



# AUDIENCE PARTICIPATION GAMES FOR PROMOTING UKIYO-E

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# OUTLINE

## 1. Introduction

Game Live Streaming & Twitch

Audience Participation Games (APG)

Games with a Purpose (GWAP)

Audience Participation Games with a Purpose (APGWAP)

## 2. The Proposed APGWAP

Purpose

Game Rules

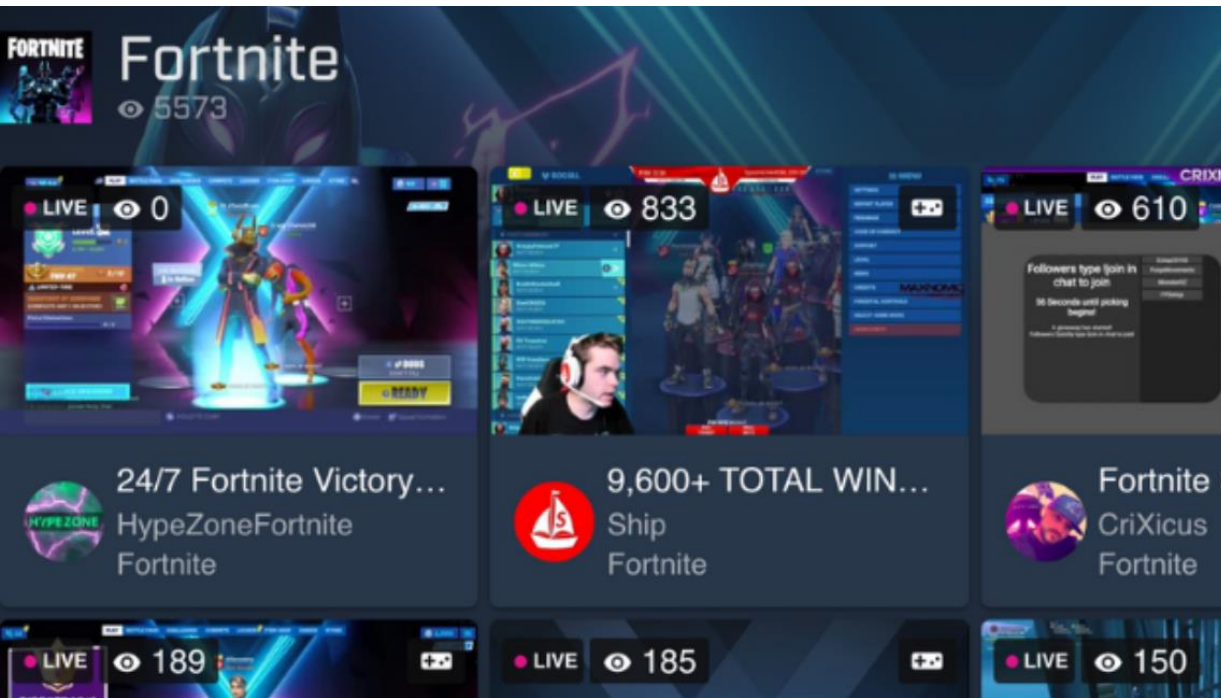
Other Details

Evaluation

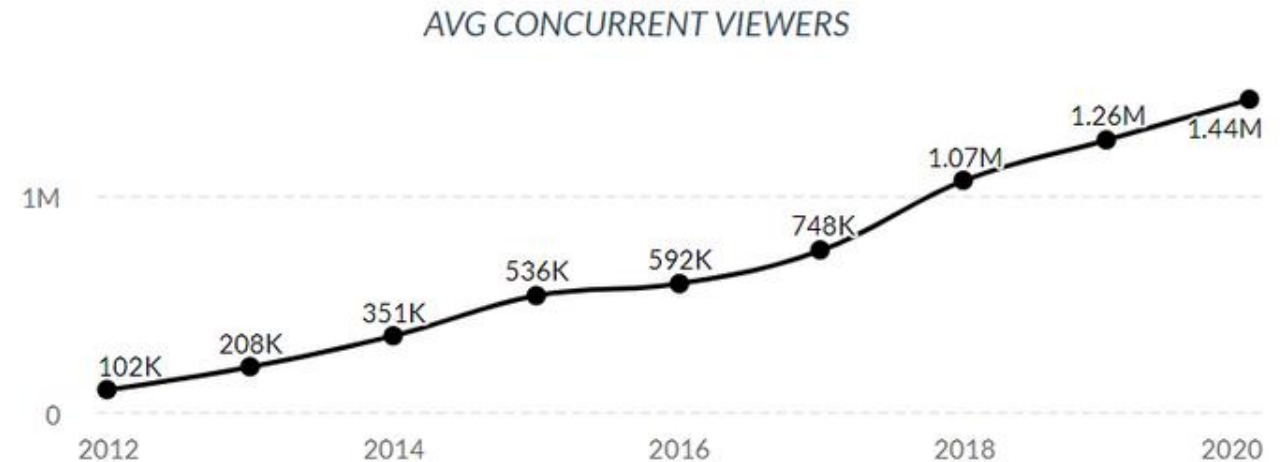
## 3. Demo



## Game Live Streaming & Twitch



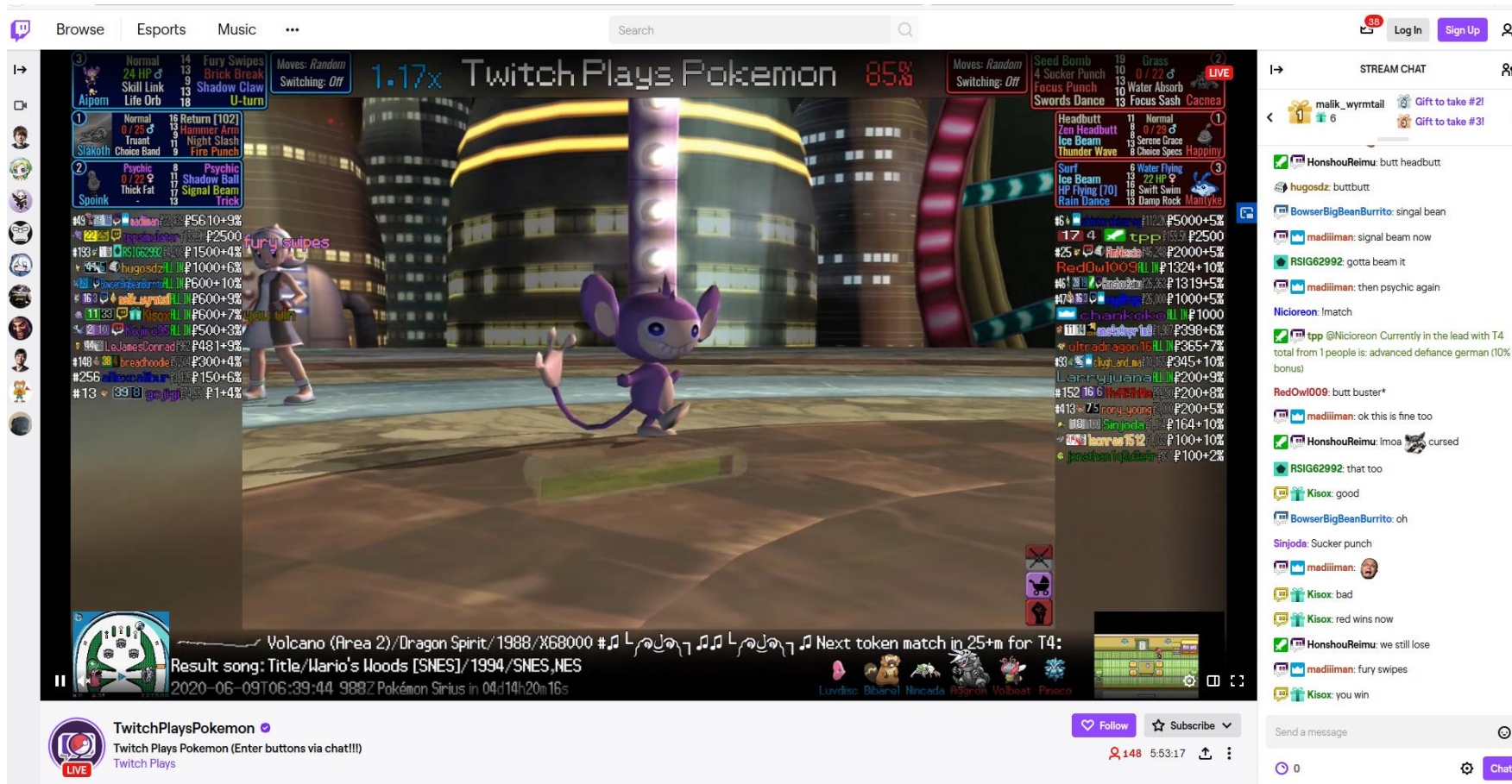
Average concurrent viewers Twitch, 2012-2020



As of March 2020, this number had climbed to 1.44 million

# APG

**Audience Participation Games**, a livestreaming design concept that allows audiences participate in gameplay via methods like chat messages.



## GWAP

**Games With a Purpose (GWAP)** is the concept of using games for human to solve problems that computers cannot solve.



ESP Game: <https://dodona.ugent.be/en/exercises/1678755178/#>



## アップガップ APGWAP

### Audience Participation Games With a Purpose (APGWAP)

is the concept of letting game live streaming audiences help solving problems that computers cannot solve.



The **World's first** APGWAP, presented by our group



<https://www.twitch.tv/ch932>


Please register for a Twitch account

**JUSTIN:** Japanese Ukiyo-e  
Streaming That Improves Narrative



# Needs for description

- ❖ For data analysis, deep learning, building recommender system
- ❖ For those with visual impairment



**Details** 238of24 [UserMemo](#)

Click on a letter to open the image in a new window (Up to eight images can be kept on view using this function.)

