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การฝึกอบรมออนไลน์เพื่อพัฒนาความสามารถด้านการคิดเชิงระบบ: การศึกษาสภาพและความคาดหวัง

Development of Online Training to Enhance Systems Thinking Ability: A Study of Existing Conditions and Expectations

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บทคัดย่อ

การวิจัยนี้เป็นขั้นตอนแรกของการวิจัยและพัฒนา อันประกอบด้วย 5 ขั้นตอน ได้แก่ การหาความต้องการจำเป็น การวิเคราะห์ การออกแบบและพัฒนา การนำไปใช้ ตลอดจนการประเมินผล เพื่อพัฒนาความสามารถด้านการคิดเชิงระบบแก่พนักงานในอุตสาหกรรมอื่น ๆ ด้วยการศึกษาสภาพและความคาดหวังในบริบทของพนักงานต้อนรับบนเครื่องบินเกี่ยวกับกิจกรรมการฝึกอบรมและความเข้าใจการคิดเชิงระบบ เมื่อศึกษาวรรณกรรมแล้ว ได้เก็บข้อมูลเชิงปริมาณโดยการแจกแบบสอบถามแก่พนักงานต้อนรับบนเครื่องบินทั้งหมด 9 สาย จำนวน 296 คน โดยเก็บข้อมูลความถี่ ร้อยละและการจัดลำดับข้อมูลแบบตอบสนองคู่ (dual-response format) โดยวิธี Priority Needs Index (PNI) ผลวิจัย พบว่า ร้อยละ 66.89 พนักงานฯ ไม่ได้รับการฝึกอบรมอื่น นอกจากการอบรมประจำปีของบริษัท ร้อยละ 61.15 เข้าใจลักษณะการคิดเชิงระบบคาดเคลื่อน วิธีการฝึกอบรมที่เหมาะสม คือ การฝึกอบรมออนไลน์ คิดเป็นร้อยละ 28.38 และการอบรมแบบผสมผสาน คิดเป็นร้อยละ 25.34 และผลการจัดลำดับความสำคัญของความคิดเห็นโดยใช้ PNI พบว่า การพัฒนาตนเองด้วยการฝึกอบรมของบริษัทนั้น มีประโยชน์ ใช้กับชีวิตจริงได้เป็นความสำคัญอันดับ 1 และด้านการสนับสนุนการฝึกอบรมจากบริษัทนั้น ควรจัดฝึกอบรมความรู้ศาสตร์ต่าง ๆ ด้วยเป็นความสำคัญอันดับ 1

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Abstract

This research aims to enhance Systems Thinking (ST) ability into various fields by studying existing conditions and expectations in the context of Flight Attendants' (FAs) training activities and their current understanding of ST. This study represents the first stage of a Research and Development design research consisting of 5 stages, i.e. needs assessment, analysis, design & development, implementation and evaluation and after literature reviews, quantitative data was collected via questionnaires focusing on frequency, percentage and dual-response data prioritization (Priority Needs Index (PNI)). The questionnaires were handed to 296 FAs from 9 airlines. The results showed that 66.89% of FAs had never received any training other than service, first-aid and safety trainings from their company, 61.15% had misunderstanding of ST characteristics, and the suitable online training method amounted to 28.38%, and blended training classes to 25.34%. The PNI method revealed that the first priority of the opinions of FAs on skill trainings provided by the airlines is the usefulness and applicability to actual work and the first priority of the opinions of FAs on training support provided by the airlines is to provide training courses in various fields of knowledge. The results of this research will lead to the enhancement of Systems Thinking ability of its employees.

Keywords: online training, systems thinking

Introduction

Transportation is a key element of the tourism system (Rhoden et al. 2008). At the present the aviation industry is focused on creating competitive advantages, outstanding technologies and excellent services (Chen, 2008), resulting not only in the establishment of new airlines and routings or advanced aircrafts, but also the expansion of airports to accommodate the ever-increasing number of flights and passengers. Therefore, the needs of the airline personnel have inevitably exponentially increased too. Ferreira (2001) stated that the Federal Aviation Administration (FAA) and the Department of Transportation (DOT) were established under the Federal Aviation Act in 1958 and in the 1970s was known as the Systems Thinking era of the airline industry as several regulations were eliminated. Apart from this, Systems Thinking is an equally

