If Experience is Worth, How Experts Behave in a Manga Case

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***Abstract*— To develop and put in place effective training methods in business, discovering how experts and novices differ is important. However, it is difficult to measure these differences in an actual work environment. In this study, that problem is resolved by using a manga case, in which business scenarios are illustrated in a distinctive Japanese comic book form. The characteristics of the manga case provide the reader with a hypothetical business situation experience. In the study, experts and novices were placed in a simulated business situation using a manga case and were asked to evaluate the leadership skills of one of the characters. From those evaluations and participant interviews, two differences were observed: 1) The experts paid attention not only to what the leader did and said, but also to background information, such as what staff members did and said and the description of the office; 2) The breadth of information considered was larger for the experts than the novices in terms of "scale" and "time." "Scale" refers to the number of individuals and organizational factors, etc., considered as they weigh the effects of events and the cause-and-effect relationships. "Time" refers to the chronological spans considered when weighing the effects of events and the cause-and-effect relationships.**

Keywords-business; expert assessment; manga case; case method; leadership.

I. INTRODUCTION

For companies, the speed of technological change continues to accelerate. One effect of that acceleration is that businesses are searching for more effective training methods [1]. To develop and put in place effective training in business, discovering how experts and novices differ is important. Once such differences are understood, it will be possible to conduct research regarding an educational approach that can effectively address these differences. In this study, these differences mean the different ways experts and novices behave and perceive work-related situations.

One obstacle, however, is that in reality it is difficult to measure the behavior and perception of experts and novices as they engage in work. As a result, in past research on business experts, accomplishments, years of service, and psychological measures have been studied [2]. This makes it difficult to use such results to develop more effective business training methods.

However, studies on experts in sports and in education have been conducted by Kato et al. and Chi et al., respectively [3] [4]. Kato et al. had participants simulate sports play and, by measuring changes in line of sight, discovered that there were differences between experts and novices. Chi et al. had participants solve a physics problem while verbalizing their thought process (Think-aloud protocol). Their study found that there were differences between the experts and the novices in how they perceived the problem. In both studies, a simulated context was devised for the experiment to discover the differences between experts and novices and measure behavior and perception.

In this study, a manga case was used to simulate business situations in order to discover expert-novice differences in behavior and perception.

Manga cases are designed for educational purposes and present typical business situations in a comic book format [5] [6] [7] [8]. Manga cases can be defined as case materials in a comic book form. They can provide simulated business experiences for experiment participants via the illustrated format. Further explanation about manga cases is provided in Section II.

In this study, Section I is the introduction; Section II provides an explanation of manga case characteristics; Section III explains the experiment's methodology; Section IV presents the results ; Section V presents the discussion; and, Section VI presents the conclusion.

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II. THE MANGA CASE

This Section describes the characteristics of manga cases and how they are used. A manga case is a genre of educational material that presents scenes and story lines important to business. Manga case topics and usage are similar to those found in case method. To date, we have created manga cases to illustrate topics, such as worker-management conflicts and negotiations with client companies.

Compared to case materials in which the business scenario is described in words, manga cases describe the scenario through a sequence of panels that make up a comic strip. In a manga case, information is embedded in the material via use of characteristic comic techniques of expression; that is, facial expressions and words of characters, and background drawings of the office furniture and cityscapes. The reader discovers pieces of information embedded in the educational content and interprets them to build a hypothesis. In this way, the reader can come close to experiencing a real business situation.

A few examples of embedded information and hypothesis building are given below from "Website Flaming!" used in this study.

Figure 1. Information embedded in expressions, words, and actions.

A. Communication through Facial Expression, Words, and Action

An example of communication through facial expressions, words, and action is shown in Figure 1, depicting a meeting at a startup company. In scenes from that meeting, elements, like the characters' words and facial expressions, communicate the nature of the relationships among the characters and how they share information:

Woman (Systems Engineer): "So, in order to get stable profits for the company…"

Man 1 (Second in command): "Hold on, if you think about VC...."

Man 2 (President): "OK, OK"

The reader can see from the woman's expression and from what she says that she is unhappy with a recent organizational decision; and, gather from the president's expression and words, that he is the type of character who wants the meeting to proceed amicably.

B. Communication via Background Depictions

Figures 2 and 3 illustrate communication via background depictions. Figure 2 depicts a whiteboard in the startup company's office. From the schedule written on it, the reader can interpret the method and status of information sharing within the company. Specifically, at this company, transaction negotiations with a major client and a briefing session for a venture capital Board are scheduled to take place in the near future, but those events are not written on the schedule. From that information, the reader can infer that management information in this company is not shared with the staff.

