

THE SIMPLE BUSINESS GAME AND SIMULATION TRANSFERING THE KNOWLEDGE OF MIDDLE MANAGEMENT TO NOVICES

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ABSTRACT

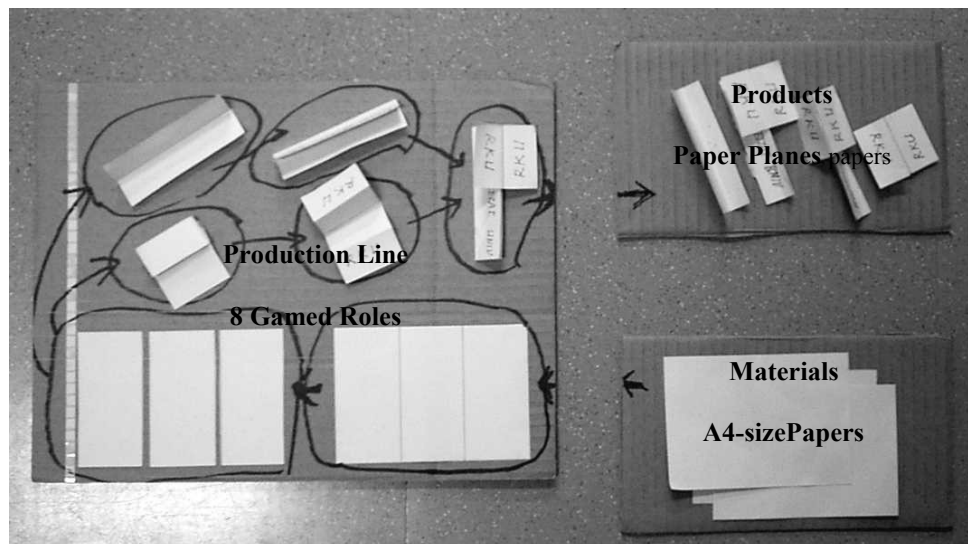
Almost every decision-making player in business games in the classroom environment in college and in-house education is interested in the financial status, such as the profit of their company, rather than the attainment of the strategic and tactic business goals which their professors expect them to implement through their decision making. Although profit is the most important measure for decision makers in real business, it should be noted that they are engaged in daily business with cost consciousness. Business games used as above can be categorized into computer-modeled complex games and non-computer-based simple games. Compared with complex games, simple games have a tendency towards pliability and a rich meaning if players are limited to middle managers with business experience. An example of the simple business game is the well known "Beer Game". This presentation will introduce how the knowledge of middle management is transferred to management novices who play a simple business game, a simple business simulation, and then a simple business game again. "Paper Plane Game" is chosen as a simple game.

INTRODUCTION

The simple game has a tendency towards pliability and a rich meaning if players are limited to middle managers with actual business experience. Otherwise, those who have no previous practices would be forced to play with toys without the interpretation of their presentations as abstract models. Therefore, an additional gaming structure is needed for a simple game to be run by them to let them rediscover such a rich meaning. In other words, we have to succeed in making possible the transfer of knowledge of middle management to management novices.

My choices among simple games are the BEER GAME (Serman, 1989) and the PAPER PLANE GAME which is originally called "Planes or burst game", designed by Legg (1994). I am experimenting on both games, usually as a combination, with the natural debriefing approach (Ichikawa & Nakamura, 2009) for both middle managers and novices. BEER GAME is a model of four companies involved in one supply-chain or Keiretsu. Contrastingly PAPER PLANE GAME can be a model of both managerial and operational levels of one company even though the designer defines his game as a very optimal operational game. The combination of both games, therefore, could make a more complete business game which is paper-

Figure 1
Paper Plane Game Model



based, not computer-based. This presentation will focus on the simulation of PAPER PLANE GAME used as a model of the decision process played by the actual middle management that played PAPER PLANE GAME professionally. The simple simulation approach presented here is easily applied in the classroom environment in college and in-house education.

