An Analysis of the Cognitive Processes Related to "Service Awareness" of Cabin Attendants

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Abstract. The purpose of the present study is to develop a way by which junior cabin attendants (CAs) can get the customer service skills dependent on experience as soon as possible. To achieve this, it is effective to analyze the service skills of skilled CAs. We argue that one customer service skill that varies widely among CAs, depending on variation in work experience, is "service awareness." The term "service awareness" is defined as a related series of cognitive skills that includes "the CA perceives a passenger's needs before that passenger verbalizes them and finds ways to satisfy those needs." This research will examine the cognition processes of the CAs as they perform customer service. Cognition in this context refers to things the CAs noticed as well as their feelings and thoughts while providing service. We record CAs' customer service behavior and conducted retrospective interviews referring to the footage. After that, we analyze the interviews based on the grounded theory approach to get to know the relationship between cognition and conducted customer service. As a result, we gained an understanding that the cognitive process of "inferring a passenger's persona and investigating services to fulfill it" is crucial.

Keywords. Cognitive Process, Service Process Model, Qualitative Research, Grounded Theory Approach

1 Background

The airline industry has recently been experiencing a general increase in the number of air passengers worldwide and continued strong growth is anticipated. Along with efforts to enhance its international network, All Nippon Airways (ANA), the leading Japanese airline, is hiring increasing numbers of cabin attendants (CAs), which decreases the average length of CA tenure. It is necessary for junior CAs to acquire effective service skills to improve the quality of customer service. We argue that one customer service skill that varies widely among CAs, depending on variation in work experience, is "service awareness." The term "service awareness" is defined as a related

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series of cognitive skills that includes "the CA perceives a passenger's needs before that passenger verbalizes them and finds ways to satisfy those needs."

The purpose of the present study is to develop a way by which junior CAs can understand and obtain the concept of service awareness in the context of their work. As Shuman et al. stated that "process skills" such as communication and teamwork can be taught by active and cooperative learning [1], it must be also possible to teach service awareness to junior CAs. To achieve this, it is effective to analyze the service skills of skilled CAs. This paper initially describes relevant studies and past research findings of the authors regarding service awareness of cabin attendants (CAs). Thereafter, it discusses the approaches used in this research and describes the measurement experiment and interview results conducted to investigate "service awareness" displayed by CAs when performing their duties toward their customers. Finally, it describes the CA customer service process model.

2 Relevant Studies

2.1 Research measuring the behaviors and identifying the customer service skills of employees

Due to the lack of appropriate methods to evaluate employee skills in the food service industry, Kurata et al. proposed a skill evaluation system that utilizes employee behavioral measurement and visualization systems [2]. The system is composed of a Pedestrian Dead-Reckoning (PDR) terminal that performs differential positioning and a sensor-data fusion system that calibrates, initializes tracking, and improves accuracy. It also includes a performance index to help determine issues in the workplace that require improvement based on the results of motion tracking using a visualization tool, determine the behaviors that require improvement, and evaluate the effectiveness of those efforts using POS data. In addition, based on the results of improvement activities, it examines the acquisition of customer service skills using an employee's precision and recall as measured by order acquisitions, and makes proposals regarding employees' skill improvement processes based on the following four employee categories: Lack of goal awareness type, working at full capacity type, precise type, and veteran type.

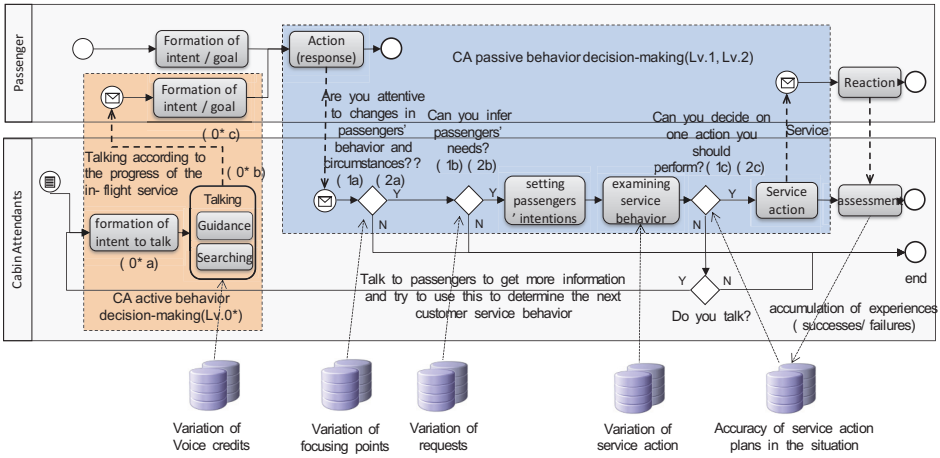
2.2 Past findings and tasks of this research