powerful tool for various other industries, i.e. the medical industry (Douglas & Kerfoot, 2008; Faezipour & Ferreira, 2013). It helps in deciphering complex healthcare systems by facilitating better understanding of the systems' design, enhancing the systems' sustainability and improving the overall healthcare standard (de Savigny & Adam, 2009). However, basing on the literature reviews, the airlines' training courses are mostly focused on mandatory face-to-face courses like service quality (Rhoden et al., 2008), general aviation knowledge, emergency and first aid training, as well as passenger handling in terms of cultural diversity and human factors training. Thus, as Systems Thinking skills have hardly been emphasized, flight attendants lack Systems Thinking skills (T. Chatchaivet, personal communication, January 23, 2016). This lack affects their overall performance, both directly and indirectly, a finding which is in line with the statement of Cabrera and Cabrera (2015a), stating that the movement of small elements which are manipulated by many people can lead to organizational change. This research aims to develop Systems Thinking to be applicable in multiple industries and the study of existing conditions and expectations of flight attendants in view of training activities and their understanding of Systems Thinking served as base for the development of the Systems Thinking ability, productivity improvement, reduction of unnecessary costs and unprofitable workload, value addition to the organization and improvement of overall customer satisfaction by incorporating online training to enhance flight attendants' borderless learning (Allen & Seaman, 2013; Charoensuk, 2014; Cuison, 2016; Khlaisang, 2012; Kuanhavej, 2000; Nilsuk, 2014; Piskurich, 2006; Yanuschik, Pakhomova, & Batbold, 2015).

Due to the lack of Systems Thinking skills in Flight Attendants (T. Chatchaivet, personal communication, January 23, 2016) as the skills have hardly been emphasized in terms of training courses which lead to their overall

performance, both directly and indirectly. The results of the literature analysis revealed the following variables, i.e. (1) Case-Based Training (CBT), (2) Online Training (OT), (3) DSRP Rules and (4) Systems Thinking (ST).

1. Case-Based Training (CBT) is an instructional process or training, presenting problems or situations which arise or may occur in real life (Herried, 1997-1998) and includes essential information in the context involved and adapted into case studies (Piskurich, 2006; Roper & Millar, 1999). The nature of the content must challenge the thinking process and encourage Systems Thinking skills (Carleton College, 2015; Connell et al., 2012; Shivakumar, 2012; Srianek, 2012), as well as promote the interconnection between the concepts and knowledge to urge learners to study, analyze data, see and understand problems, exchange opinions (Kaemmanee, 2008; Sintapanon et al., 2002) and provide suggestions for problem solving in written or oral form, through audio-visual means or through the computer system. To achieve the learning objectives, the above steps can be done in group or individual work (Piskurich, 2006). The results of Connell et al. (2012) by using *t*-test revealed that prior to the instructional activities using case studies, students' skills associated with systems thinking ability compared to the results of ANOVA were unsophisticated. Through instructional methods using case studies related to systems thinking, it is possible to increase students' systems thinking ability. According to Carleton College (2015) stated that case-based learning is an effective instructional strategy to enhance learning related to systems thinking.

2. Online Training (OT) is a process of learning or training. Its technology presents learning contents through electronics in various forms of multimedia, i.e. animation, sound, television signal via the Internet, Intranet or satellites for more than 80% of total learning (Allen & Seaman, 2013) by combining appropriate instructional strategies, theories and principles (Khlaisang, 2012; Na

Songkhla, 2007) to provide quality lessons and achieve learning objectives. OT provides immediate interaction with the learners which encourages and facilitates learning anytime, anywhere and supports both synchronous and asynchronous learning (Allen & Seaman, 2013; Chang, 2016; Charoensuk, 2014; Cuison, 2016; Khlaisang, 2012; Kuanhavej, 2000; Nilsuk, 2014; Piskurich, 2006; Yanuschik et al., 2015). It is a suitable learning tool to accommodate flight attendants' nature of work. Yanuschik et al. (2015) revealed that web-based instruction improved learners' learning process while the result of Chang (2016) revealed that OL helped learners to access various resources, take more responsibility in their learning, take advantage of technology in searching for information and better access their instructors. Instructors could play a more influential role as advisers to provide guidance rather than coaching the learners, and learners' progress can be constantly monitored, enabling them to be aware of their strong points and weaknesses. Assignments can be repeated anytime and accessed anywhere.