A	B	C	D	E	F	G	H
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AcNo. [H-22-1-5-8\(3\)](#) CoGNo. [H-22-1-5-8](#) AIGNo. [H-22-1-5-8](#)

Artist: 豊国 〈3〉 (Utagawa Toyokuni:3) Signature: 五渡亭国貞画

Size & Technique: 大判/錦絵 Orientation: 横 Position: 001:001/03;03

Version: Col Overlap: 1 All Overlap: 1 (Photo Group: Page: 1 )

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Title: (雪中諸葛孔明を訪ねる劉備主従) 「関羽字雲長」  
かんうあざなはうんちよう  
kanuazanahaunchō

Genre: 武者絵・歴史画 三国志 Theme: 関羽

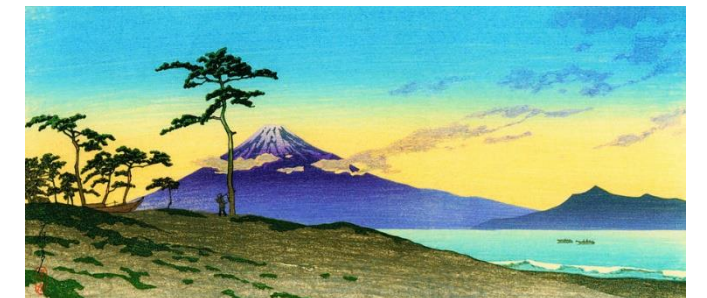
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[Set images](#) 1280× 1024× 800× 100×

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# Collecting Non-Expert Descriptions



<b>Expert description</b>	Painting, album leaf. Landscape. Fuji beyond lake and pine clad promontory. Ink and colours on paper.
<b>Non-expert description</b>	The picture show a beautiful view of a very high mountain along with a wide river. The context looks like, there is mist covering everything, there is one boat in the river.



<b>Expert description</b>	Woodblock print. Popular culture. Woman with baby, with picture of Kinryuzan Sensoji temple inset.
<b>Non-expert description</b>	A japanese woman is holding the kid. The woman wears kimono and so is the kid. There is a picture hanging in the room. It looks like they are mother and son.

← From  
**British Museum**

# CONTRIBUTIONS

- ❖ **A new concept:** audience participation game with a purpose (APGWAP)
- ❖ A complete design of APGWAP, which can be of use as **a reference for other purposes**, and results as well as discussions on description quality and
- ❖ **Player Enjoyment** from a conducted full-scale experiment with the proposed APGWAP.



# GAME RULES

1 Game round has 2 Sessions:

- ❖ Describing: 80 secs
- ❖ Voting: 30 secs

Describers	Voters
<ul style="list-style-type: none"><li>• Can describe multiple images (1 description / image)</li><li>• Can be a voter in a voting session</li><li>• Cannot vote for descriptions which are belong to the image he created descript</li></ul>	<ul style="list-style-type: none"><li>• Vote for 1 description in the list of description.</li></ul>

# DESCRIBING SESSION

**DESCRIBING SESSION**  
Feel free to describe as many images below as you want

Ranking score:  
lang2hou: 17  
jun1ej: 16  
tnt\_jrtrncnfari: 9  
ranutoasaki: 6

icelabuki  
CH932

jren728  
jun1ejJJ  
doradora...

A

B

C

A: A woman with a baby

Please describe them in format: "imageID:description".  
E.g. A: There is a group of kids playing on a beach.

Ukiyo-e Game

3 1,468

CH932: Voting session is over. Please wait turn.  
jren728: B14  
CH932: Descriptions for image B has reached limit. Choose others.  
icelabn@uni:  
goseu1104: #16  
CH932: Voting session is over. Please wait turn.  
sasukekasi:  
bugattiparrot: #4  
CH932: Voting session is over. Please wait turn.  
ctronichikari: #4  
CH932: Voting session is over. Please wait turn.  
ichimarumaska: So confusing  
icelabuki: #1016  
hatsukitechiesu:  
CH932: Voting session is over. Please wait turn.  
icelabuki: #10  
CH932: Voting session is over. Please wait turn.

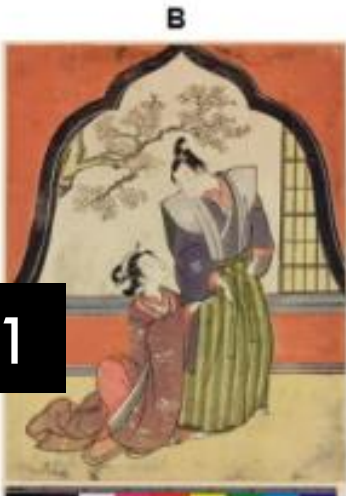


# VOTING SESSION

## VOTING SESSION



- 1:a black and white photo of a person wearing a hat
- 2:a black and white photo of a person wearing a hat
- 9:woman with her child
- 14:a women holding her baby
- 15:a woman and her child



- 3:a painting of a woman in a green dress
- 4:a painting of a woman in a green dress
- 7:a wife helping his husband dressing
- 10:a young man and a young woman
- 16:the woman is getting friend with menefit
- 18:young couple



