EXPLORING THE COMPETENCY OF GROUND SERVICE STAFF: THE APPLICATION OF INTERDISCIPLINARY EDUCATION IN COLLEGE VIA THE DACUM ANALYSIS METHOD

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Abstract

This study explores the competency of airlines' ground service staff and how to narrow the gap between academia and industry. Using the Developing A Curriculum (DACUM) method, which identifies and describes the competencies required for a job, observation of the workplace, and the opinion of experts, this study offers recommendations for the development of curriculums from both academic and industrial perspectives. The results show that the competency profile of airline ground service staff contains 8 duties, 129 tasks, and 101 competencies, including 31 items of knowledge, 34 items of skills, and 36 items of attitudes. It further shows that certain courses need to be included in interdisciplinary education. These include knowledge of the aviation industry, integration ability, an introduction to crime prevention, an understanding of the tourism industry,

an understanding of business management, IT skills, legal knowledge, public relations, and some medical experience. These subjects should be applied to curriculum development in college.

Keywords

Ground Service Staff, Competency, Interdisciplinary Education, DACUM

1. Introduction

Airline ground service staff (from hereon, referred to as "the staff") are at the front line for ensuring flights are on time. Their duties include checking in passengers and overseeing departures and arrivals. They are responsible for the departure and VIP lounges and coordinating the ramps. They need to do all this as well as deal with any problems that may arise within limited time frames (Shen, 2010). What is perhaps not fully understood is that according to the IATA 2019 annual report, in 2018, airlines offered services for to up to four billion passengers on 22,000 routes, and handled 64 million tons of cargo. As traffic volumes have increased year by year, the workload of the staff has also grown exponentially. To reduce the workload of the staff, airlines have invested in technology that allows travelers self-service options. Compare to the past, it will be a new customer service model (Marisa, 2018), but the focus of schools has been more on theory than on practice. However, curriculum planning should be improved to meet the personnel demands of the industry (Huang, 2019). It is evident that traditional ways of learning are no longer adequate for the employment needs of today's society (Tai, 2002; Rustum, 2002): requirements have changed and employees need to be able to multitask, be multiskilled and work in an interdisciplinary environment (Slingenberg, Rademaeker, Sincer, & van der Aa, 2008).

This study explored the competency profiles of the staff and their interdisciplinary capabilities in order to consider the course design through "Developing A Curriculum (DACUM)". To enhance the reliability of the study, triangulation was included. This study serves to narrow the gap between academia and industry, explore the implications for management, and offer practical recommendations.

2. Literature Review

2.1 Ground Service Staff

The staff is on the frontline, provides a wide range of services required at airports, from when passenger check-in until they board the plane for their flight (Yang, 2001). These staffs are

on-site presence between the airline and the passengers. Despite a huge workload, they must provide a service that meets the high professional standards required by the company and deal with customer-associated social stressors. However, these pressures take an enormous toll on the staff's emotional resources and the eventual physical, mental, and emotional fatigue experienced can lead to staff resignations (Dormann & Zapf, 2004). Tsai (2007) pointed out that the work of the staff requires both physical and cognitive ability as well as a high level of emotional intelligence. According to the Eva airline training materials (2018) and Yang and Tseng (2010), duties of staff include check-in counters, C.I.Q.S., departures, and arrivals, lost and found, the team for loading operation team, the departure lounge and V.I.P lounges, ramp coordinator, and handling any problems.

As well as offering a professional service, the staff is expected to meet certain physical standards: their uniforms must be neat and tidy and they must follow the regulations about the jewelry they wear, and their hairstyle and length. Furthermore, they are required to have good communication skills, the ability to react professionally in any situation, and be able to control their emotions (Nickson et al., 2005; 2004). Hong (2009) pointed out that the ability to communicate in English is essential for the staff.

