Aviation Human Factor Regarding Basic Skills Of Air Traffic Controllers In Thailand

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Abstract

This research aims to study the aviation human factor regarding basic skills of air traffic controllers in Thailand. This research is a qualitative research. The sample group consisted of air traffic controllers from various airports in Thailand and the head of the supervisory authorities for air traffic control, totaling up to 26 key informants. The research was conducted through in-depth interviews and results were analyzed through content analysis methods. The study results for basic skills of air traffic controllers among BSc in Air Traffic Control students, who attended an internship in Thailand's aviation agency, indicated that St Theresa International College students had preliminary operational skills, communication skills, and decision-making skills, which composes the current, standard basic skills for air traffic controllers within aviation agencies in Thailand. The basic skills of personnel consist of 6 skills: 1) preliminary operational skills, 2) communication skills, 3) stress management skills, 4) fatigue management skills, 5) situational awareness skills, and 6) decision-making skills.

Keywords: Human factors, basic skills of personnel, air traffic control

Background Information

The aviation industry is one with importance to humanity due to the rising needs to travel to different places within a short amount of time [3, 6]. As the demand for air travel grows, increased production of qualified aviation personnel is also required [[5, 7].

Imperative aviation personnel, besides the pilots, include air traffic controllers who are responsible for supervising and monitoring aircrafts throughout their flight paths. They would determine the bearings, speed, and aircraft ceiling, in which the pilots must act in accordance with, so that air traffic operations can be carried out conveniently, quickly, and safely throughout the flight paths [5].

Air traffic controllers are therefore an essential factor in the aviation industry, or also known as Aviation Human Factor. They must be qualified according to the standards of the

International Civil Aviation Organization (1984) [4], to instill confidence that personnel operations are carried out accurately and safely. It is also a vital part of efficient air transportation, which is beneficial in commercial transportation and other peripheral aspects as well [1].

What matters is that as air traffic increases, or during periods when air traffic is congested with numerous flights arriving at the airport, air traffic management or air traffic control therefore depends on aviation human factors. This inevitably shows the capacity of air traffic controllers in providing air traffic services [8, 9].

From the study on human factors related to air traffic control, it was found to consist of 3 aspects: individual factors, learning factors, and basic skill factors [5,10]; Wise et. al, 2010). Factors related to the management of human error in flight consist of basic skill factors [3]. Thus, it is essential to be attentive to the development of basic skills for air traffic controllers in order for them to have the highest service capability [2].

In addition, St Theresa International College ensures that learning management for air traffic control courses offered complies with the guidelines for curriculum quality assurance through the AUN-QA system, which aims to respond to the needs of stakeholders. The researcher believes that human factors should be studied, specifically on the basic skills of air traffic controllers in Thailand, which will benefit lecturers, the program committee, and university administrators. They will be able to use the information gained to develop course contents, aviation human factors and/or curriculum development, to respond to the requirements of internship agencies, training supervisors, and in accordance with the country's aviation standards and internationally as well.

Research Objectives

1. To study the Aviation Human Factor regarding basic skills for air traffic controllers among BSc in Air Traffic Control students at St Theresa International College, who attended an internship in the aviation agencies in Thailand.

2. To study the Aviation Human Factor regarding basic skills of air traffic controllers, which is the current standard within aviation agencies in Thailand.

Research Methodology

This research was a qualitative research. The researcher conducted the study through in-depth interviews. The sample group consists of air traffic control personnel from various airports in Thailand, including 10 student trainee supervisors, 5 intern student supervisors, 5 in-house specialists, and 6 head supervisors of air traffic control, totaling up to 26 key informants. The sample group was selected through purposive sampling, in which all of them have more than 10 years of experience working in the air traffic control field. The researcher performed data collection during December 2010 - December 2019. The interview data which were processed through triangulation will be analyzed using content analysis methods, and the results summarized.

Research Results

The researcher studied aviation human factors regarding the basic skills of air traffic controllers in two important areas: student performance during internships, and current standard skills within aviation agencies in Thailand. The study results were as follows:

1. Aviation Human Factor regarding basic skills for air traffic controllers among St Theresa International College students.

In-depth interviews with the sample group from all internship sites, on human factors for air traffic controllers of St Theresa International College's BSc in Air Traffic Control students who attended an internship in the aviation agencies in Thailand, revealed that students' human factors in terms of individual factors and knowledge factors were at a good level, in turn encouraging a good level for basic skills factors as well.

For the human factor in terms of individual factors, it was found that the interns from the college were organized, disciplined, punctual, honest, diligent, patient, politely dressed, well-spoken, showed respect towards departmental heads and supervisors, and were able to complete their work within the assigned time, which is the basis for learning and developing various skills.

For the human factor in terms of knowledge, it was found that the interns from the college had a good attitude towards the air traffic control profession, are committed to learning, consistently ask for additional work knowledge from their intern mentor, and willing to research for additional knowledge from diverse operational manuals, both for use in work and for future knowledge, which is a supporting factor for the development of various skills.