- 5:a wall with a picture of a man on it
- 6:a painting on a wall with a painting on it
- 8:a woman riding a goose
- 11:a woman ride on a bird
- 13:A woman wearing a kimono flying on a goose
- 17:flying duck again1

Please vote for 1 description above in format: "#description\_id". E.g. #1

#1

limit. Choose others.

sasukeakasi: A: the woman@s face is soooo lo

CH932: Descriptions for image A has reach limit. Choose others.

bugattisparrow: 🤔🤔

gosou1104: B: A woman kneels in front of a m

aol\_monogatari: C: A girl in kimono flying on a

CH932: Descriptions for image C has reach limit. Choose others.

jren728: C: women sitting on a flying bird

CH932: Descriptions for image C has reach limit. Choose others.

gosou1104: C: A woman rides on a swan

jun1feJJ: 🤔

doradoramatsu: A:a woman with baby

CH932: Descriptions for image A has reach limit. Choose others.

jun1feJJ: 🤔🤔🤔

anhhaibkhn: B: A girl is holding a guy pant

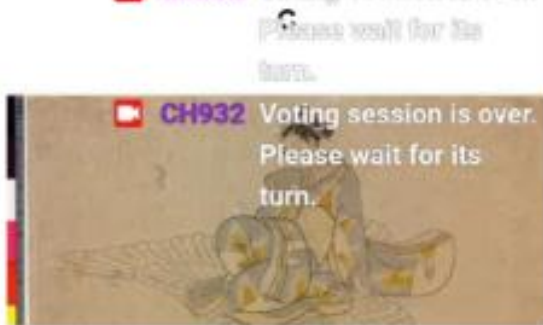
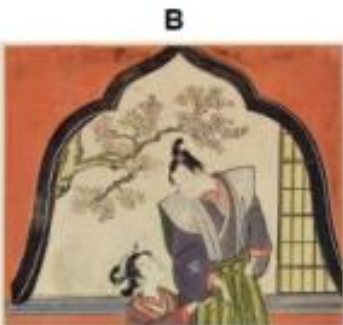
CH932: Descriptions for image B has reach limit. Choose others.

Fang2hou: 🤔🤔🤔

bugattisparrow: @jun1feJJ 🤔

# RESULT OF GAME ROUND

## RESULT OF ROUND 16



Winning descriptions for this round are:  
15: A woman and her child for image A  
7: a wife helping his husband dressing for image B  
17: flying duck again1 for image C

### Score awarded to players:

7_jh_7 ← -2	aoi_monogatori ← 0	doradoramatsu ← -6	ebinkatsu ← -5	fang2hou ← 2
gosou1104 ← 2	hatakeitachiasu ← -2	icelabnijuni ← -6	ichimarumaska ← 1	juni1ejj ← 0
kuralemot ← -5	ligoligo12 ← -1	narutoasaki ← -6	pengold ← -2	sasukeakasi ← 1
	touma100 ← -6	uranium410 ← 2		

Ranking score:  
fang2hou: 19  
jun1ejj: 16  
aoi\_monogatori: 9  
ligoligo12: 5

SevenC...  
touma100...  
CH932 Voting session is over.  
Please wait for its turn.

CH932 Voting session is over.  
Please wait for its turn.

jun1ejj: #13

CH932: You cannot vote for this description because it was the winning description you voted created before

yoshina621: #16

aoi\_monogatori: #18

CH932: Sorry you cannot vote since you are a describer. Wait for the next round if you wish.

CH932: You cannot vote for more than one description.

ligoligo12: #17

CH932: you can see full list of ranking score <https://drive.google.com/file/d/TWY3xdfaJbWxq04SdCApliXT4/view>

阿\_左 (122304532): #18

CH932: Voting session is over. Please wait turn.

Fang2hou: #7

CH932: Voting session is over. Please wait turn.

ctronichikari: #12

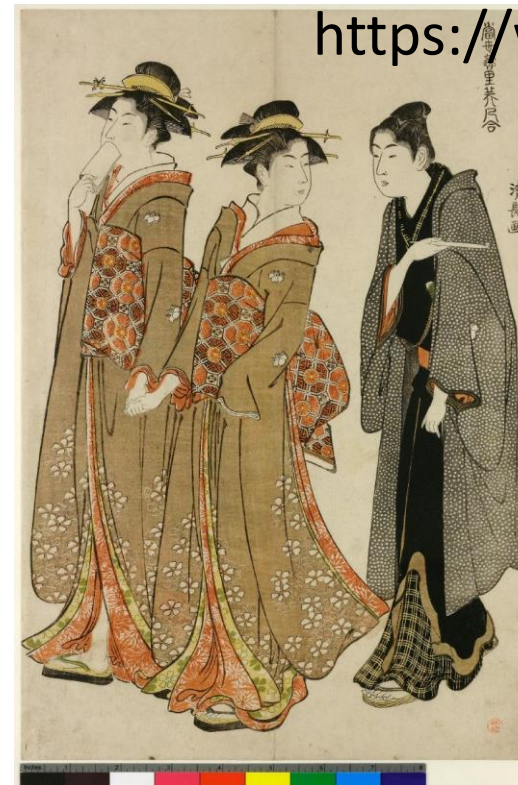
CH932: Voting session is over. Please wait turn.