The authors conducted analyses of customer service skills of cabin attendants (CAs). Besides conducting behavioral measurements of CAs using the method described in 2.1 with the cooperation of the Service, Sensing, Assimilation, and Modeling Research Group of the Human Informatics Research Institute in the National Institute of Advanced Industrial Science and Technology (AIST), The

authors analyzed customer service skills of CAs by making behavioral observations and developed a CA customer service process model that considers "service awareness" [3]. Behavioral observations, visual confirmation of task contents, positioning and details of customer service behavior, and recording onto a paper medium revealed the reasons for and details of the communications between CAs and passengers. From this, differences were noticed between junior CAs and skilled CAs, such as the time they spent serving drinks and the frequency of cabin inspection.

Based on the above, Tachioka et al. considered passive and active behavioral decision-making strategies [4], which they combined with the knowledge gained from behavioral measurements and observations to develop the CA customer service process model indicated in Figure 1. While this model shows the characteristics of the CA customer service, of which "service awareness" is a part, the knowledge they gained from behavioral observations is fragmented. There is no clarity on the cognition processes involved while carrying out the service (i.e., why a specific service was carried out).

Fig. 1. CA-customer service process model including both passive and active behavior decision-making strategy[3]



3 Research Methods

3.1 Cognition, the focus of this research

From the background given above, this research will examine the cognition processes of the CAs as they perform customer service. Cognition in this context refers to things the CAs noticed as well as their feelings and thoughts while providing service.

3.2 Recording customer service behavior

We draw out the cognitive processes in the CAs through a retrospective interview regarding their customer service behavior after serving the passengers. However, the CAs may find it difficult to recall their customer service behavior and conditions. To resolve this problem, Kitajima et al. conducted interviews based on footage from a field-of-view camera worn by the subjects and investigated how the decline of cognitive functions in the elderly is tied to their behavior on the premises of a railway station [5]. Similarly, in this research, CAs wore a field-of-view camera, and retrospective interviews were conducted referring to the first-person footage recorded.

3.3 Persona and scenario

In recording the customer service behavior of CAs within this research, experiment cooperators played the role of passengers on the aircraft. Subsequently, the experiments were conducted in a cabin mockup, an on-the-ground training facility resembling a cabin. Recreating this service environment was to draw out the cognitive aspects of the CAs during the service. We also attempted making passenger roles realistic. Specifically, we prepared a persona for each individual playing the role of a passenger by ascribing to that person a background, a particular temperament, etc., based on which the passenger behaves during the flight. For example, as a persona, we set "a businessman in his 40s, with a calm and conservative personality," and as a corresponding scenario, we set "(during boarding) he gets to his seat smoothly. He glances at the in-flight-shopping magazine after being seated. (After the seatbelt sign is turned off) he continues to look at the in-flight-shopping magazine, and states, 'I'm just looking' when engaged in a conversation."

3.4 Retrospective interviews

As mentioned in section 3.2, retrospective interviews were conducted referring to the footage from the field-of-view camera of the CAs and the footage from the fixed-camera. Semi-structured interviews were conducted in which the question items were roughly pre-determined. In the interviews, we invited the CAs to look at the footage, recollect what they could while they served customers, and to speak freely so that their cognition processes come into full play. When the CAs were speaking, the footage was paused and we asked them four questions regarding ① Things they noticed; ② What led them to notice such things; ③ Things that came to their mind while observing passenger behavior; and ④ Reasons for performing/not performing a particular service.

3.5 Interview analysis based on the grounded theory approach

By conducting retrospective interviews, we obtained speech data that pertain to cognitive processes while the CAs carried out their service. From this data, we analyzed the cognitive characteristics of each CA. We utilized the grounded theory approach (henceforth, GTA). GTA is a methodology by which roles played by characters in a

particular situation and their interactions and the resulting multiple processes of change are expressed as a theory[6]. GTA, characterized by its ability to derive theories from phenomena, is considered most suitable for this research.

GTA procedure comprises (1) – (4) below: (1) segregate interview data into text fragments; (2) understand the characteristics of the text fragment data; (3) categorize text fragments; (4) understand the relationship between the categories; and (5) write out new findings from the relationship between categories.

In (1), we gained an understanding of the contents of the interview data. Subsequently, we fragmented the data based on their meaning. When segregating the text fragment data, sentences with different implications were separated based on their meaning. For example, in this experiment, we obtained a text fragment data: "I thought about the fact that he was wearing a mask while walking, and when I gave him the blanket, I think at that moment, I was thinking of what should I say next."