3. The term DSRP represents the theory or basic rules of human thought and is comprised of 4 basic rules: (1) Distinction, (2) System, (3) Relationship, and (4) Perspective. DSRP rules create a mechanism to determine concepts relating to dynamics, patterns, development, adaptation, and complexity by comparing concepts with data or symbols (Content) and (Context) in which DSRP rules act as the context defined into the 4 sets of rules: Distinction (D) consists of what we define (Identity) and something different from what we define (Other), System (S) consists of each element (Part) and all elements incorporated as a whole (Whole). The Relationship (R) consists of the relationship between the cause of the action (Affect) and the outcome of that cause (Effect). The Perspective (P) consists of what is abstract or ambiguous (Subject) and what is clearly identified (Object). (Cabrera & Cabrera, 2015a, 2015b). For the evaluation of Systems Thinking humans use and apply the basic rules of DSRP to get results, in another

words, Systems Thinking is something that can be easily learnt and applied to the existing knowledge in order to achieve the desired results. The main idea of DSRP rules is a simple tool which presents the language and the methods of human thinking to enhance metacognition (Cabrera & Colosi, 2009). DSRP rules, which immerge symmetrically and universally, act as a powerful tool in framing complex human thoughts (Cabrera & Colosi, 2008; Cabrera et al., 2008; Hummelbrunner, 2008). Hummelbrunner (2008) applied DSRP rules to implement "Systemic Framework" in organization evaluation system and found that (D) helped the distinction between components, mechanisms and external factors to determine the scope of assessment. (S) helped in creating the evaluation system focusing on the whole system and/ or some components. (R) helped define the relationship between each element and how they were linked and (P) used as a tool to determine that the perspectives of each stakeholder may or may not be the same, or may be similar, as perspectives can be subjective or objective.

4. Systems Thinking (ST) is a theory or tool which helps in analyzing systems and framing human thoughts to understand a system as a whole or as a big picture (Behl & Ferreira, 2014; Faezipour & Ferreira, 2013), to understand the interaction of the dynamic components (Douglas & Kerfoot, 2008; Ferreira & Faezipour, 2012), to enable the ability to critically solve the complex problems which simultaneously change (Czarnecki, 2012) and to create lifelong learning. The characteristics of systems thinkers consist of 8 elements: (1) Looking at things in a big picture. (2) Observing changes of things within a system through time, creating patterns or trends. (3) Understanding the relationship between causes and effects within a dynamic system that is driven in a circle rather than a straight line. (4) Understanding the relationship within the system. (5) Understanding how the dynamics of the system work, viewing things from various perspectives.

(6) Determining the structures of a system and their behaviors before performing any action. (7) Comparing the results from both short and long term actions including unwanted incidences that might occur. (8) Understanding that the effects of complex and dynamic systems may not occur immediately but the potential consequences need to be taken into account. (Benson, 2007; Waters Foundation, 2015). All the above variables have tendencies and consistency in terms of the principles and concepts to facilitate Systems Thinking ability of flight attendants. The results of Benson (2007) marked that hands-on problem-solving skills related to interdisciplinary teaching can remarkedly enhance systems thinker characteristics, even for children at the age of five. Douglas and Kerfoot (2008) applied systems thinking into nursing personnel development, based on the theories of Martha E. Rogers and Peter Senge emphasizing on seeing things in the big picture, understanding the interactions between each hospital department, the interconnection between them and the non-linear communication which could lead to positive or negative effects on the whole system.

Research questions

What are the existing conditions and expectations of flight attendants in terms of training activities and the understanding of Systems Thinking in order to enhance Systems Thinking ability?

Research objectives

1. To study the existing conditions and expectations of flight attendants in terms of training activities and the understanding of Systems Thinking in order to enhance Systems Thinking ability.

2. To represent the first stage of the Research and Development design research in order to obtain related information used for further design and develop Systems Thinking Training Program to enhance flight attendants' Systems Thinking Ability.

Research methodology

The findings of this research represent the first stage of the Research and Development (R&D) design in order to identify needs by means of collecting the quantitative data; the quantitative data collection samples were obtained from 296 flight attendants who reside in Thailand and work for 9 airlines. It is calculated by G* Power program with the confidence level at 95%.

Research Instruments used in this study was the Needs Questionnaires on flight attendants' training by collecting on frequencies, percentage, by applying data prioritization in dual-response format, using the analysis from Priority Needs Index (PNI).