2.2 Competency

The meaning of "competency" includes the concepts of knowledge and skill (Trinder, 2008) that can be separately identified: (1) knowledge, which is the outward manifestation and includes professional competence, expertise in specific areas, and ability from learning, training, and/or experience; and (2) skill, which is an unobservable individual ability that includes first, personal motivation to achieve a goal; secondly, personal traits of behavior, thoughts and emotion, and lastly, a person's self-concept that includes attitudes and approaches to the job (Spencer and Spencer, 1993).

Human resources managers identify various talents by using professional competence models (Chung-Herrera et al., 2003; Kerr & Jackofsky, 1989). When a person with specific capabilities is employed in an occupation that requires the same capabilities (Ko, 2012), job satisfaction and the quality of customer service will be enhanced (Bharwani & Jauhari, 2013) and the employee's standard of work will be high (Blayney, 2009). Currently, high levels of emotional intelligence are recognized as being the most important personal and social ability demanded by employers from graduates (Jameson, Carthy, McGuinness & McSweeney, 2016). Another important

factor is that the design of the curriculum and teaching material will be more effective once the vocational ability model is clearly understood (Chung-Herrera et al., 2003; Sisson & Adams, 2013; Tesone & Ricci, 2005).

2.3 Competence-Oriented Courses

Competence-oriented courses for education, the concept of which originated in the 1960s, focus on students' knowledge acquired from the curriculum and their performance in tests of their learning. Therefore, such courses can be seen to be a way of educating (Magnusson & Osborne, 1990). In the design of the curriculum, Su (2017) noted that two elements were necessary: (1) the teaching content must be appropriate for the outcomes goals; and (2) teaching should be student-centered, with the needs of students the subject of learning activities. Furthermore, under these two elements, there were four major components necessary in the curriculum: (1) course content as a complete work process; (2) student-centered learning activities; (3) action-based learning; (4) workplace-based learning environments. Therefore, competence-oriented courses ensure that students acquire knowledge, skills, and understanding of future employment trends and that their ability can be evaluated (Schilling & Koetting, 2010). As competence-oriented courses are academic, they can alleviate the gap between academia and industry as well as enhance the skills and productivity of workers. Education should focus on the training of vocational ability so that students can possess professional skills before entering the workplace (Passow, 2012).

2.4 Interdisciplinary Education

Jones and Merritt (1999) defined interdisciplinary as "an ability to integrate knowledge from different disciplines which includes the discipline as key knowledge". Spiro, Vispoel, Schmitz, Samarapungavan, and Boerger (1987) presented their theory of cognitive flexibility which refers to adapting knowledge in a variety of ways in response to changing situations and then making appropriate responses. This shows an ability to transcend what has been previously learned and being innovative. Interdisciplinary ability includes various components among which are the following: (1) learning ability, which is the ability to acquire knowledge independently and to keep updating knowledge; (2) the application of the methodology, which is the ability to use methodological thinking to solve problems in different situations; (3) innovative ability, which is the ability to use innovative thinking to identify and solve problems; (4) the ability to use tools, which refers to being able to communicate in foreign languages and to use computers;(5) practical ability, which refers to the ability to apply knowledge to real-life situations.

The changes to society and its increasingly complex structure have required colleges and universities to adjust their curriculums. To cope with industrial transformation and the challenges posed by this transformation, colleges and universities have begun to focus on the need to introduce interdisciplinary training. The aim of interdisciplinary education is to foster students' ability to integrate knowledge from various sources to solve complex problems: problems that would be difficult to solve with knowledge from a single discipline. Interdisciplinary education encourages students to integrate knowledge and perspectives from different fields and to construct a cogent point of view. (Menken & Keestra, 2016; Repko & Szostak, 2017; Lattuca, Knight & Bergom, 2013). Therefore, the curriculum should integrate cross-disciplinary knowledge to help students develop problem-solving strategies, encourage their creative thinking and allow them to be innovative by designing courses that encourage exploration and implementation.

3. Methodology

The aim of this study was to explore the competency of staff through observation and DACUM. It included triangulation to check the credibility of the data.