THE KNOWLEDGE OF MIDDLE MANAGEMENT

THE SIMPLE MANAGERIAL AND OPERATIONAL GAME

PAPER PLANE GAME consists of eight gamed roles more dynamic in debriefing than three or four gamed roles of the beer game.

This paper plane game is originally an operational game that teaches students or workers optimized production technology principles by playing work at the eight steps of the process flow of a manufacturing system. The input is A4-size papers as raw material and the output are simply two pieces of folded paper with particular marks on them and stapled together in an Origami-made airplane. Figure 1 shows a paper plane game mode (approximately 20cm x 40cm), which I use for briefing the game for players.

The rule of the game is easily understood. The time of the run varies between 45 and 120 minutes according to the level of the knowledge of players. I have found that it takes more time for higher management people to play it than operation-oriented people. I analyze the difference as follows.

Even though this game was designed as an optimized production-oriented operational game, it has four characteristics that suit the purpose of this paper; (1) highly abstracted level, (2) planning capability, (3) different roles, and (4) real manufacturing involving the players as human resources. The players of the game are expected to play alternately in both levels of management and operation. In other words, they will play as members of a functional organization as well as those of a team.

When one of the players (Nakamura, 1999) participated in the game for the first time in ISAGA1991 held in Japan, she was very disappointed in the way the game was played. The disappointment was caused by one of the participants, who gave the solution to the game to other participants before it was run. He seemed to have enough very natural scientific knowledge to run the game efficiently by finding the bottleneck of the process of the production model. He instructed the participants on how to play the game. As a result, all the participants except him were forced to work like machines in an operational mode in particular. I think that he, probably many others, might not know the importance of human factors in not only team management but also even operational level.

THE SIMPLE MANAGERIAL AND OPERATIONAL GAME

The gaming team consists of eight participants who had several years experience in Japanese management. The steps of the play are shown in Table 1. The game description sheet is shown in Figure 2. The number in each stage of work on the sheet indicates working standard hours (in this game, seconds). For instance, the body painting needs 30 seconds, which is a bottle neck in this game. A copy of the instruction was handed to every player. The actual game play is explained as follows.

INITIAL INERTIA

In Inertia 1 in Figure 3, players organized themselves and chose the leader Pa (Player A) and the subleader Pb. They then shared their own knowledge relating to the game. One standing in the rear is a facilitator.

In Inertia 2, they arrived at the conclusion that the bottleneck was in the operation with the longest processing time. This was given 30 seconds per unit in the game description. All the players worked out this operation once in order to measure the actual time of the operation and to find who is the best worker in terms of less time for this operation. As a result, Pc was appointed to this task with a working time of 34 seconds per unit, which was longer than that of the game description.

Table 1
Steps of the Gaming

Phases	Initial inertia	Playing	Debriefing
Period	60 min.	15 min.	45 min.
Organizatton	Team	Functional structure	Team
Tasks	Organizing a team, understanding the conceptual map, sharing players' knowledge relating to the problem, pre-play practicing, and making decisions	Working on their own jobs as role players, noticing wrong decisions, and adjusting for better decisions	Discussing with an endogenous review and then with an exogenous review