Figure 3 depicts the startup company's office space. From this scene, the reader can extrapolate the office size, equipment, the number of employees, the amount of capital invested in equipping the office, the working hours, etc.

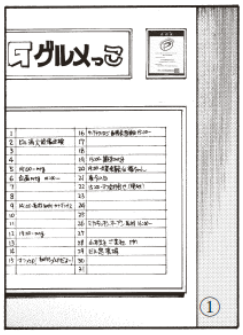

Figure 2. Background depicting a whiteboard.

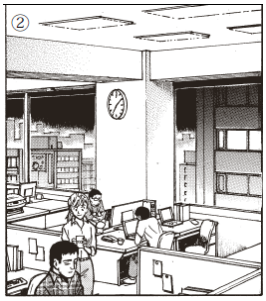

Figure 3. Background depicting the office.

C. Information Discovery and Hypothesis Building

The reader gathers and synthesizes information from panels, such as those shown in Figures 1, 2, and 3, and builds a hypothesis about what is happening. An example of this hypothesis development follows.

Hypothesis: From the investment in equipment, the number of employees, and earnings issues, it appears that the company's finances are not healthy. On the other hand, in the near future, there is going to be a meeting with the venture capital Board. That means that tonight's negotiations with the major client company need to be successful. However,

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Man 2, the president, has not shared that information with the staff, and is trying to resolve the problem alone.

III. METHODOLOGY

This Section explains the details of the methodology used in the study. Business experts and novices were recruited as participants, provided with the manga case, and asked to respond to a set of problems. After responding to all the problems, they were then interviewed. The interviews consisted of questions about the participants' thinking and what they paid attention to as they responded to the problems. More details are provided below regarding the manga case, the participants, the problems, and the interview questions.

A. The Manga Case

For the experiment, the manga case used was "Website Flaming!" which explores the case of an IT startup company. The main characters are Mr. Tanaka, the president of the startup company, Ms. Isaka, the company's systems engineer, and Mr. Chiyokura, the company's second in command. Other characters include the company's other staff and the staff of the major client company. The general story line is that the website of the startup company is about to go up in flames and though they have made various attempts to prevent this from happening, it eventually catches fire and takes down the company's servers.

B. The Participants

The participants in this study consisted of four university students as business novices (N1, N2, N3, N4) and four company employees as experts (E1, E2, E3, E4). The experts were selected referencing the 10-year rule, and, therefore, had 10 years or more of working experience [9].

C. The Problems

The following three problems were set up related to leadership skill evaluation:

Problem 1: Choose 20 or more panels that are relevant to evaluating Mr. Tanaka's leadership.

Problem 2: Use the provided leadership evaluation scale to assess Mr. Tanaka's leadership.

Problem 3: Based on your evaluation in problem 2, select additional panels to those you chose in problem 1 that are relevant to your assessment.

There are two reasons why the evaluation of leadership was chosen as the theme for the problems. First, in business, leadership evaluation is considered a necessary skill regardless of business type. Second, knowledge specific to a particular business is not a necessary factor in leadership evaluation. "Knowledge specific to a particular business" refers to the knowledge learned after joining and working at a company. The knowledge about financial operations in a startup company would be an example of this. Basing a problem on this type of knowledge would likely introduce bias into the results regarding the differences between working participants and student participants, by including an effect from such knowledge.

The reasoning behind problem 2 was to prevent bias from the differences in the participants' perceptions regarding leadership. By using a common measure of leadership to evaluate Mr. Tanaka's skills, participants were forced to somewhat share the same leadership standards. More specifically, the initial selection of panels in problem 1 was created as a separate step to enable an examination of how exposure to problem 2 might affect expert and novice participants differently. The results of that analysis are omitted here since they fall outside of the purpose of this study.

For problem 2, the Performance-Maintenance (PM) Leadership Scale was employed because it is standard leadership evaluation scale. The scale evaluates leadership based on performance and maintenance items [10]. Although there are a few versions of the PM Leadership Scale, in this study the scale for top management leadership was used [11]. The top management scale has 77 items. Part of the scale is shown in Table I. For each PM evaluation item, the participants were to choose one out of four ratings: "good," "bad," "seen in some panels but no judgment is possible for the whole story," and "not seen in any panel."