The observation of the staff took place at the Taoyuan and the Kaohsiung International Airports. The observers were required to focus on the knowledge, skill, and attitudes the staff applied to their work, and to collate a competency profile after observing how the staff worked.

Triangulation was originally used in navigation but was applied to the study of social sciences by Norman Denzin in 1978. This study use observation method and DACUM to explore staff's competency from the perspective of authors, scholars, managers of the aviation industry and ground service staff. Using more than one methodology to collect data is called methodological triangulation and applying a multi-level of research design in research is called data triangulation (Duh, 1997). Undertaking data triangulation and methodological triangulation to review the opinions of different respondents on the same issue, plus sources are a way to enhance the credibility and the rigor of the research (Chang, Wu, & Lin, 2018).

Developing a Curriculum (DACUM) was originally a method used to analyze competency but after being revised by Robert Norton from Ohio State University Education and Career Training Centre, it has become widely used around the world for competency analysis and curriculum design (Norton, 1985). DACUM can be used for planning and developing an academic curriculum as well as for designing training materials and work manuals, recruiting, training assessment, and career

consulting (Workforce Development Agency, 2013). For this study, we arranged a DACUM meeting to which we invited experts in the industry who had valuable experience and academic scholars from the air transport service department. Those present were asked to give feedback on the required duties, tasks, professional knowledge, professional skills, and the professional attitude of the staff.

4. Data Analysis

4.1 Observation

The observation was conducted at the Taoyuan International Airport and the Kaohsiung International Airport, the aim of which was to identify the duties, tasks and competencies, which include knowledge, skills and attitude, required of the staff. The results identified check-in counter, ticket and information counter, departure service, arrival service, lost and found, VIP lounge service, and handling problems. Under these 7 duties, there are 56 tasks to be completed and the staff should have at least 35 items of competency (9 items of knowledge, 16 items of skills and 10 items of attitude) to be qualified. Overall, the staff provides passenger services from all over the world, moreover, safety and security are the things that airlines take the most seriously, therefore, the aviation safety and security notice and passenger travel document checking, especially on forgery document, show high important in the items of competency. Besides, airline system operation, ticketing, air transportation, cargo and ramp control operation in knowledge catalog, language ability (including foreign and mother language), EQ management ability, communication skills in skill catalog and teamwork spirit, enthusiasm, empathy, affinity, patient and pressure resistance in attitude catalog also account for important competency indicators. The results are shown as a competency profile in Table 1.

4.2 Triangulation

The findings of the observation this study and information from researchers such as Shen (2010), Yang and Tseng (2010), Wan (2011), the training material from the Eva training academy (2018) and the training material for China's airline ground service staff (2018) and the following DACUM, the results were merged in a competency profile, as shown in Table 1.

4.3 Developing a Curriculum (DACUM)

The DACUM comprised 10 experts, of whom 5 were senior managers in the aviation industry, 3 were academic professionals and 2 were the staff. The conference was divided into two

parts: first, to establish the competency profile of the staff, and second, to discuss the gap between academics and industry, establish the interdisciplinary ability that staff must possess, and then design the curriculum.

The results show 8 duties and 129 tasks the staff is required to undertake. These include the check-in counter, the ticket and information counter, departure service, arrival service, lost and found, VIP lounge service, ramp coordinator and handling problems, the correspondent tasks are shown in the following Table 1.