SevenCN1995: #4



# SOME DESCRIPTION RESULTS FROM GAME

<https://www.twitch.tv/ch932>



From  
JUSTIN  
Players

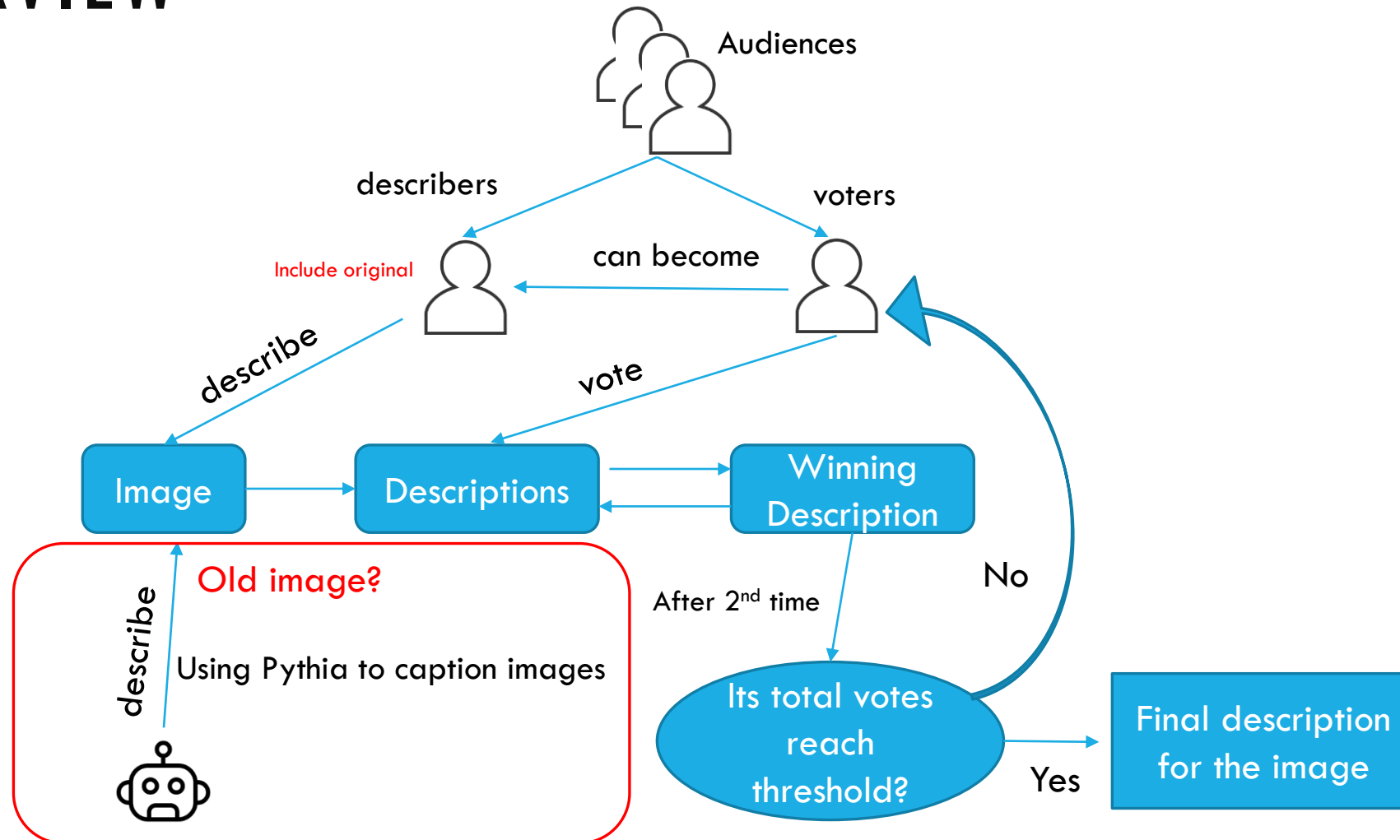
```
"a woman riding a goose": □{
  "score":0.3000000000000001,
  "used_time":5
},
"A woman wearing a kimono flying on a goose": □{
  "score":1.0,
  "used_time":2
},
"flying duck again!": □{
  "score":0.4,
  "used_time":1
}
```

```
"a women holding her baby": □{
  "score":0.5142857142857142,
  "used_time":2
},
"a woman and her child": □{
  "score":0.6666666666666666,
  "used_time":1
}
```

```
"3 wimen are walking": □{
  "score":0.9411764705882353,
  "used_time":2
},
"three women is talking.": □{
  "score":1.0,
  "used_time":1
}
```

```
"man and woman in European clothes": □{
  "score":2.0,
  "used_time":2
},
"A man and a woman": □{
  "score":0.6666666666666666,
  "used_time":1
}
```

