

# How players learn at "KANSO-SEN"

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## 1 Introduction

This paper reports some of our work on understanding how players learn at KANSO-SEN. KANSO-SEN is that the players exchange their opinions about each other's impressions on the game after the game is over. Most of IGO and SHOGI players do KANSO-SEN. We regard the KANSO-SEN as one of co-operative learning process. Co-operative learning is common works in educational or cognitive researches. For example, co-operative learning are not very effective at some small groups in mathematics (Mulryan, 1992). Another works that co-operative learning is more effective than individual learning (Ellison & Boykin, 1994). However, most of these works are learning on easy or convergent problems. These are not suitable for researching the effect of co-operative learning.

In our research we are interested in SHOGI and the KANSO-SEN as a difficult problem to understand how human learn at co-operative situation. It's broadly known from experience that KANSO-SEN is good to improve the players' SHOGI technique. The current study is an investigation of subjects' learning of SHOGI at KANSO-SEN between novices, experts and both.

In this way, we are assured that the behaviors we observe are many levels of players' co-operative learning processes.

## 2. The features of KANSO-SEN

We have already explained that KANSO-SEN is that the players exchange their opinions about each other's impressions on the game after the game is over. We must add that it is allowed that someone who watches the game joins the discussion once in a while. It goes without saying that players don't speak with each other while playing the game. Players' exchanging a few words with someone who watches the game is prohibited, too. Most players therefore have the motivation that want to know if their moves that they chose while playing the game were correct. Furthermore, at games of face-to-face type like SHOGI, chess, checker and so on each player has each viewpoint of

the opposite side. So, players are present at KANSO-SEN with a great thrill of expectation that might come in contact with another viewpoint.

It is almost impossible that we find out a correct move at a situation of difficult games like SHOGI. We often use a kind of intuition to difficult situations like SHOGI. We call the intuition "TAIKYOKUKAN". It is important for players to have better TAIKYOKUKAN. To improve it, players need to discuss their opinions of many situations about games.

These expectations give KANSO-SEN the tone for ideal co-operative learning. We interpreted KANSO-SEN as a good example of co-operative learning. It is because that it gives two players different viewpoints naturally and makes the players motivated very much.

### 3. Experiments

#### 3.1. Objectives

By examining players learning processes for KANSO-SEN of SHOGI, what kinds of information are exchanged and how they learn are investigated. We designed two conditions to examine the influence of partner's level. Learning processes of novice SHOGI player with who were the same level partner and the higher level partner at KANSO-SEN were observed.

#### 3.2. Method

The subjects in this experiment were two students in the SHOGI club of our university. They were novice players of SHOGI (amateur 5 kyu). We prepared another player for their partner at KANSO-SEN who was a middle-grade player of SHOGI (amateur 4 dan).

The actual experiments were conducted in the following order.

##### (1) Playing with a computer program

In order to keep the equal partner's level of the SHOGI, a subject played a game with a computer program. The subject was allowed unrestricted thought time for the game. The partner for KANSO-SEN watched the game.

##### (2) Self-explaining the game

The subject was parted from the partner for KANSO-SEN for a while after the game is over.

The subject was asked to think aloud while reconstructing the game with using the computer replay function, and all performances are recorded by a video.

### (3) Filling out the first questionnaire

The subject was asked to fill a questionnaire after he finished explaining the game. The contents of the questionnaire were " What is a point on this game? ", " What are good moves on this game? " and so on.

### (4) Playing KANSO-SEN

The subject and the partner for KANSO-SEN were asked to discuss about the game, and all performances are recorded by a video.

### (5) Filling out the second questionnaire

The subject was asked to fill an another questionnaire after he finished the KANSO-SEN. The contents of it were the same of the first questionnaire.

We designed two conditions. One was that novice subject discussed with novice partner (NN). Another was that novice subject discussed with middle-grade partner (NM). We examined two conditions each 9 times for 2 months and analyzed these verbal-protocol data above (2), (4).

## 3.3. Results and Discussion

<Result 1> One subject could beat the computer program that he had never beaten.

This result indicates that there are some effective learning processes that can't obtain in ordinary playing. We can't assert that the process is KANSO-SEN. It might be saying that speaking aloud about own game has some significance for effective learning. The subjects were observed that reflected the trace of their own games to learn a lesson from it.

<Result 2> In both conditions, subjects changed their opinions before and after KANSO-SEN.

This result was acquired from examining two questionnaires before and after KANSO-SEN. It indicates that most subjects are changed their thought by KANSO-SEN. examining process was observed at most KANSO-SEN, while it wasn't seen at Self-explaining process. A subject and the partner divided their roles of observer and inventor very neatly. That helped the examining operation.

<Result 3> they were talking on different wavelengths at NM-condition, while they made a perfect pair at NN-condition.

This is because novice and middle-grade players' intuitions are too different. The ideas that middle-grade player naturally generated weren't almost understood by

novice player. On the other hand, the conversation grew lively between novice players.

<Result 4> In both conditions, players winnowed the candidates of moves down about from 2 to 5.

Many researches on problem solving have insisted that novice searches all possibilities for drugs. However, novice as well as middle-grade players could select a few candidates before they decided their moves. This result indicates that novice learn the way of thinking about SHOGI at first. The outline of thinking way to select their move is a sequential of thinking that they generate some candidates at a situation and read the tips to select a move. We call it "SHOGI players' script". This is because that they must winnow the candidates of move as players can't search for drugs in difficult problems like SHOGI.

<Results 5> Meta-cognitive utterances are observed at the latter period of this experiment.

Subjects refer to the meta-cognitive utterance like "I tend to counter with a defensive fall..." "Such move is particular to the computer..." and so on at the latter period of this experiment. This is because that the experiences that they replay and reflect their own game help their meta-cognitive views of SHOGI.

#### 4. SHOGI players' script

Based on the results of the experiment a cognitive model "SHOGI players' script (SPS)" is proposed which simulates SHOGI move selecting. SHOGI players must learn the rules of SHOGI at first time. They begin to learn SPS at the same time, too.

From the results of the experiment the SPS consist of three stages of "Generating the candidates process", "Winnowing the candidates process" and "Selecting one move process".

In generating the candidates process the candidates are generated using intuition. At such difficult problems like SHOGI human always use intuition naturally. Then in the next winnowing the candidates' process, players search the many situations from the candidates. Finally, in the Selecting one move process, these candidates are compared with using players' evaluation standard.

Using SPS model helps explain the learning processes at KANSO-SEN. Learning processes are regarded as refining processes of intuition and evaluation standard.

#### 5. Conclusion

In this research by observing KANSO-SEN through a psychological experiment, a cognitive model SPS has been proposed. It has been explained the learning process with SPS model.

In the experiment of this research 5-kyu-grade novice has been used to obtain preliminary information about learning processes at KANSO-SEN. But slightly more low-grade novice expects not to have the SPS model. In the future it is hoped that psychological experiments how the lower-grade players' learn the SPS model.

## REFERENCE

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