Table 1: *Duties and Tasks of Airline Ground Service Staff*

Duty	Task
Check-in counter	1. Greeting 2. Confirm the flight that passenger will take 3. Travel document checking, including passport, visa, Mainland travel permit for Taiwan residents, and others 4. Luggage check-in operation, including scaling, luggage tag, overweight luggage operation and others 5. Passenger check-in 6. Dangerous goods delivery operation 7. Upgrading operation 8. Special passenger service, including unaccompanied minor, people with disabilities and others 9. VIP reception 10. Group Inclusive Tour check-in counter 11. Go-show 12. Deliver the boarding pass and luggage receipt to passenger and inform the boarding time and the number of the boarding gate 13. Maintain order in the check-in hall 14. Assis the operation of Self-check-in kiosk 15. Assis the operation of Self baggage drop service
Ticket and Information counter	1. Passenger name correcting 2. Extra fee collected and issuance of receipt 3. Inquiry of special regulation of visa 4. Ticket review 5. Inquiry of membership service 6. Inquiry and description of special regulation of ticket 7. Ticketing 8. Registration of go show passenger 9. Application of Receipt Issuing and onboard certificate 10. Itinerary alter

	11. Upgrading operation
	12. Flight status/ finder
	13. Expired ticket operation, including cancellation, complemental balance, and others
	14. Ticket accounting
Departure service	1. Passport checking
	2. Boarding pass confirming
	3. Passenger list, cabin crew list, special passenger service information and balance sheet checking
	4. Connecting for pre-flight check operation
	5. Boarding guiding
	6. Boarding control
	7. Boarding broadcast
	8. Finding passenger
	9. Lost property operation
	10. Maintain order in the departure lounge
	11. Number of boarding passengers
	12. Passenger seat adjustment
	13. Inspection tour on passengers' carry-on baggage
	14. Being aware of passenger's physical conditions
	15. Security control of boarding gate
	16. Delivery of immigration form
	17. Double check-in operation
	18. Notification of delivery and pushback
	19. Being aware of the ramp operation
	20. Close entrance door
	21. Delivering the pre-flight check record sheet, passenger list and cabin crew list to corresponding sector
Arrival service	1. Open entrance door
	2. Noticing the passenger service massage from the former station
	3. Special passenger service, including unaccompanied minor, people with disabilities and others
	4. Returning baby cart, wheelchair to passenger
	5. VIP's pickup and customs clearance service
	6. Immigration form delivery
	7. Guiding alight from the plane
	8. Assistance of transit
	9. Delivering lost property to the Lost and Found department
	10. Informing the right arrival time of the flight
	11. Assisting passenger in filling in immigration form

	12. Delivering document to corresponding sector
	13. Assisting repatriated passenger
	14. Close and lock the entrance door
	15. Calling an ambulance for emergency patient
	16. Assisting in an emergency landing or diverted plane
Lost and Found	1. Supervising the operation of unloading luggage
	2. Operation of unarrived luggage
	3. Operation of damaged luggage
	4. Operation of lost luggage
	5. Operation of unclaimed luggage
	6. Operation of transit luggage
	7. Operation of misleading luggage
	8. The lost property in the airport or on the plane storage
	9. Operation of unaccompanied baggage
	10. Settlement of claim
	11. Dangerous goods delivery
	12. Operation of SITA World Tracer
	13. Assisting passenger in dealing with unfinished case
	14. Operation of delivered error
	15. CIP and VIP luggage operation
	16. Receiving and assisting in clearance documents and packages of the company
VIP Lounge service	1. Greeting
	2. Confirming the using eligibility
	3. Separating passenger from first-class and business class
	4. First-class passenger service
	5. Temporarily storage for large luggage
	6. VIP information
	7. Boarding reminds
	8. Renew the magazine and newspaper in the VIP Lounge
	9. Maintaining VIP Lounge clean and tidy
	10. Headcount calculation
Ramp coordinator	1. Ground security vigilance
	2. Confirming the operation of carting
	3. Delivering the flight plan
	4. Delivering the load sheet
	5. Confirming the entrance door was closed well
	6. Coordinating the information between ground service staff and cabin crew
	7. Flight punctuality control
	8. Assisting in eliminating abnormal condition in cabin