Figure 2
Instruction Sheet for Players

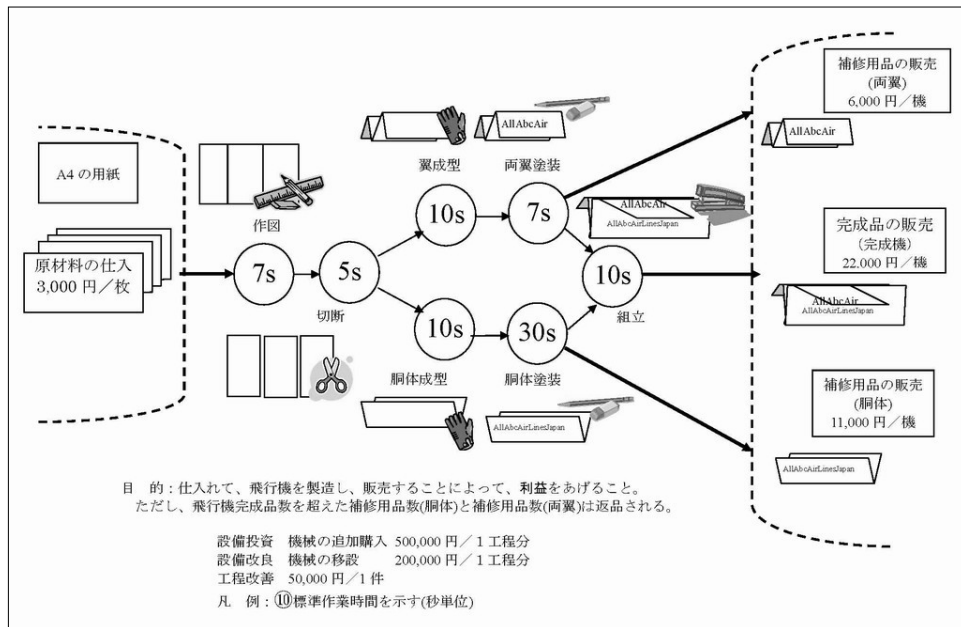
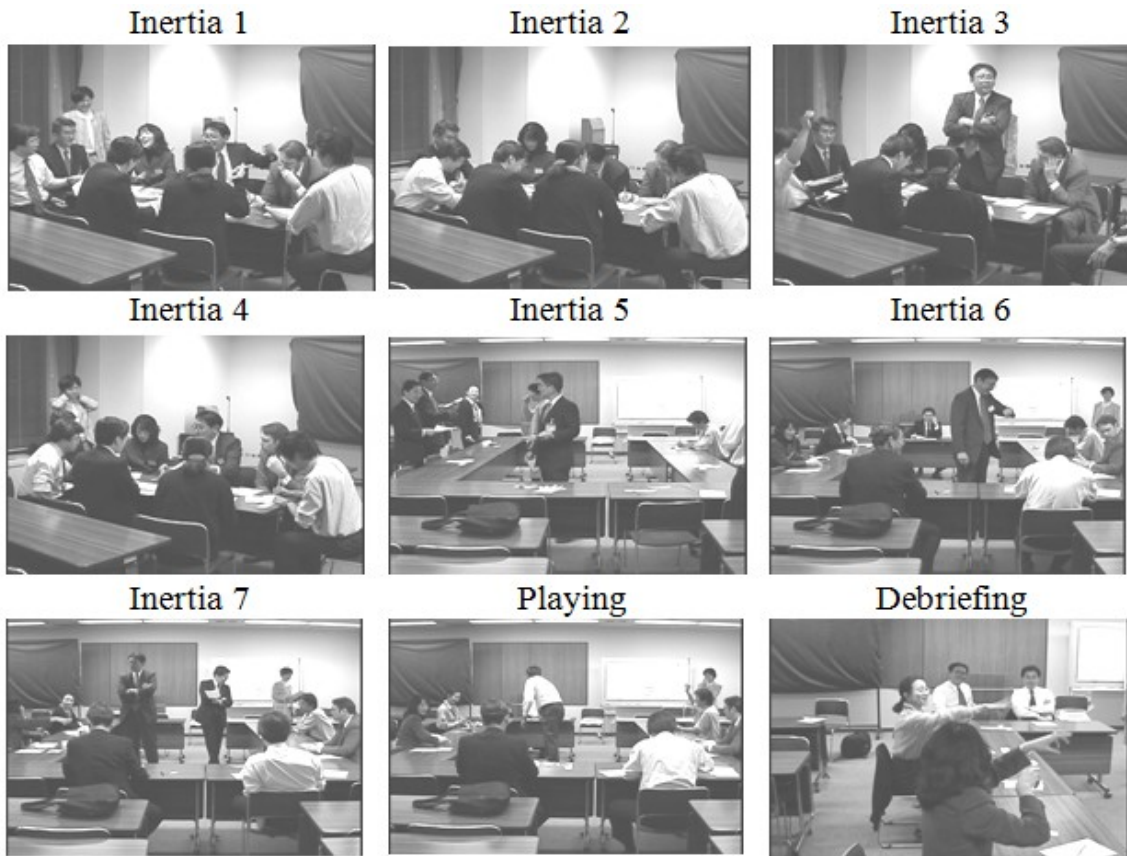