TABLE I. PM LEADERSHIP SCALE(TOP MANAGEMENT LEADERSHIP)

Item #	Evaluation Item
1	Demands the accomplishment of priority objectives.
2	Requires that decision-making has an objective and quantitative basis.
3	Once an objective has been set, it is pursued, even when difficulties are encountered.

D. The Interviews

Interviews were performed after all the problems had been answered. In the interviews, participants were asked about Mr. Tanaka's leadership evaluation and the reasons for their choices when answering problems 1 and 3.

IV. RESULTS

This Section presents the results obtained from the methodology explained in Section III, followed by a discussion. First, the answers to problems 1 and 3 were quantitatively analyzed. Next, the interview answers were qualitatively analyzed.

A. Quantitative analysis

This Section presents a quantitative analysis of the answers to problems 1 and 3. Figures 4 and 5 show the results of problems 1 and 3. The horizontal axis of Figure 4 shows each participant and the vertical axis shows the

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number of panels selected. The number of panels related to Mr. Tanaka's words and actions was tabulated separately from those panels without his words and actions (referred to below as "background information panels"). In Figure 5, the ratio of background information panels to the total number of panels selected is shown on the vertical axis against the horizontal axis showing the novices and experts.

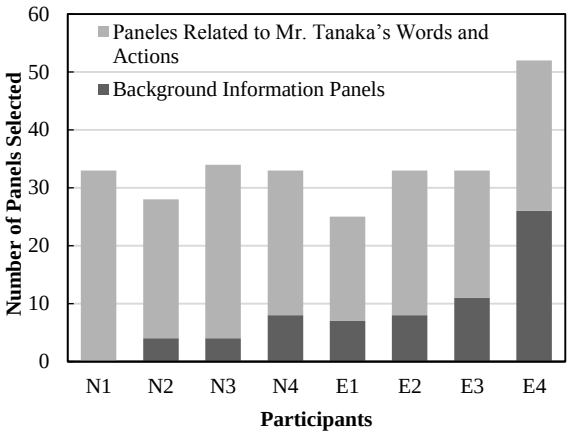

Figure 4. Number of panels selected by participants

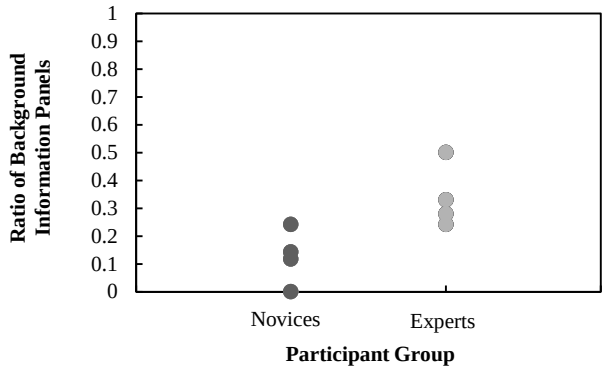

Figure 5. Ratio of background information panels.

In Figure 4, a difference can be seen in the number of background information panels that the novices selected, 0–8 (with an average of 4), compared to the experts' selecting 7–16 (with an average of 13). In addition, in Figure 5, a difference can be seen in the ratio of background information panels to the total selected, 0.000–0.242 (avg. 0.126), by the novices, compared to 0.242–0.500 (avg. 0.338) for the experts.

The ratios of background information panels to the total number of panels selected were tested for variance in the means of the novice and expert groups. First, in order to test for equal variance, an F-test was performed. The result of the F-test showed that the variance between novices and experts was not significant with a one-tailed $P=0.41>0.05$ result. Next, a t-test was performed assuming an equal variance for the two samples. The t-test showed a significant difference in the means between the novice and expert groups with two-tailed $P=0.03<0.05$ result.

B. Qualitative Analysis

In this Section, the qualitative analysis is presented. The analysis consisted of a repetitive process of: 1) segmenting of the interview results; 2) coding; and 3) thematic grouping. The results showed two key themes in the interviews: "scale" and "time."

"Scale" is the scale of items being considered at the time of the interview. The four items discovered, from a small to a large scale, were: Mr. Tanaka's personal attitude and nature, Mr. Tanaka's relationships with staff, Mr. Tanaka's relationship with the outside world, and the overall organization.

"Time" is the chronological relationship between the events in the story line and the events the participants were considering at the time of their comments. The three periods identified were: the past, during the story line, and the future. To clarify, "the past" refers to an event the participant considered had already happened before the story began. "The future" refers to an event the participant considered will happen after the story ends.