The research methodology was in line with the two research objectives and the steps were as follows:

1. Questionnaire generation

The research was based on the study and evaluation the data related to the Needs Prioritization training needs of the flight attendant by using the sequencing technique of dual response format through the analysis from the Priority Needs Index (PNI) in the form of Likert scale initiated for 2 sets of condition; existing condition and desired condition (Wongwanich, 2005). This was to set the priority of needs for skill development through training provided by the company and the company's support to encourage employees to attend training. The overall needs Questionnaire covers issues of the respondents' general information, as well as the suitability of the questions relevant in the

development of Systems Thinking ability and is divided into 6 main sections: (1) Personnel characteristics, (2) Current status, (3) Problem occurrences during the performance on the aircraft, (4) System Thinking, (5) Skill Trainings, and (6) Training support from the company.

1.1 Make a draft of the Questionnaire, consult with the advisor for suggestions about the suitability and the needed issues and edit according to the advisor's suggestions.

1.2 Submit the Questionnaire to 5 experts for evaluation in terms of content, consistency and coverage, the result of which showed that the Index of Item-Objective Congruence (IOC) Scores ranged from 0.8 to 1.0 with the average being 0.95. The Questionnaire was, therefore, consistent in terms of content, consistency and coverage, after that it will be modified according to the advice of experts before using for data collection.

2. Data collection

2.1 Request permission to collect the data from the airline's crew resources management department.

2.2 Hand over the approval for data collection to the flight attendant training department to set the collection period.

2.3 Channels of Questionnaires collection

a. Via human resources or crew management departments by inserting the Questionnaires into the pigeon holes of flight attendants of Nok Air, Thai AirAsia, Nook Scoot, Lufthansa and Swiss International Airlines.

b. Face-to-Face data collection at the Cafeteria of Thai Airways Crew Training Center.

c. Via online, using Google Form through social media applications, i.e. Line and Facebook.

3. Data analysis consisted of

3.1 Data analysis of frequency, percentage, data prioritization in dual-response format using the analysis from Priority Needs Index (PNI).

3.2 Open-ended questionnaire analysis of content and content on case studies related to work performance before and during the flight.

Research findings

The results of the data collection initiated with the descriptive data divided by the characteristics followed by 5 Tables which consisted of Table (1) Descriptive data on flight attendants' frequently used programs or applications, Table (2) Descriptive data on the frequency of social media usage, divided by the length of the working day, or day(s) off, Table (3) Descriptive data on the basic understanding of Systems Thinking and the opinions on training experience, Table (4) Data related to the opinions of flight attendants on skill enhancement trainings provided by the airlines, Table (5) Data related to the opinions of flight attendants on training support provided by the airlines and Diagrams of problem occurrences during work performance on the aircraft which divided into 3 Diagrams consisted of Diagram (1) Problem occurrences during on ground preparation Diagram (2) Problem occurrences during passengers boarding and Diagram (3) Problem occurrences before take-off and at cruising altitude respectively as follows:

The results of the descriptive data divided by the characteristics showed that from the total number of 296 respondents 77.36% were female, 44.59% were at the age of 30 or younger 84.12% graduated bachelor degree 45.27% worked for Thai Airways International, 33.11% worked for more than 12 years, 55.40% worked as economy class flight attendants, 79.79% are able to use commonly used programs, 70.61% used Apple Smart Phone as their technological devices and 83.11% connected through internet by using the hotel's WiFi.

Table 1

Descriptive data on flight attendants' frequently used programs or applications by case (multiple answers possible, choosing the 3 most important priorities, giving rank 1 to the most important respectively)

Program/ Application	Names of Program/Application	(*n*) by Case	1 Priority	2 Priority	3 Priority
Program	Word Processor	244	**72.54**	22.54	4.92
	Spreadsheet	182	28.02	**39.56**	32.42
	Presentation Program	165	12.73	39.39	**47.88**
	SPSS	8	12.50	0.00	87.50
	Others	26	69.23	15.38	15.38
Application	E-commerce App	51	1.96	23.53	74.51
	YouTube	271	46.49	**49.08**	4.43
	Google Search Engine	209	**65.07**	28.23	6.70
	Google Doc	71	15.49	23.94	**60.56**
	Google Form	34	20.59	26.47	52.94
	Google Sheet	18	0.00	33.33	66.67
	Keynote	37	0.00	29.73	70.27
	Others	31	35.48	16.13	48.39

Table 1 showed that the commonly used programs by case, Microsoft Word was marked with 1st priority or 72.54%, Microsoft Excel was marked with 2nd priority or 39.56% and Microsoft PowerPoint was marked with 3rd priority or 47.88%. The ranking for commonly used applications showed Google Search Engine in rank 1 or 65.07%, YouTube was marked with 2nd priority or 49.08% and Google Doc was marked with 3rd priority or 60.56% respectively.