In (2), we gained an understanding of the characteristics of the text fragment data. We extracted contents from the text fragment data, which we called properties and dimensions. "Properties" refer to the perspectives of looking at the data and the sections into which they are divided. As a specific example of properties, we have "things one remembered while walking." "Dimensions" refer to the characteristics of the data from the perspective of the property created. The dimension corresponding to the prior-mentioned property would be, "he was wearing a mask."

Having indicated as many properties and dimensions as possible against the text fragments, we created a label that simply represents a given text fragment. If we were to label a specific example, it would be "reflecting on what to say while walking."

In (3), all text fragment data are compared and categorized. As an example of a text fragment similar to a specific example of a text fragment, we have the label, "troubled by serving a passenger with a stomachache." By combining, we have the category, "thoughts about the service to be performed."

In (4), we separated categories into paradigms, which are "situations/conditions," "behaviors," and "conclusion." By separating them into such paradigms, we were able to understand under what "situations/conditions" "behaviors" were executed and what "conclusions" were achieved because of the links between categories.

In (5), we wrote out the links between categories that we identified in (4). In so doing, we clarified the specific roles played by properties and dimensions.

4 Experiment to extract cognitive processes

4.1 Experiment outline and setting

In this research, we conducted an experiment to extract information about the cognitive processes involved when CAs served their customers. The experiment in this study can be divided into two parts: recording the customer service process and retrospective interviews to understand the cognitive processes at play. To record the customer service process, we used a cabin mockup owned by ANA and targeted 25 minutes of in-flight service to passengers on the left side of the rear cabin. Experiment participants, as indicated in Table 1, were 11-20 passengers in the cabin (different on

the different dates of the experiment), one CA (junior/skilled) each to provide service, and one CA to assist with the experiment. We used the HX-A1H camera from Panasonic Inc. for the field-of-view, two omnidirectional cameras, and the THETA from Ricoh Inc. as the fixed camera. Retrospective interviews were conducted 40 minutes after serving the passengers in a separate room, using footage from the field-of-view and fixed cameras as a reference. Interviews lasted approximately 35-45 minutes.

Table 1. Outline of personnel for customer service process recording

Date	September 27	December 8	December 12
CA experiment cooperators	Junior: 1 person, Skilled：1 person （Each time with one CA experiment assistant）		
Passengers （with scenario）	20persons (8 persons)	11 persons (9 persons)	13 persons (10 persons)

4.2 Results of the customer service process recording experiment and considerations

In the customer service process recording experiment, reviewing during the interview was done with the help of the field-of-view and fixed cameras. Reviewing is possible only if three requirements are met: (1) using field-of-view camera, CA interaction should be clear and comprehensive with regard to the content of the conversation; (2) using the omnidirectional cameras, it must be possible to distinguish the service the CAs are providing for the passengers; and (3) all passengers should be visible to have a broad understanding of what they are doing. The footage obtained fulfilled these three requirements and was sufficient to conduct the interviews.

4.3 Results of the retrospective interviews and its considerations

In the September experiment, we conducted a questionnaire survey asking the CAs whether they were aware of the scenario prior to the retrospective interview. This influenced the remarks made during the interview to act as a verification of the CAs' customer service and the scenario. We were unable to obtain enough information on what their original thoughts were while serving the passengers. Based on this reflection, in the December experiment, we did not provide any information to CAs prior to the interviews. As a result, we were able to obtain information focused on the actual cognitive processes during the December experiment.

5 Result of the interview analysis using GTA and its considerations

5.1 The result of the interview analysis

The interview result of each CA was analyzed using GTA. The categorized results are as indicated in Table 2

Table 2. The result of categorization

Category	September 27		December 8		December 12	
	Junior	Skilled	Junior	Skilled	Junior	Skilled
Regarding service and operation	3	0	8	13	6	10
Regarding service intent	0	1	5	8	11	7
Regarding service performed	0	0	1	0	7	1
Understanding cabin conditions	0	0	0	0	1	0
Actual service performed	11	12	10	8	10	20
Anticipating passenger needs	1	9	5	6	3	9
Understanding passenger condition	12	9	8	13	11	18
Inferring passenger condition	0	3	2	4	3	7
Collecting information to grasp passenger condition	0	0	3	4	1	9
Other	34	63	10	8	13	1
Regular tasks undertaken	5	10	0	10	3	0
Inferring passenger action	0	0	3	4	0	0
Not talking to passengers while providing service so as to avoid disturbing other passengers	0	0	2	0	0	0
Giving priority to operation	0	0	3	0	0	0
Things unnoticed	7	6	0	0	0	0
Insignificant things	0	5	0	0	0	0
Impression on passengers	3	1	0	0	0	0
Things one was unaware of	2	0	0	0	0	0

Following the categorization, we developed a graphic display for each CA of the categories for each passenger. Figure 2 indicates a graphic display of categories for the passengers who played the role of a couple. In Figure 2, the blue squares represent the paradigm “situation/condition,” and the orange squares represent the paradigm “behaviors.”