Against the themes of "scale" and "time," the interview results are shown in Tables II and III. As can be seen in these tables, novice comments rarely related to the "overall organization," to the "past," or to the "future."

The next few paragraphs give examples of expert comments, accompanied by the panels they refer to. These illustrate three themes with differences between the experts and novices: the "overall organization," the "past," and the "future."

1) The "overall organization"

The first example is shown in Figure 6, a scene where employees are having a conversation. For this scene, one expert commented, "They are not on the same page," implying that, the leader is neglecting to pay attention to enabling smooth communication among staff.

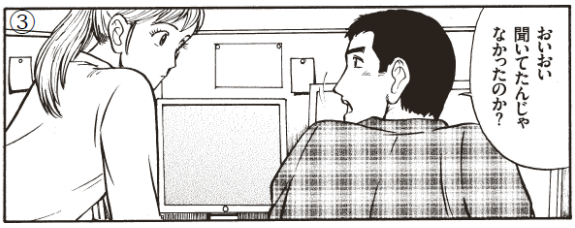

Figure 6. A conversation between staff members.

Second in Command: "Weren't you listening?"

A second example is shown in Figure 7, a panel depicting a whiteboard in the office. Regarding this panel, one expert commented, "Even though it is year-end and there must be meetings with the venture capital Board and banks, that hasn't been shared." By this, he meant that, when

information important to the operation of the organization is not internally shared, a gap in awareness arises between the leaders and staff.

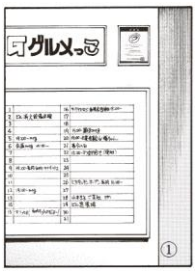

Figure 7. The whiteboard.

As in these examples, experts evaluated Mr. Tanaka's leadership skills based on information related to the entire organization. Elsewhere, some experts, noticing elements like the office equipment, threw doubt on the firm's balance in allocating funds. Additionally, there were comments pointing to the immaturity of the systemic response to the server problems.

On the other hand, novice comments were largely limited to Mr. Tanaka's individual behavior. The only exception was one comment stating that, "Good benefits" in response to a scene in which Mr. Tanaka is explaining about bonuses.

2) The "Past"

Figure 8 depicts a business dinner scene with a client in which the president's response to the situation is questionable. Regarding this scene, an expert commented that, "They didn't prepare for the meeting by working out an integrated approach internally beforehand." By this he meant, usually, before an external meeting, an integrated approach is worked out internally, including roles and conversation content. However, because Mr. Tanaka does not trust his staff, that probably never happened.

Staff member: "He should push the word-of-mouth side as we do that. Do they want us to simply do subcontract work?"

Figure 8. A lack of trust from staff.

In these comments, the expert is looking for cause-and-effect relationships from the past that preceded the story's timeline. Another expert made comments implying that, a strategy to deal with the server problems (in the story) should have been put together before the story, not during it.

On the other hand, novices tended to identify causes or measures only in actions or events within the story line and they had no comments on the past before the story's time line.

3) The "Future"

The first example of the future theme is depicted in Figure 9, in a scene in which Mr. Tanaka responds to a question from the client. In this scene, he replies that there are no problems, in response to the client's question regarding whether there have been problems with the website. Regarding this scene, an expert commented that, "If there really were problems, to respond that way is a bad idea," meaning that, if there were truly problems, there could be situations later on when it would be difficult to explain these to the client and the client's trust would be completely lost.

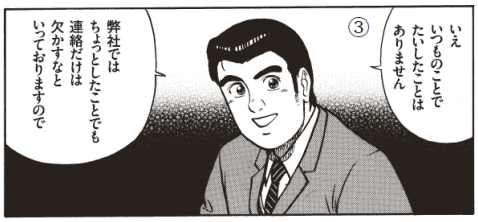

Figure 9. Response to a client.

Tanaka: "There's no problem. It's something that happens all the time. I always tell the staff to keep in touch even about the slightest things."

A second example, in Figure 10, is a scene of an internal meeting where Mr. Tanaka is giving an explanation about the business going forward. Regarding this scene, an expert commented that, "He's thinking about new business," by which he meant, Tanaka is thinking not only about the current business but about future business.

Figure 10. Tanaka's future business vision.