Table 2

Descriptive data about the frequency of social media usage, classified by the length of the working day, or day(s) off

Period	Social Media Applications	Not at all	1-30 Mins/ day	31 Mins - 2Hrs /day	2.01-4 Hrs/ day	4.01-6 Hrs/ day	>6 Hrs / day
Work Day	Facebook	5.41	21.28	**29.39**	26.35	9.12	8.45
(a)	Line	1.69	16.89	**25.34**	**25.34**	14.53	16.22
	Instagram	27.70	**29.73**	16.89	15.20	6.08	4.39
	Twitter	82.77	**11.49**	3.38	1.01	0.34	1.01
	WhatsApp	83.78	**12.50**	2.03	1.35	0.00	0.34
	FireChat	98.99	0.00	**1.01**	0.00	0.00	0.00
	Others	96.62	**1.35**	**1.35**	0.68	0.00	0.00
Day(s) off	Facebook	4.39	12.50	**24.66**	24.32	17.91	16.22
(b)	Line	2.03	11.49	**22.64**	22.30	18.92	**22.64**
	Instagram	24.66	**23.99**	16.22	14.86	10.14	10.14
	Twitter	81.76	**9.12**	4.73	1.01	2.36	1.01
	WhatsApp	83.11	**12.16**	2.03	1.69	0.34	0.68
	FireChat	98.31	**0.68**	0.34	0.34	0.34	0.00
	Others	97.30	0.34	**1.35**	1.01	0.00	0.00

The results from Table 2(a) showed that during workdays flight attendants used the following social media apps in terms of usage duration per day: Facebook 29.39% with a duration of 31 minutes to 2 hours, Line 25.34% with a duration of 1 minute to 4 hours, Instagram 29.73% with a duration of 1 to 30 minutes, Twitter 11.49% with a duration of 1 to 30 minutes, WhatsApp 12.50% with a duration of 1 to 30 minutes, Fire Chat 1.01%, with a duration of 1 minutes to 2 hours and other applications 1.35% with a duration of 31 minutes to 2 hours.

Table 2(b) shows that during day(s) off flight attendants used the following social media apps in terms of usage duration per day: Facebook 24.66% with a duration of 31 minutes to 2 hours, Line 22.64% with a duration of 31 minutes to 2 hours and more than 6 hours, Instagram 23.99% with a duration of 1 to 30 minutes, Twitter 9.12% with a duration of 1 to 30 minutes, 12.16% WhatsApp with a duration of 1 to 30 minutes, Fire Chat 0.68% with a duration of 1 minutes to 30 minutes other applications 1.35% with a duration of 31 minutes to 2 hours.

Table 3

Descriptive data on the basic understanding of Systems Thinking and the opinions on training experience

Descriptions	Opinions	(*n*)	% (*n* = 296)
Basic understanding of Systems Thinking.	• Step-by-step thinking, understanding an action, sequence of an action in a systematic way	181	61.15
	• Look at the system as a whole, understand the interaction between each element of the system	115	38.85
Have you attended any courses rather than service, first aid and emergency training?	Yes	82	32.43
	No	214	66.89
Which training method do you consider appropriate?	Face-to-Face Training	137	46.28
	Self-Training with Online Training	84	28.38
	Blended Training	75	25.34

The results from Table 3 Basic Understanding of Systems Thinking and Opinions on Training Experience showed that 61.15% of the respondents understood that Systems Thinking implied step-by-step thinking and the understanding of the sequence of any action in a systematic way. 66.89% have

never attended training courses other than service*, first aid* and emergency* trainings (*these basic training courses are mandatory courses of flight attendant qualifications provided by the airlines (Lufthansa Flight Training, 2015) and the opinion of the appropriate methods for training are self-training with online training, accounting for 28.38% and 25.34% with blended learning.