Next, we wrote down the relationship between the categories as indicated in Figure 2. Below is the written version of the category graphic displays for each junior and senior CA (written as《categories》and"properties").

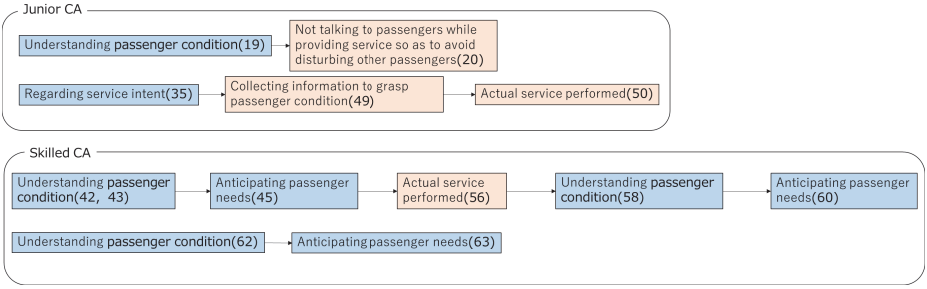


Fig. 2. Graphic display of categories related to the couple.

Junior CA

The Junior CA "noticed" the passengers looking at the Otaru travel guide prior to preparing for departure and《grasped the condition》of the couple. Nonetheless, she perceived the passengers who looked like they had a stomachache or were sick "to prioritize them for larger concern" and chose《not to speak to them so as to be considerate to other passengers》. Regarding the couple, who were her "target passengers," she listed out the tourist-related information as "things she hoped to tell them." However, her concerns about delaying other services was "a reason not to talk to them," and the "service she performed" was not a time to engage them in such action. She saw drinks collection as "the ideal time to speak to them." After《considering intended service》, she "performed the action" of checking the guidebook from the side, during "the period" when she was walking the aisle, as a way to《gather information to understand passenger conditions》. She had a high "level of understanding" about what the passengers were looking at. Having "seen" the word Otaru, "she talked about things" such as destinations and sightseeing with passengers as《service performed》. The "passengers' response" was regarding their destination.

Skilled CA

In terms of《grasping passengers' conditions》the skilled CA listed boarding as "the appropriate time" and mentioned looking at the guidebook as one of the "things she noticed" the couple doing. Regarding the "condition of the passengers,"she felt that they were very close. On observing this condition, "the thing she thought of" was that it would be best to leave the two to their own, indicating that she was《inferring passengers needs》. While thinking about these things, she greets them《service performed》and "the content of the greeting"was to ask if they were going on a trip. "The impression from the passenger's response"was not very enthusiastic, thus indicating under "things she thought of"that she might be interrupting them, thereby signaling that she was《inferring passengers needs》.

5.2 Considerations for interview analysis

We conducted an analysis similar to the above for each passenger. The following differences can be seen in the cognitive processes of junior CAs and skilled CAs:
(1) No difference was observed in the things they noticed about passenger conditions.
(2) Junior CAs move on to perform a service directly after understanding the situation.
(3) Skilled CAs infer passenger needs before performing a service.
(4) Skilled CAs understand passenger conditions and often anticipate behaviors.

With regard to (1), this research introduced a scenario that determines passenger behavior and therefore not much difference was found in the scenario witnessed by each CA.

With regard to (2), we clarified that junior CAs would engage right away in some sort of approach toward the said passengers after understanding their conditions.

On the contrary, as stated in (3) and (4), skilled CAs examine passengers before approaching them. During this examination, they gain an understanding of the passenger's character (anticipation of passenger behavior and condition) and consider what service behavior might be desired (inferring needs) by such an individual.

From the above, we consider that the differences between skilled CAs and junior CAs lie in the cognitive processes that precede their service behavior. Such cognitive processes indicate an insight into the passenger's character and an ability to foresee what he/she would like/dislike.

This research hypothesized "service awareness" skills as being the source of excellent customer service. With regard to such "service awareness," we consider that a deep insight into the possible behavior of passengers and their internal state become essential cognitive skills that need to be a part of customer service requirement.

6 Conclusion

This research recorded customer service processes in a cabin mock up, and drew out the cognition process of CAs during customer service using retrospective interviews while referring to such recordings. Furthermore, by analyzing and examining the interview data using GTA, we analyzed the cognitive processes required for excellent customer service skills. As a result, we gained an understanding that the cognitive process of "inferring a passenger's persona and investigating services to fulfill it" is crucial.

In future, we will engage in the development of training methods to help junior CAs acquire these cognitive processes without having to depend on the length of service to gain this knowledge.

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