For the human factor in terms of basic skills, the college interns had air traffic control skills in all 3 areas of responsibility: Aerodrome Control Service, Approach Control Service, and Area Control Service. 1) Preliminary operational skills, such as arranging the distance between aircrafts according to the specified standards (in compliance with the procedure), 2) Communication skills - communication between air traffic controllers and pilots, accurate terminology use which are appropriate to the situation, and 3) Good decision-making skills, such as the courage to make decisions during a crisis, the ability to avoid situations which may potentially lead to mistakes, and no issues associated with drug or alcohol use.

2. Aviation Human Factor regarding basic skills of air traffic controllers which is the current standard within aviation agencies in Thailand.

In-depth interviews with the sample group from all internship sites revealed that the aviation human factor regarding basic skills of air traffic controllers, which is the current standard within aviation agencies in Thailand, should consist of 6 skills. These are preliminary operational skills, communication skills, stress management skills, fatigue management skills, situational awareness skills and decision-making skills.

2.1 Preliminary operational skills includes the ability to use manuals while operating in order to carry out the procedures or processes precisely, the ability to coordinate accurately, the ability to manage air traffic and arrange the distance between aircraft - aircraft according to the specified standards during practice/operation.

2.2 Communication skills include the ability to communicate information clearly, to interpret or decipher it accurately and precisely, the ability to communicate in a concise and comprehensive manner, and the ability to see and hear well.

2.3 Stress management skills includes the ability to manage one's own stress emerging from the workload, the complexity in providing air traffic service, the operational environment, as well as pressure arising while working.

2.4 Fatigue management skills includes the ability to manage one's own physical conditions, such as getting sufficient rest, and controlling the number of working hours per day or per week appropriately. A mental state that decreases one's alertness as a result of sleep deprivation, extended wakefulness, disruptions to the circadian phase, and/or workload (from mental or physical activities), will affect their ability to work safely.

2.5 Situational awareness skills includes the ability to be aware of past situations while practicing/operating, the ability to be aware of upcoming situations while practicing/operating, the ability to anticipate the situation that is about to occur while practicing/operating, situational awareness and focusing on the task at hand.

2.6 Decision-making skills demonstrate the courage to make decisions during a crisis and the ability to make accurate and quick judgments in different situations under various pressures, based on conditions of safety awareness.

Study results have shown that all 6 skills were essential and are related to each other. The sample group expressed their opinions that if an air traffic controller has an imbalance in their own skill management, especially stress management skills and fatigue management skills, if they are poorly executed, operations will be carried out with stress, and fatigue may occur. This will decrease the efficiency of their situational awareness skills, which might result in erroneous and unsafe decision-making.

Conclusion

The results of the study can be summarized as follows.

1. Aviation Human Factor regarding basic skills for air traffic controllers among St Theresa International College students.

For the human factors for air traffic controllers of St Theresa International College's BSc in Air Traffic Control students who attended an internship in the aviation agencies in Thailand, it was found that students' human factors in terms of individual factors and knowledge factors were at a good level, in turn encouraging a good level for the basic skills factor as well.

For the human factor regarding basic skills, the college interns demonstrated 3 important air traffic control skills, including 1) Preliminary operational skills, such as arranging the distance between aircraft - aircraft according to the specified standards, 2) Communication skills, such as accurate terminology use which are appropriate to the situation, and 3) Decision-making skills, such as the courage to make decisions during a crisis, and the ability to avoid situations which may potentially lead to mistakes.

2. Aviation Human Factor regarding basic skills of air traffic controllers which is the current standard within aviation agencies in Thailand.

The aviation human factor regarding basic skills of air traffic controllers, which is the current standard within aviation agencies in Thailand, should consist of 6 skills. These are preliminary operational skills, communication skills, stress management skills, fatigue management skills, situational awareness skills, and decision-making skills.

All 6 basic skills are related, with preliminary operational skills and communication skills presented as necessary skills required to carry out operations. However, if stress management skills and fatigue management skills are not coordinated, situational awareness skills and decision-making skills will be led to be inefficient, which may potentially instigate mistakes and hazardous conditions.

Recommendations

Recommendations for applying the research results:
According to the study on human factors regarding basic skills for air traffic controllers among St. Theresa International College students, it was discovered that the interns possessed 3 important skills: 1) preliminary operational skills, 2) communication skills, and 3) decision-making skills. Subsequently, lecturers and course administrators should develop various course contents affecting the development of students' skills, to be consistent with the current standards of aviation agencies in Thailand.

The study suggests that the basic skills of air traffic controllers, which is the standard of aviation agencies, should consist of 6 skills, namely preliminary operational skills, communication skills, stress management skills, fatigue management skills, situational awareness skills, and decision-making skills. Hence, course administrators and institutional administrators should include stakeholders' opinions in the process of curriculum improvement, in order to be more comprehensive.

Recommendations for further research:
According to the study, ineffective control of stress management skills and fatigue management skills will lead to inefficient situational awareness skills and decision-making skills, which may potentially cause inaccuracies and hazards. Nevertheless, since the study was qualitative with results obtained through in-depth interviews, other methods of study should also be conducted. For instance, quantitative research could further endorse the results of the research, which would be beneficial towards both curriculum development and developing the quality of curriculum learning management.

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