Table 4

Data related to the opinions of flight attendants on skill enhancement trainings provided by the airlines was analyzed and prioritized in dual-response format, using the analysis from Priority Needs Index (PNI) in the form of Likert scale initiated for 2 sets of condition; D = existing condition and I = desired condition (Wongwanich, 2005)

Opinions	D	I	Mean D	Mean I	(I-D)	(I-D)x I	Priority
Provided training was useful and can be applied to actual work.	586	729	1.98	2.46	0.48	1.19	1
The Airlines provide appropriate training courses for you.	547	651	1.85	2.20	0.35	0.77	2
Overall, you are satisfied with the training courses provided by your company to enhance performance skills.	565	666	1.91	2.25	0.34	0.77	3

The data in Table 4 showed the respondents' opinion that the training must be useful and suitable for actual work was marked with 1st priority. Marked with 2nd priority was that airlines provided appropriate training courses for them. Overall satisfaction with the training courses provided by the company to enhance performance skills was marked with 3rd priority.

Table 5

Data related to the opinions of flight attendants on training support provided by the airlines by applying the analysis from Priority Needs Index (PNI) D = existing condition and I = desired condition

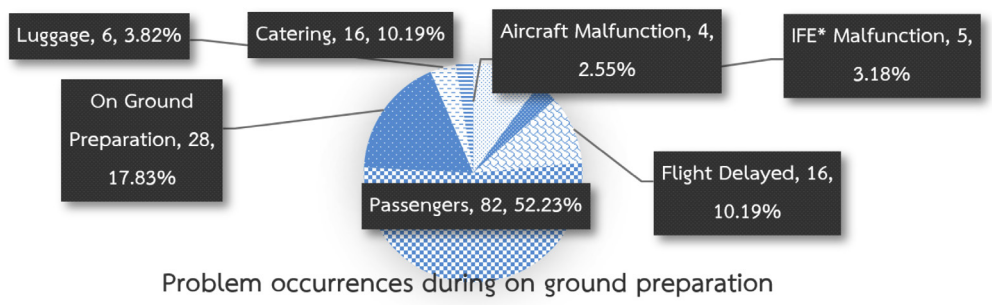
Opinions	D	I	Mean D	Mean I	(I-D)	(I-D) x I	Priority
1. The airline should set training in various fields.	880	1,144	2.97	3.86	0.89	3.45	1
2. The airline should provide training materials and manuals.	981	1,178	3.31	3.98	0.67	2.65	2
3. Overall, you are satisfied with the training support provided by the airline.	968	1,153	3.27	3.90	0.63	2.43	3
4. You were given training support by your airline.	947	1,134	3.20	3.83	0.63	2.42	4
5. The airline should conduct employees' survey for training improvement.	988	1,165	3.34	3.94	0.60	2.35	5
6. The airline should provide training experts for each training topic.	1,011	1,177	3.42	3.98	0.56	2.23	6
7. The airline should provide sufficient audiovisual equipment for training.	1,000	1,166	3.38	3.94	0.56	2.21	7
8. The airline has set regular training schedules.	961	1,129	3.25	3.81	0.57	2.16	8
9. The airline should conduct pre-training evaluation.	924	1,061	3.12	3.58	0.46	1.66	9
10. The airline should conduct post-training evaluation.	1,044	1,131	3.53	3.82	0.29	1.12	10

The data in Table 5 showed that the opinion on setting up training courses in various fields was marked with 1st priority, the opinion on provision of training materials and manuals with 2nd priority and overall satisfaction with the training support provided by the airline with 3rd priority.

Problem occurrences during work performance on the aircraft

Figure 1

Occurrences during on ground preparation



The data of problem occurrences during on ground preparation was collected by open-ended questions, they were categorized and analyzed in terms of frequency and percentage. Diagram 1 showed that 52.23% of the occurrences during on ground preparation were related to passengers' discontentment caused by seat separation, reseating or seat duplication and 17.83% were relevant to the limitation of flight attendants' preparation time. (*IFE = Inflight Entertainment. occurrences accounted for 3.18%).