Figure 3
Scenes of the Gaming Play



In Inertia 3, with the assistance of the subleader Pb, the leader Pa standing alone, took the initiative in making all the players exchange understanding of the game from their own game-role perspective. As a result, a total vision of the game was established and shared.

In Inertia 4, Pc started alone practicing his operation, which was the bottleneck of the productivity of the production, in order to make his work more efficient. The other players tried to examine each role with the assistance of others and the facilitator.

Inertia 5, which was a pre-play practice phase, shows that all the players moved to a simulated manufacturing site. Pc who was sitting practicing by himself his role in the actual game site. The other players try to examine the whole site.

In Inertia 6, the leader Pa measured the running time of the whole production process while the other player worked as assigned.

In Inertia 7, just after the pre-play practice phase, another player Pd appeared to help with the leadership. The second sub leader Pd could afford to see all the production because he was not busy. The leader Pa, who is with folded arms, realized that he could not take leadership during production because he found out that he was busier than he expected. This was also true with subleader Pb. As a result, the shared understandings were partly reviewed.

PLAYING

Playing in Figure 3 shows a scene at the beginning of the 15-minute production, where the leader Pa bought materials in bulk according to the production plan for efficiency. Pc tried to send a hand signal but no one responded, nor did the leader. It seemed that there were no communications between members of the group in the initial part of the production time.

DEBRIEFING

All the players involved themselves deeply in operational activities, to escape from deep mental concentration on details. Debriefing in Figure 3 shows that there were non-verbal languages used for an effective communications. The second sub leader Pd continued to exchange experiences with others with a sign language.

TEKIZAI-TEKISHO MANAGEMENT

TEKIZAI-TEKISHO

In addition to Kaizen, Kanban, and Keiretsu, Tekizai-Tekisho is one of Japanese management words used frequently by managers and executives, meaning “the right man in the right place for the right job.” As you can imagine, Keiretsu is related to the closed coupling of companies in the flow of products and services. Kaizen has to do with the pursuit of high quality standards and Kanban means just-in-time which aims at cost reduction. Tekizai-Tekisho is concerned with human management.

As one of the excellent gaming runs I have directed and experienced, the players of the gaming explained above advanced to solve Tekizai-Tekisho problem immediately after the startup. In parallel with them, I have directed and experienced Paper Plane Games for many players at middle management, but there have been no team that compares with this team in management skills. More discussion on this excellent case is found in Ichikawa & Nakamura (2004).

MORE-HASTE-MORE-PROFIT PLAY

A gaming team consists of eight novices with no work experience. At most cases of game run, at least two teams (group) are organized for educational effectiveness, for example, surviving in a competitive market. The steps of the play are shown in Table 2, which is almost the same as the steps shown in Table 1, unless more detailed instruction is needed for them. The game description sheet, the same one shown in Figure 2 and profit-and-loss calculation sheets are handed to every player for educational goals. The number in each stage of work on the sheet indicates working standard hours (in this game, seconds). A typical novice game play is explained as follows.

INITIAL INSTRUCTION

I usually instruct players to set up a gaming site in a class room. Then, I explain the meanings of symbols on the game description sheet. Most players usually cannot understand

Table 2
Steps of the Gaming for Novices

Phases	Initial inertia	Playing	Debriefing
Period	60 min.	15 min.	45 min.
Organizatton	Team	Functional structure	Team
Tasks	Organizing a team, understanding the conceptual map, sharing players' knowledge relating to the problem, pre-play practicing, and making decisions	Working on their own jobs as role players, noticing wrong decisions, and adjusting for better decisions	Discussing with an endogenous review and then with an exogenous review

what they have to do and what will be happening. As a result, I direct a 5-minute pre-play game run for them to experience how to this game work.