# OVERVIEW



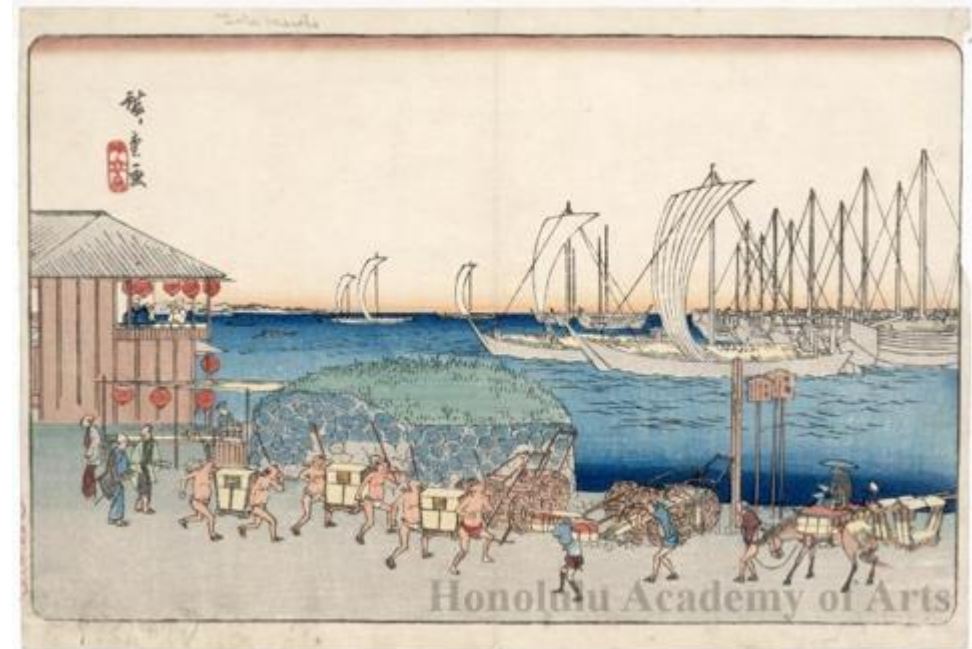


# Descriptions by an AI

(Pythia)



a large group of people standing next to each other



a group of people standing on top of a beach



# EVALUATION

- ❖ Description Quality
- ❖ Player Experience (Enjoyment)

correctness & sufficiency

# EVALUATION 1: Description Quality

## 3 Stage

### 1.describing

❖ 24 participants → 4 equal groups  
each group describe 5 images → 20 Images  
6 Desc./Img

### 2.voting

❖ 19 participants → select the best description → 20 Images

### 3.evaluation

❖ 24 participants → ... (next slide)

Best Desc.

correctness & sufficiency

# EVALUATION 1: Description Quality

From previous stage, we got  
20 Image + Best Desc.

## 3.evaluation

selected by Cosine Similarity (Deep Learning method)

- ❖ For each image → Shown with 4 other similar images  
Let each participant **choose based on a given clue**

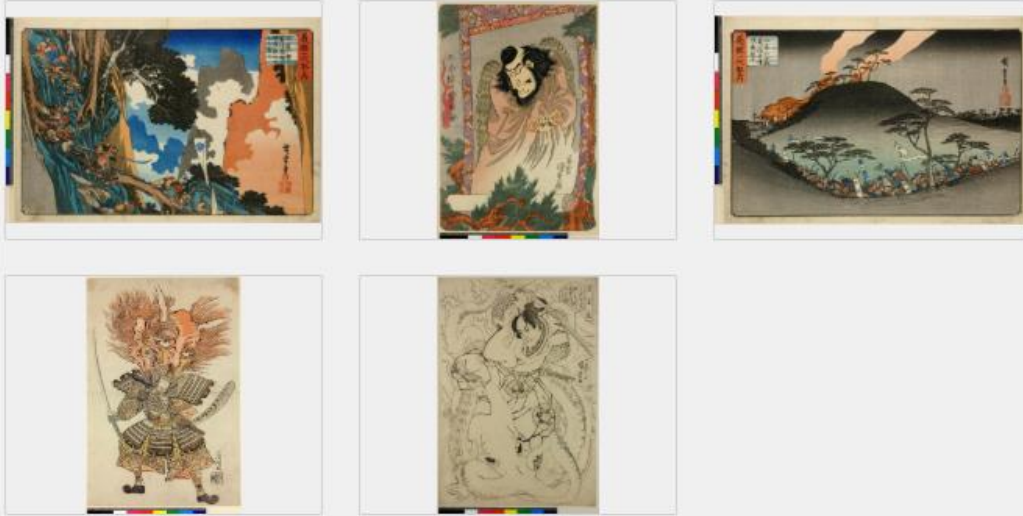
3 Conditions: **Keywords** vs **Non-expert Descriptions** vs **Expert Descriptions**

- ❖ 24 participants → 2 Equal Group  
Each group answers 10 questions of each condition