Figure 2

The diagram of the occurrences during passengers boarding

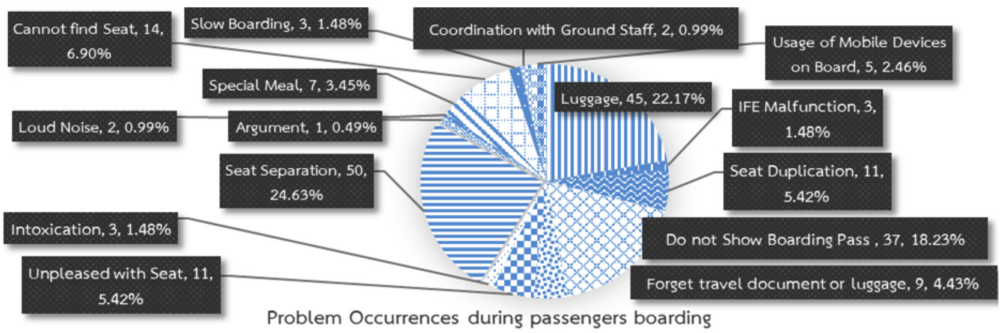


Figure 2 showed that 24.63% of occurrences during passengers boarding were caused by seat separation and 22.17% by passengers' luggage.

Figure 3

The diagram of problem occurrences before take-off and at cruising altitude

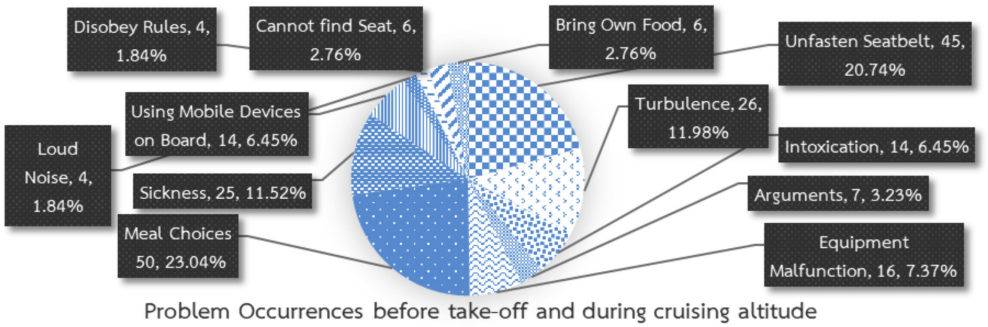


Figure 3 showed that 23.04% of the occurrences before take-off and at cruising altitude were caused by the availability of meal choices and 20.74% were caused by passengers' refusal to fasten seatbelts.

Discussion

The topics of discussion in this section mainly addressed on 4 points consisted of (1) Technological devices and working conditions of flight attendants (2) Appropriate learning management system usage for further research steps

(3) Systems thinking necessity and (4) Appropriate tools and concepts to enhance systems thinking for flight attendants.

1. The results pertaining to the use of technological devices showed that 70.61% of flight attendants used IOS Platform Smart Phones, namely iPhone, 62.16% owned Notebook and 51.01% IOS Platform Tablet, i.e. iPad, showing that these technological devices are consistent and beneficial to the working conditions of the flight attendants who travel most of the time. Hence, OT for flight attendants deems to be one of the tools able to enhance a suitable learning environment, as flight attendants can access online training through these devices via internet anywhere, anytime, synchronously or asynchronously (Allen & Seaman, 2013; Charoensuk, 2014; Cuison, 2016; Khlaisang, 2012; Kuanhavej, 2000; Nilsuk, 2014; Piskurich, 2006; Yanuschik et al., 2015).

2. In terms of the usage duration of social media applications, Facebook was the most frequently used application, i.e. between 31 minutes to 2 hours, equivalent to 29.39% during the work day and 24.66% during day(s) off. Moreover, the 1st ranking of frequently used applications was Google Search Engine, equivalent to 65.07%, the 2nd ranking was YouTube, equivalent to 49.08% and the 3rd ranking was Google Doc, equivalent to 60.56%. Above data showed that flight attendants were capable of using these applications which is consistent with the fact that the researcher had chosen Google applications as a platform for the lay-out of effective online training models by introducing Google Classroom, a learning management systems (LMS) to manage non-complex instructions (Iftakhar, 2016). This Google platform included a variety of learning management tools, i.e. lesson creation, teaching materials in the form of documents, images or animations, links or quizzes (Google, 2015). In addition, Google Classroom is compatible with Google Drive which acts as a data management system and can be utilized with other Plug-ins such as Google

Sheet, Google Slides and Google Form. Google Classroom can conveniently be communicated with through Google Mail, scheduled through Google Calendar and can easily oversee and follow up with the learners attendance and progress (Wikipedia, 2017).