PLANNING

The main issue among players in almost all cases is that of who takes charge of which gamed-role. Usually they find two options. They like to do rock, paper, scissors to make the assignment decision. The next one, less frequent however, is preference on the same roles as the ones of the pre-play game. In this case, I will ask why and get an answer that they have the experience. This is understandable. They never doubt the correctness of data given on the description sheet.

**Figure 4
More-Haste-More-Profit Play**



PLAYING

Whenever I run the paper plane game for novices, players show the same scene. I call it “More-haste-more-profit play.” The typical case is shown Figure 4.

All players at the gamed work places concentrate on their own work and especially a player of the transporting role at the center in Figure 4 runs delivery of parts to tar-

geted work places for all 15 minutes. Very few players show efforts to place their processed parts in a place that will make it easier for the next player to reach them.

**Figure 5
Team Writing Debriefing**



DEBRIEFING

A debriefing follows the playing, which is the most meaningful phase of gaming especially in a simple game which is an abstract model of a social system. To be meaningful it needs the richness of the previous experiences of players. I used to try to make players to debrief on what has happened in the play and to make an interpretation of how to connect them to management problems. All failed because they hesitate to open their mouths, probably because they want to avoid embarrassment before their classmates. Silence continued in the classroom.

Instead of oral debriefing, exchange of opinion notes among team members is introduced. They write what has happened and what it meant (Figure 5). Someone makes their comments and then someone else adds their comments on the comments related in some way. This continues until no one makes further comments. I got to see the merits of this journal writing after awhile.

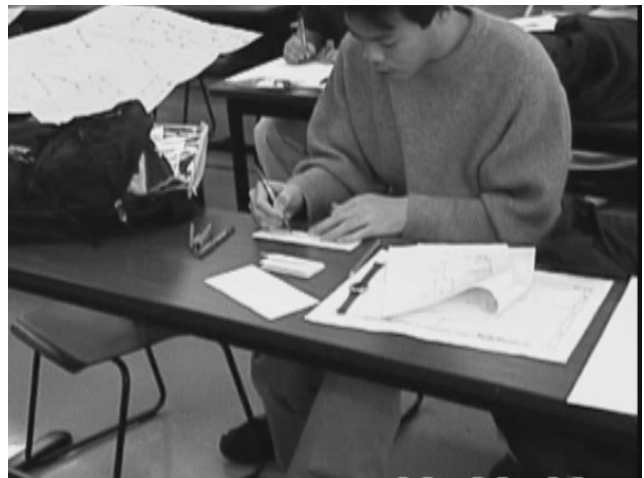
**Table 3
Extended Steps of the Gaming for Novices**

	Individual simulation	Planning	Playing	Writing debriefing
	30 min.	30 min.	15 min.	30 min.
	Individual	Team	Functional structure	Individual
Continued from Table 2	Experring all gamed roles, recording working hours of one’s own	Strategic planning, Job assingment,	Manufacturing Paper Plains	Findings, fellings, suggestions etc

Figure 6
One Player Simulation 1



Figure 7
One Player Simulation 2



MANAGEMENT PLAY BY OBJECTIVES AND SELF-CONTROL

This presentation proposes the following, a sort of “individual simulation exercise.” The aim of this exercise is to make possible the transfer of knowledge of middle management to management novice. The solution is so simple that players should be able to correct the data of working hours provided on the description sheet learning through a learning-by-doing phase of the gaming. At the right time as players have concretely experienced the data inaccuracy, they are motivated to try to do all the gamed-roles.

I redesigned the gaming steps to add an individual simulation phase to the original steps (Table 2) developing to the extended steps of the gaming for novices (Table 3).