# Keywords

\* 11. Please select the best image for this keywords: "myth/legend, history"

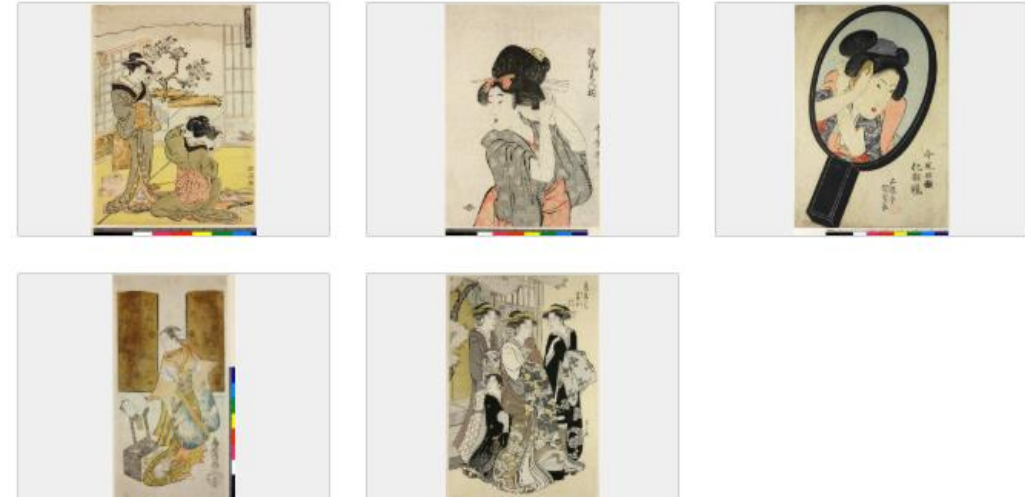


# Non-expert Descriptions

<https://www.twitch.tv/ch932>

\* 17. Please select the best image for this description:

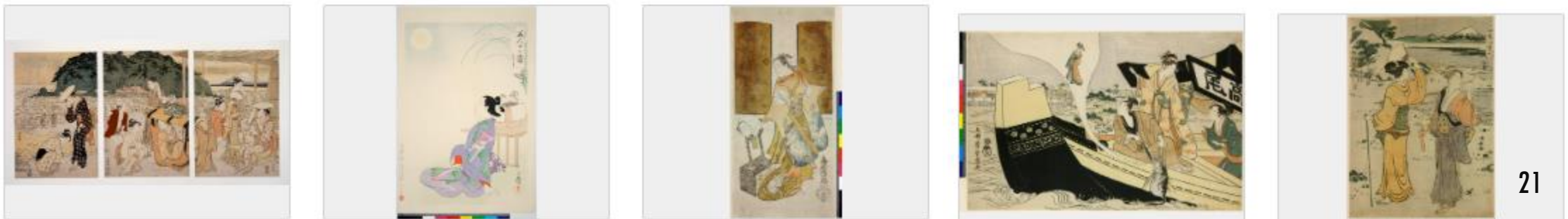
"two woman are in the pictures. one of them is sitting and still fixing her appearance while looking in the hand mirror. The other one is standing and talking to the sitting one."



# Expert Descriptions

\* 25. Please select the best image for this description:

"Colour woodblock oban triptych print. Travellers at Enoshima: Collection of elegantly dressed pilgrim travellers waiting at tea-stall at Katase Beach; seven women and one young man taking off hat, fanning breast, wiping perspiration, smoking pipe and re-tying sandal; more tourists watching boys swimming and looking across towards island; snow-capped Mt Fuji in distance. Signed, marked and inscribed."



correctness &amp; sufficiency

# EVALUATION 1: Description Quality

	Keywords	Non-expert Descriptions	Expert Descriptions
Correctness	50.7%	<b>92.9%</b>	75%

## EVALUATION 2: Player Experience

❖ Questionnaire: Game User Experience Satisfaction Scale (GUESS)

❖ 1<sup>st</sup> PX Experiment:

- 25 participants, Ritsumeikan University Student, 18 min
- most of the images to be randomly displayed at least three times (to evaluate the reward and penalty mechanisms)

❖ 2<sup>nd</sup> PX Experiment:

- 21 participants, Bangkok University Student, ~20 min
- increasing the voting time, added background music, etc. and we have publicized the game online



# EVALUATION 2: Player Experience

## ❖ GUESS

Game  
User  
Experience  
Satisfaction  
Scale

TABLE I  
GUESS QUESTIONS

Factors	Questions
1	I think it is easy to learn how to play the game.
1	I find the controls of the game to be straightforward.
3	I feel detached from the outside world while playing the game.
3	I do not care to check events that are happening in the real world during the game.
4	I think the game is fun.
4	I enjoy playing the game.
5	I feel the game allows me to be imaginative
5	I feel creative while playing the game.
7	I am in suspense about whether I will succeed in the game.
7	I feel successful when I overcome the obstacles in the game.
8	I find the game supports social interaction (e.g., chat) between players.
8	I like to play this game with other players.
9	I enjoy the games graphics.
9	I think the graphics of the game fit the mood or style of the game.