The researcher has refrained from using Facebook, although this application figured as the most popular platform and is even being used for education purposes. The reason is that Facebook is an application where lesson engagement, i.e. clicking "Like" or posting short messages, etc. is the main focus (Clements, 2015). Moreover, Facebook does not provide a data management system that enables easy systemic data retrieval and storage, nor are there the necessary plug-ins for easy creation of exercises or questionnaires for educational purpose.

3. The research results of Basic Understanding of Systems Thinking and Attitudes concerning training experiences showed that 61.15% of respondents misunderstood the meaning of Systems Thinking, i.e. to look at things in a big picture, to observe the changes of things within the system through time, to see the creation of patterns or trends and to understand the relationship between causes and effects within the dynamic systems. All these elements are driven in circles rather than in straight lines: understand the relationship within the system, understand how the dynamics of the system work, view things from various perspectives, determine the structures of the system and their behaviors before performing any actions, compare the results from both short and long term actions, including unwanted incidences that might occur, understand that the effects of complex and dynamic systems may not occur immediately but that the potential consequences need to be taken into account (Benson, 2007). Therefore, in order to create better understanding and be able to apply these skills in real life, it is appropriate to design Systems Thinking training courses to

enhance Systems Thinking Ability for Flight Attendants.

4. The data concerning occurrences during work performance on the aircraft was divided into 3 parts as described in Diagram 1-3 and showed that 52.23% of the occurrences during on ground preparation came from passengers' aspects, consisted of seat separation, reseating or seat duplication. 17.83% were caused by flight attendants' preparation time limitation, 24.63% of the occurrences during passenger boarding came from seat separation, 22.1% came from passengers' luggage, 23.04% of the occurrences during cruising flight came discontent about meal choices and 20.74% came from the passenger's refusal to fasten seatbelts. Therefore, the occurrences during work performances on the aircraft were real life events or cases (Herried, 1997-1998), adaptable as case studies (Piskurich, 2006; Roper & Millar, 1999), challenge thinking processes and encouraging Systems Thinking (Carleton College, 2015; Connell et al., 2012; Shivakumar, 2012; Srianek, 2012). The researcher converted the occurrences into case studies and linked them with the Systems Thinking concepts in order to let flight attendants analyze the problems, exchange their opinions (Kaemmanee, 2008; Rajamangala University of Technology Suvarnabhumi) and determine the most appropriate solutions to the problems. Moreover, in order to enhance Systems Thinking ability, the researcher has introduced the basic rules of thought DSRP, the theory or basic rules of human thought, to create a mechanism in determining any concept with dynamics, patterns, development, adaptation, and complexity by comparing each concept as data or symbol (Content) and (Context) in which DSRP rules act as the contexts defined into 4 sets of rules; Distinction (D) consists of what we define (Identity) with something other than what we define (Other), System (S) consists of each element (Part) and all elements incorporated as a whole (Whole). The Relationship (R) consists of the relationship between the cause of the action (Affect) and the outcome

of that cause (Effect) and the Perspective (P) consists of what is abstract or ambiguous (Subject) and what is clearly identified (Object). (Cabrera & Cabrera, 2015a, 2015b). All of these elements combined with problem solving by using Case-Based Training encourage Systems Thinking ability. Thus, DSRP deems to be an appropriate tool to create a Systems Thinking ability for flight attendants.

Suggestions

This section is mainly addressed on 2 aspects which consisted of the further research and development on Systems Thinking skills in various industries and airlines' online training encouragement.

In this research, the main focus is on the context of flight attendants, but Systems Thinking skills is a powerful skill useful in personnel development in various other industries to see the system as a whole, to understand the dynamics of the system, to understand the causes and effects in both direct and indirect impacts. Therefore, the conduct of further research on this subject should be widely encouraged for the utmost benefit of other industries.

For the aviation industry it is suggested that Online Training should be introduced as a widespread training alternative, as training courses can be conveniently accessed anytime and anywhere and are appropriate for use with the nature of this profession. Systems Thinking skills will lead to the learners' acquisition of a broader range of aspects, resulting in employee's improved job competencies with the added bonus of higher customer satisfaction and the improvement of the employer's performance rating.

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