	9. Confirming the aircraft fuel replenishment
	10. Circular of flight estimated
	11. Recording the maintenance completed time
	12. Clearance operation
	13. Ground operation cooperation and supervision
	14. Ground safety request and accident prevention
	15. Loading check of luggage and cargo
Handling problems	1. Calming passenger's mood
	2. Dealing with the change of the aircraft model
	3. Dealing with passengers' complaints
	4. Dealing with a quarrel between passengers
	5. Dealing with passenger violence
	6. Operation of denied boarding passenger
	7. Dealing with No-Sow passenger
	8. Dealing with unwell passenger
	9. Patient assistance
	10. Operation of missing passport
	11. Operation of missing boarding pass
	12. Operation of lost property
	13. Operation of flight consolidation
	14. Operation of flight delay
	15. Operation of overbooking
	16. Operation of entry cancellation
	17. Operation of luggage return
	18. Operation of flight re-route
	19. Operation of flight cancellation
	20. Operation of irregularly upgrading, irregularly downgrading, irregularly overbooking
	21. Delay flight inquiry
	22. Catering services, accommodation arrangement, and coordination

For these duties and tasks, the study also collated a competency profile that included 31 items of knowledge, 34 items of skill and 36 items of attitude, the details are shown in the following Table 2:

Table 2: *Competency of Airline Ground Service Staff*

	Knowledge	Skill	Attitude
C o m p e t e n c y	K-1 Airline System operation K-2 Employee code of conduct K-3 Aviation safety and security notice K-4 Civil Aviation Regulations K-5 Warsaw Convention and The Montreal Convention K-6 IATA regulations K-7 Air Transportation, Cargo, Ramp Control operation K-8 Aviation Terminology K-9 Familiar with responsible duties and tasks K-10 Provision of airport's regulated area K-11 Dangerous goods K-12 Booking operation K-13 Luggage operation K-14 Ticketing K-15 Company culture and Workplace ethics K-16 Company's organisational structure K-17 World Geography K-18 Customer relationship management K-19 Customer psychology K-20 Introduction to risk management K-21 Travel document checking	S-1 Healthy body S-2 EQ management ability S-3 Checking ability S-4 Booking system operation ability S-5 Billing ability S-6 Language ability S-7 Computer operation ability S-8 Comprehension S-9 Travel document checking S-10 Communication skill S-11 Retaining Customer S-12 Order of priority S-13 Comprehensive thinking S-14 Negotiation ability S-15 Perspicacious S-16 Internal coordination ability S-17 Resourceful ability S-18 Irregularity handling skill S-19 Problem solving ability S-20 Unruly passenger handling S-21 Disruptive passenger handling S-22 Handheld transceiver operation ability S-23 Boarding broadcast ability S-24 Entrance Door operation ability S-25 Makeup ability S-26 Catering service skills	A-1 Strong dedication A-2 Compatibility A-3 Responsible A-4 Frustration tolerance A-5 Workplace ethics A-6 Professional ethics /morality A-7 Confidence A-8 Making all-out effort A-9 Enthusiasm A-10 Empathy A-11 Customer orientation A-12 Teamwork spirit A-13 Punctuality A-14 Showing respect to others A-15 Positive A-16 Thoughtful A-17 Affinity A-18 Smiling A-19 Pressure resistance A-20 Patient A-21 Perseverance A-22 Sensitivity A-23 Seeking support from family A-24 Cost control concept A-25 Willing to communicate A-26 Worldly-wise A-27 Curiosity A-28 Safety consciousness A-29 Enjoys challenge A-30 Culture of enterprise A-31 Smooth mood A-32 Being modest to learn A-33 Elegant demeanour A-34 Original intention

K-22 Medical cognition	S-27 Teamwork	A-35 Open mind	
K-23 Current affairs	S-28 Interaction ability	A-36 Attentive	
K-24 Personal Information protection	S-29 Observation ability		
K-25 Balance sheet making knowledge	S-30 Car driving ability		
K-26 Self-technology operation	S-31 Work and rest management		
K-27 In-flight meal operation	S-32 Cross-functional communication skills		
K-28 Transfer flights operation	S-33 Coordination ability		
K-29 Introduction to aircraft	S-34 First Aid skills		
K-30 Introduction to culture of various country			
K-31 Notes on the entry and exit process			

Data Source: Shen (2010); Yang and Tseng (2010); Wan (2011); Training material from Eva airline training academy (2018); Training material of ground service staff from China's airline (2018); Observation of this study; DACUM of this study.