INDIVIDUAL SIMULATION

All players are instructed to play all the gamed-roles in the same way as described using objects such as pencils, scales, scissors, and staples. They are to record their own working hour of each gamed-role on a simulation results sheet. The values are averages of several tries. Figure 7&8 show their one player simulation.

Figure 8
One Player Simulation Results

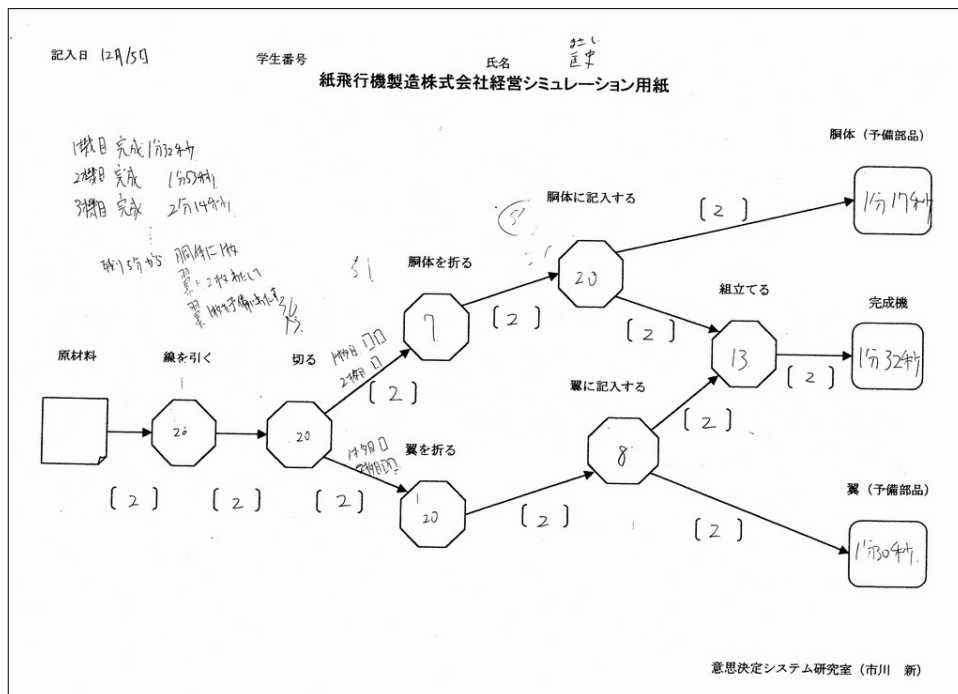


Figure 9
Discussion on Tekizai-Tekisho



PLANNING

The main issue among players again is that of who takes charge of which gamed-role. As optimized solution could be available mathematically, discussion on planning, Tekizai-Tekisho in particular, becomes complicated and much longer. It seems to be a combinational problem for them. The exchanges are very activated (Figure 9).

PLAYING

Though all players at the gamed work places concentrate on their own work again and yet they play on their own pace. They have already discovered the wastefulness of a more-haste-more-profit play.

DEBRIEFING

Usually, the last of gaming phases is debriefing, because the debriefing is known well to be the most important one. Which of the gaming phases of this simple game run deserves a usual debriefing is the combination of the individual simulation and planning (2nd one). All players are able to share the deep knowledge through conversation and dialogue (Baker, 2002:9-10), or agreement and conflict.

For the closing of the gaming, I chose an individual reflection phase, in other words, an individually written debriefing. Each player is instructed to reflect on all the gaming phases and then write their reflections with reference to the team writing debriefing (Figure 5). The individually written debriefing format is the same as that of the team's format.

