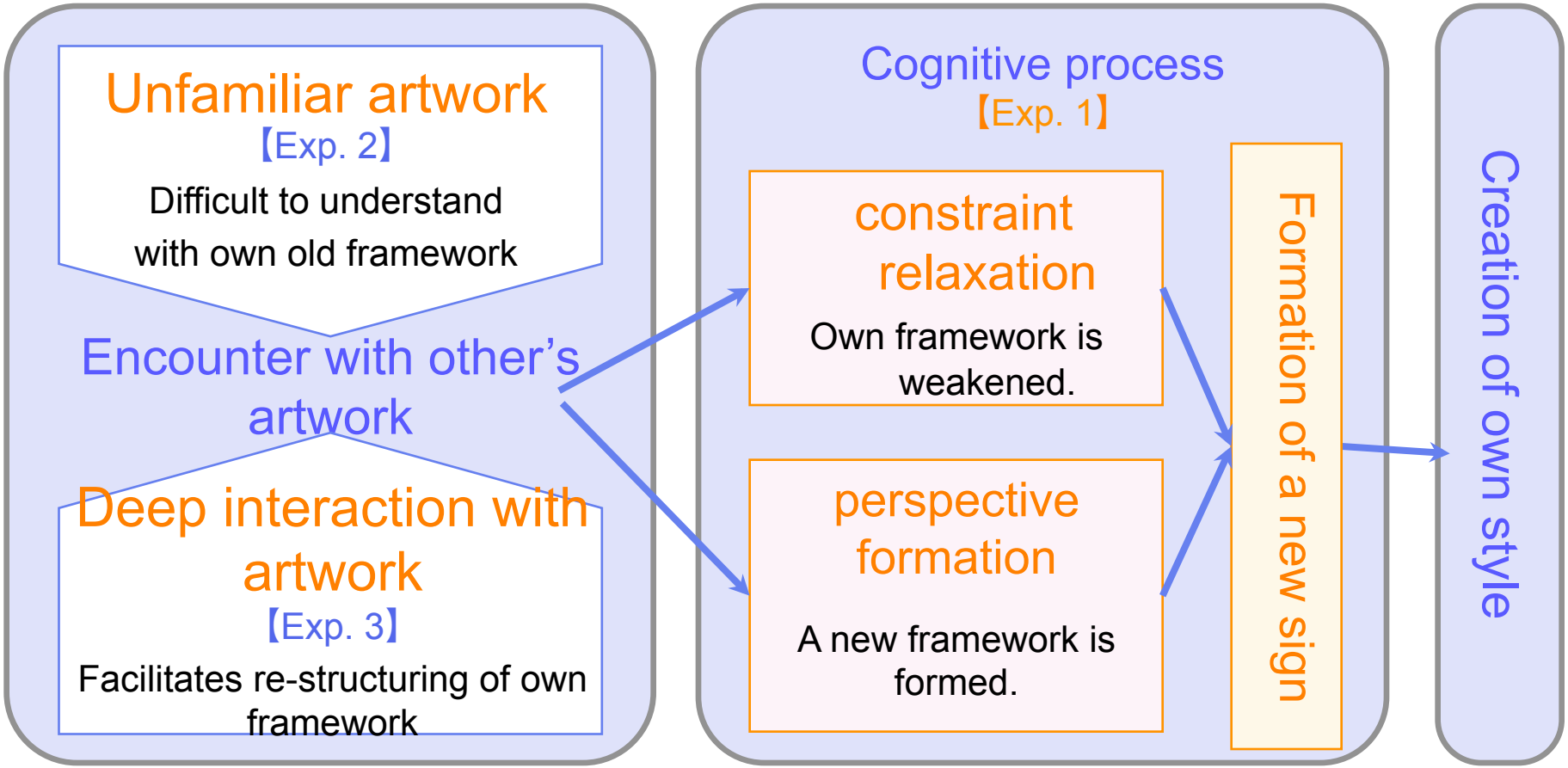
Exp. 3 Effect of the way to interact

- Creativity of drawings
  - Viewing model long enough had the same effect as copying.
  - Verbal suggestion had no effect.
    - (contrast analysis)



⇒ Deep interaction with other's artwork improved creativity.

Summary



Deep encounters with *unfamiliar* artwork through *imitation* encourages students to weaken old frameworks and generate a new perspective. This process enables them to search for new configurations and leads to new expressions.

Our research projects in today's talk

- Fieldwork
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  - Deep encounters with something outside of one's own experience.
- Design-Based Research(DBR)
  - Museum studies. Art appreciation through dancing.

(Meta) design principles for creative education so far

1. Support encounters with something different from participants' preconceptions
2. Support encounters that are deep and active
3. Support utilization of one's perceptions and feelings
4. Support creative action and reflection
5. Support social interaction on participants' expressive activities

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Examples of our Design-Based Research

- Study of an art workshop by artist Shinji Ogawa and an art exhibition at Nagoya University Museum. (Agata & Okada, 2009 a, b)
- Study of an art exhibition at Komaba Museum and an art workshop by artist Takeshi Shinohara. (Agata & Okada, 2010)
- Study of a dance improvisation workshop by choreographer Kaoruco. (Nakano & Okada, 2013)
- Study of an undergraduate photography course by photographer Fumimasa Hosokawa. (Ishiguro & Okada, 2013)
- Study of an undergraduate drawing course by painter Motohiro Kozawa. (Yokochi, Yageta, Kozawa, & Okada, 2014)
- Study of an acting workshop by actress Yuri Kinugawa at Hakodate City Museum. (Sugimoto, Okada, Kinugawa, & Kawashima, 2016)
- Study of a dance workshop by dancer Masao Miki at Komaba art museum. (Nakano & Okada, 2016)

Our DBR studies on art appreciation in museums

●Encounter with something different

- To facilitate new ways to access exhibits
  - Using methods of other genres （theater, dance,,,）
  - Using new modes of perceptual activity （dance,,, ）
  - Using exhibits as a material for another genre of activity（Philosophical discussion triggered by an exhibit）

●Deep (active) encounter

- Art appreciation with hands-on activity
  - Physical movements （dance, acting）
  - Creative activity （workshop for making art, dance, theater）
- Art appreciation with active thinking
  - Meaning making（philosophical discussion）
- Art appreciation with interaction with others
  - Appreciation in social settings（dance, acting, philosophical discussion）

“Art appreciation through dancing” project

Takeshi Okada

Collaborator: Yuko Nakano

- We have conducted one observation study of dancers’ choreographing and four DBR studies on dance workshops.