Factors: (1) Usability/Playability, (3) Play Engrossment, (4) Enjoyment, (5) Creative Freedom, (7) Personal Gratification, (8) Social Connectivity, (9) Visual Aesthetics

## EVALUATION 2: Player Experience

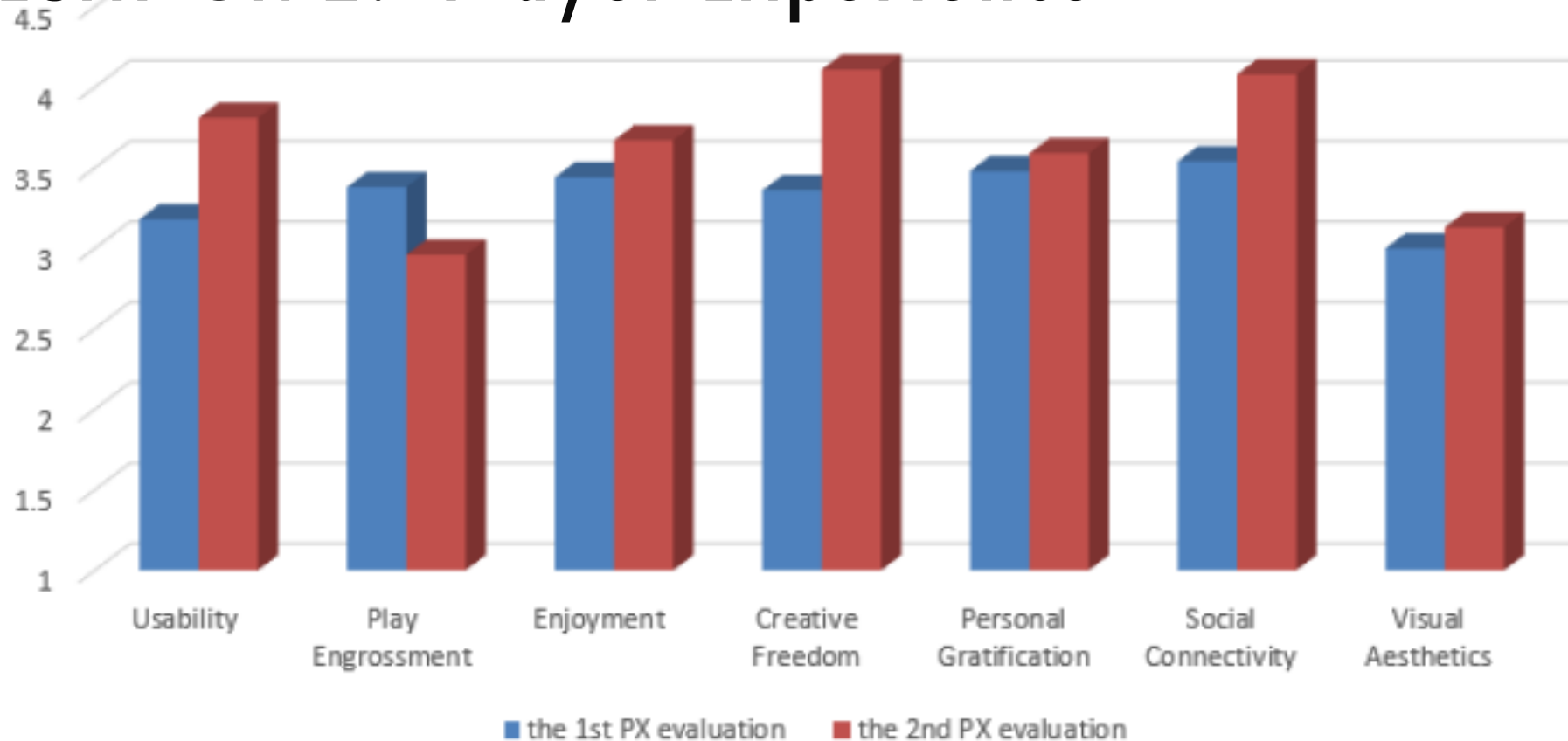


Fig. 4. Result of each satisfaction factor on JUSTIN game in the first control experiment and the second control experiment after publicizing

# CONCLUSION

- JUSTIN, the first Audience Participation Games With a Purpose (APGWAP) for collecting Ukiyo-e descriptions, to be used in future systems.
- APGWAP can be effective in humanities research
- Non-expert description can be helpful.
- The system provides good gameplay experience.



# FUTURE WORK

## ❖ Comments from the 2<sup>nd</sup> PX Experiment:

- Support more languages such as Japanese, Thai
- Add functions to the chat bot to make it more interactive.
  - For example, do cheering after players win or create or vote a description to encourage them
- Improve graphics by using Unity to develop the game
- Add auto words correction so when players type wrong word or have typos, the system to automatically correct itself.



<https://www.twitch.tv/ch932>

# JUSTIN: Japanese Ukiyo-e Streaming That Improves Narrative