To narrow the gap between academic and industry, participating experts identified four potential problems: students' English proficiency; lack of knowledge of the industry; the advancement of education in professional competency; and insufficient practical experience. The experts also made some suggestions for academia: new courses should be developed to develop students' abilities in areas such as emotional intelligence, communicative ability, the ability to work as part of a team, legal knowledge, IT skills, character education, and leadership. For interdisciplinary courses, the experts proposed nine areas to be incorporated into the curriculum: knowledge of the aviation industry, integration, introduction to crime prevention, appreciation of the tourism industry, appreciation of business management, IT skills, interpersonal communication, public relations, and some medical training.

5. Discussion

This research developed a competency profile of the staff by means of on-site workplace observation, triangulation, and DACUM methodology. Compared with the previous research such

as that of Shen (2010) and Wan (2011), this research has updated the competency profile and identified a further eight new items of knowledge, eight new skills, and nine new attitudes.

With regard to the gap between academia and the industry, this research has established that there are four important issues to be addressed: English proficiency; lack of knowledge of the industry, the advancement of education in professional competency; and insufficient practical experience. Also, the experts indicated that the curriculum should include training in the following areas for the staff: handling emotions; expressive ability; teamwork; character development; and interpersonal communication.

Because the demands of industry are changing, schools should update their curriculums and begin interdisciplinary education to meet the needs of companies. This research has identified seven subjects that should be included: interdisciplinary knowledge of the aviation industry, integration ability, introduction to crime prevention, and understanding of the tourism industry, an understanding of business management, training in technology service/IT, legal knowledge, public relations, and some medical training.

6. Conclusions

6.1 Competency Profile of Airline Ground Service Staff

The competency profile compiled by this research through DACUM can be useful for both academia and industry. For academics, schools can implement it in the design and planning of courses. With competency-oriented courses, students will be well prepared to enter the workplace, having developed the necessary competencies. For industries, the competency profile provides necessary and accurate basic information for human resource development and management, such as the standards for recruits, training, performance reviews, and the organization of the company structure. Furthermore, it can also show the staffing needs and requirements of the company, while offering individuals a standard for self-assessment and the opportunity to enhance their competency.

6.2 Curriculum Development

Front-line service staff is required to be proficient in understanding, speaking and reading English. Although students' English proficiency is one of the current issues in education, schools should focus more on helping students to comprehend and speak the language through practical exposure. This research recommends that schools should apply 1. Situational teaching, 2. Debate, 3. A case study into competency-oriented courses. The aim of the application is to stimulate situations

that may occur in the workplace and improve students' ability to express themselves in English (Hong, 2009), and to make students' communication skill more effectively and express themselves well (Latif, Mumtaz, Mumtaz, & Hussin, 2018). These will also improve their logical thinking, moral sensitivity and judgment (Kim & Park, 2019) and teamwork skills (Hanna, Barry, Donnelly, Hughes, Jones, Laverty, Paesons, & Ryan, 2014), Moreover, it would inspire students' learning initiatives (Sapeni & Said, 2020) and enhance the interaction between professor and students or among students. Lastly, as was noted in the introduction, the design of the curriculum should ensure student-centered instruction, so that students can easily transition from school to the workplace.

One of the experts consulted in this research noted that despite the social structure of our society changing so rapidly, morality is still important in education. Min, Swanger, & Gursoy (2016) pointed out that experts in the industry have indicated morality as being the most important attribute, so schools should continue to incorporate subjects such as moral reasoning in their curriculum planning.

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