Nakano, Y., & Okada, T. (2016)

Participants' processes that need to occur during dance workshop

1. Careful attention to oneself, others, and the environment (input)

2. Careful attention to own emotion and images activated by the attention (input)

3. Embodiment of the attention and emotion as body movement (output)

4. Iterative cycles of input and output

5. Refection on one's own experience

Dance Workshop at Komaba art museum: Art appreciation by using body movements

Goal	**To appreciate "Large glass" by Marcel Duchamp using body movements.**
Facilitator	Mr. Masao Miki, dance artist
Date and time	24th and 25th, January 2013, 18:00-20:00
Place	Komaba art museum at the University of Tokyo
Participants	16 undergraduates, company workers, teachers, and dancers on 24th and 12 of them on 25th Eight attended in both days.
Data collection	Pre-test and Post-test before and after the workshop

Works offered in the dance workshop

- Body movement paying attention to own body parts, joints, and breath
- Play with objects in different ways from ordinary ones.
- Trace the artwork with own body movement
- Expression of one's impression of the artwork without viewing it after careful viewing
- Decision making on movements of fingers, legs, and other body parts in relation to the artwork
- Group discussion on the composition of dance performance

Day 1

表1 2013/1/24(1日目)

所要時間	内容
2分	『大ガラス』を鑑賞
5分	駒場博物館についての話(駒場博物館の折茂先生)
17分	質問紙記入(プレテスト)
2分	
12分	
3分	
4分半	
2分半	
3分	
4分	
7分	
10分	
1分	
2分	
5分	
10分	
1分半	
7分	
18分	
20分	

※帰り際に，デュシャンと大ガラスについての資料配布

Warm up

Encounter with “Large glass”, and Exercise for viewing from various perspectives and using body movements to express them

Dance expression with “Large glass”

(Appreciation through dancing)

tips

1) Perception of one’s own body and body movement

2) Encounter with the artwork through body movement

3) Learning of methods to view the artwork and express one’s experience

4) Expression of one’s experience with the artwork as dance performance

Day 2

表2 2013/1/25(2日目)

所要時間	内容
2分半	
3分	
11分半	課程の瀧上華さん)
13分	
4分	
4分半	
3分	
5分	
6分	
45分	組になった参加者が,
24分	
12分	
20分	

Academic explanation of the Large glass and warm up

Dancers' performance

Dance creation and performance

tips

1) Art historian's introduction of Marcel Duchamp and his artwork, Large glass.

2) Dancers' performance to show examples of dance performance.

3) Making of a performance as a group.

- They enjoyed the workshops very much!
  - Five point scale (5:very much) after the workshop

Day 1：4.53（0.80），Day 2：4.90（0.29）

- New image after viewing the artwork
  - Before WS1: 2.88 (.84) → After WS2: 4.13 (.84)
- New ideas after viewing the artwork
  - Before WS: 3.25 (1.04) → After WS2: 4.25 (.89)
- Motivated to view other artworks of the artist
  - Before WS1: 4.13 (.99) → After WS2: 4.88 (.35)
- Motivated to participate in expressive activities after viewing the artwork
  - Before WS1: 3.13 (.84) → After WS2: 4.00 (.93)
- Moved emotionally by viewing the artwork
  - Before WS1: 3.13 (.64) → After WS2: 4.38 (.74)

Excerpts from the reports after the WSs

- I felt the artwork became familiar to me. I came to consciously view the artwork. (S)
- I started knowing more about the artwork. I felt that the artwork became vital and animated. (H)
- I felt that I discovered myself though viewing the artwork. (B)
- I felt that I did not view the artwork but was afforded to view the artwork. I felt like that I became the hands and legs of the artwork. (A)
- I did not like art appreciation before. But, I realized that feeling artwork is very interesting. I experienced the hallucination and imagination after feeling the artwork and became motivated to actualize it as my expression. (A)

Dancer's learning

- The dancer himself was inspired by designing and facilitating this workshop. He developed the new art concept, "disassemble and reconstruction of a function", that has continued as his art concept for dance expression for more than the following two years.

Summary of the results

- Being inspired by the artwork, Large glass, the participants experienced new images, ideas, emotions, and motivation to participate in expressive activities.
- They progressed from just having visual impressions of the artwork to more advanced observation of the detail of the artwork focusing on deep insights from it. They also experienced feelings of discovery about themselves and a change in their relationship with the artwork.

Conclusion

- “Inspiration-based Learning” framework is useful for creative education!
  - This may not be an effective method for correct understanding, but would be a useful method for exploratory learning in creative domains.
    - Different from “Deliberate Practice”. (Ericsson et al.,1993)
  - This may contribute to the development of a personality trait, openness to experience, which is important for creativity, because inspiration requires people to respond to the environment.
  - This may contribute to the development of individuality.
    （There is not just one correct answer, but various ways of inspiration exist. Each person can choose their own path to inspiration.）