Tanaka: "So, we've started website management of 'word-of-mouth websites' in order to expand the company, and its finally started to achieve a little turnover this year. We're a long way from operating in the black on a year-to-year basis with just this project, and the management costs aren't cheap, but if you think about the spinoff business which can be derived from word-of-mouth, it's clear that it will grow. No, we have to make it grow."

In these examples, without limiting their evaluation to the results of actions within the story, the experts appreciated the possible impact on the company's future after the story ended.

In contrast, the novices tended to look for results and evaluations of Tanaka's actions only within the story line, and made no comments about the future beyond the story's time frame.

V. DISCUSSION

The qualitative analysis showed that when evaluating leadership, experts referred to a larger amount of background information, defined as information other than the words and

actions of the leader. Examples of this were conversations between staff and information written on the whiteboard.

The results of the qualitative analysis showed that the experts referred to information broad in scale and time in order to evaluate leadership skills. Being "broad in scale" meant that the experts focused not only on the leader's actions and words but also on the situation of the overall organization. Being "broad in time" meant that the experts did not limit themselves to considering actions and results within the story, but rather found causes in past behavior (before the story) and also evaluated the impact of actions in the future after the story.

Synthesizing the results of the quantitative and qualitative analyses, thinking that was "broad in scale" seemed to result in the experts paying attention to background information, such as conversations between staff members in Figure 6 and the whiteboard in Figure 7. Additionally, thinking that was "broad in time" seemed to result in the experts paying attention to background information, such as a lack of trust from staff in Figure 8.

The results can be summarized as follows: It may be seen that the experts tended to consider information more broadly in terms of scale and time, and as a result, the ratio of background information they used was larger.

VI. CONCLUSION

This study used a manga case to identify differences between expert and novice assessments in the evaluation of leadership skills. The results of this study suggest two points regarding how experts and novices differ as they evaluate leaders. First, experts may tend to observe not only the actions and words of leaders, but also background information, namely, information, such as what staff members do and say, and how the office looks. On the other hand, novices may tend to depend more on observations of the leader's actions and words. Second, the breadth of information taken into consideration by experts may be larger than that of novices in two ways, "scale" and "time." "Scale" refers to the number of individuals and organizational factors, etc., considered as they weigh the effects of events and cause-and-effect relationships. "Time" refers to the chronological spans considered when weighing the effects of events and cause-and-effect relationships. It may be that because experts have a broader sense of scale and time, they pay more attention to background information.

We hope that in the future the methodology used in this study can contribute to the development of more effective learning methods for novices in business.

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TABLE II. CATEGORIZATION OF NOVICE INTERVIEW RESPONSES

		Scale			
		Tanaka's Attitude and Nature	**Tanaka's Relationship with Staff**	**Tanaka's Relationship with the Outside World**	**Overall Organization**
Time	**The Past**				
	Within the Story	・I can imagine what he is thinking. ・He didn't do it early enough. ・He should move earlier. Etc.	・Pushes the ultimate responsibility onto his staff. ・Runs meetings efficiently. ・He gives his management opinion and he shares it. Etc.	・He's good at external PR. ・He knows how to talk to people outside the company. ・He's a vigorous salesman. Etc.	・Good benefits.
	The Future				

TABLE III. CATEGORIZATION OF EXPERT INTERVIEW RESPONSES

		Scale			
		Tanaka's Attitude and Nature	**Tanaka's Relationship with Staff**	**Tanaka's Relationship with the Outside World**	**Overall Organization**
Time	**The Past**		・They didn't prepare for the meeting by working out an integrated approach internally beforehand.		・The server should have been reinforced. ・If it's known beforehand that usage is going to suddenly increase, shouldn't they devise some way like using filters so that, for at least that day, the servers are down as little as possible? ・They're not going to let the servers go down, but the whole system is broken.
	Within the Story	・He is not up to the job. ・He tries to handle difficult situations alone. ・On the positive side, it's good that he tries to take responsibility for problems. Etc.	・He proactively adopts proposals from staff. ・He communicates with staff over yakiniku dinners. ・He is surprisingly well liked by his staff. Etc.	・Shouldn't he be clearly questioning the business model? They would be overlooking something, because they don't have B to C experience. He goes around impressing them with his strong points. ・He is concerned about social issues. ・His excuses are long-winded! Etc.	・Awareness of the company's financial struggles is not shared. ・Considering the revenue, expenses are too high (the building, conference rooms) . ・Staff members are not on the same page. Etc.
	The Future	・He's thinking about new businesses		・If there really were problems, to respond that way is a bad idea.	

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