THE MANAGER

According to Drucker (1985:398-399), a manager has two specific tasks. The first is creation of a true whole that

Figure 10
Individually Written Debriefing

記入日 10/8	学生番号	氏名 田中
あなたの経営目標は最大利益の追求です。そのために、どのようなことをしましたか？次回は、どのようなことをすべきと考えますか？		
	発言・行動・出来事	気持ち(言葉にはしなかったが)
ゲーム前	①材料の不足が心配なため、材料の不足を事前に防ぐために、10日の在庫の1/2を事前に仕入ることにした。	①材料の不足が心配なため、材料の不足を事前に防ぐために、10日の在庫の1/2を事前に仕入ることにした。 ②暇い。(暇い) ③材料購入や物動は費用が大きいので、2つの項目は前日した方がよい。 ④工費改善 せいでに材料の不足が心配なため。
ゲーム中	①10日の在庫の1/2を事前に仕入ることにした。 ②10日の在庫の1/2を事前に仕入ることにした。	①材料の不足が心配なため、材料の不足を事前に防ぐために、10日の在庫の1/2を事前に仕入ることにした。 ②暇い。(暇い) ③材料購入や物動は費用が大きいので、2つの項目は前日した方がよい。 ④工費改善 せいでに材料の不足が心配なため。
ゲーム後	①10日の在庫の1/2を事前に仕入ることにした。 (10日の在庫の1/2を事前に仕入ることにした)	①材料の不足が心配なため、材料の不足を事前に防ぐために、10日の在庫の1/2を事前に仕入ることにした。 ②暇い。(暇い) ③材料購入や物動は費用が大きいので、2つの項目は前日した方がよい。 ④工費改善 せいでに材料の不足が心配なため。
担当した役割	1. 材料の不足を事前に防ぐために、10日の在庫の1/2を事前に仕入ることにした。	担当したい役割とその理由
		材料の不足を事前に防ぐために、10日の在庫の1/2を事前に仕入ることにした。理由: 材料の不足が心配なため。
		工費改善 なし

意思決定システム研究室 (市川 新)

is larger than the sum of its parts. The second is to harmonize in every decision and action the requirements of immediate and long range future. This notion would be applicable to the tasks of the players of the simple business game and simulation

The first task is said in particular that the manager should make effective whatever strength there is especially in the human resources and neutralize whatever there is of weakness. Consequently, the matured players of the paper plane game presented in the first half of this paper proved their excellence to management. Also, the players of the individual simulation and the planning phases in the last half of this paper learned the first task by doing or literally manufacturing parts.

As for the second task, the manager should live and act in two time dimensions and balance them. He is responsible for the performance of the whole and of his own component in it. At the paper plane game demonstrated in ISA-GA1991 Japan, the player who instructed the other participants on how to play the game did not have the knowledge of management at all. Instead, the matured players first discovered both of the management and operational levels being latent in the original game. All the players practiced and familiarized on all the gamed-roles in the individual simulation.

Due to low-priced stationery products used, the game and simulation are simple enough to be exercised in any settings. The gaming design presented on this paper makes an excellent business game.

REMARKS

I learn from any game run that the success of a play depends on the exactness of responsibilities of players. Armstrong (1979) suggested some principles of natural learning; learner responsibility, setting objectives, finding and engaging in active learning tasks, obtaining feedback on performance, and applying what was learned. With players' self-directing, no human facilitators would be required to run a game except only at the start of each new stage. In other words, we could do with minimum dependence on facilitators if the players are seriously motivated. Even then, the interest of the gaming researcher would be not much about practice in itself but with the design of the game. However, it is an agreed viewpoint of the gaming researchers that the quality of knowledge transfer controls the success or failure of gaming.

From the previous case of the paper plane game it shown that even if the research got the participation of the well-matured player, it has become clear for gaming play that responsibilities, principles, and practices of the player are essential for research on gaming. In addition to the natural debriefing approach as a structured debriefing (Ichikawa & Nakamura, 2009), the structuring of knowledge transfer frame enables natural learning for players and by the players. As a conclusion, the simple game needs debriefing oriented gaming design.

Through this presentation, I showed the importance of the knowledge transfer structure design in gaming design and practice of gaming design.

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