

# Development of Leadership Potential in the System of Higher Education: Civil Aviation Students

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The prime objective of the current study is to investigate the link between TQM, human oriented elements and the organizational performance. The satisfaction, commitment, and loyalty are considered as human oriented elements. The TQM is accessed as a determinate of the organizational performance. In addition to that, the current study has examined the mediating role of human oriented elements in the relationship between TQM and organizational performance in the higher education institutes of Thailand. The structural equation model is employed to analyse the structural model and structural relation among measured and latent variables. It analyses the direct and indirect association among variables. The SEM-AMOS is used, and the results of the study have provided a great deal of agreement with the hypothesized results. It is evident that the youth and graduate from Thailand tertiary institutions are not prepared with the skills with which to exploit and judiciously utilized the endowed natural resources in the country. These and other reasons have rendered the attainment of self-reliance and entrepreneurship education among the teaming

graduates difficult to maintain. This study has focused on the subjective measure of organizational performance including information gathering in problem solving/communication, faculty intellectual pursuits, achievement and development among staff and students, achieving academic excellence through quality adherence and feedback among others. The study which is among pioneering studies will be helpful for policymakers, educationist and researchers and student in understanding the issues in the higher education sector of Thailand.

**Key words:** *Leadership potential, students, civil aviation, learning process, physical activity, Ukraine.*

## Introduction

Continual life-long education is one of the priorities of Ukraine's state policy (On Higher Education, 2014). This, in turn, determines the major goal of modern education—the dynamic development of human capital as the main focus of national education and the basic principle of the development of modern society (Efimova, 2016). At present day, society sets higher precedence to one's spiritual and leadership potential. There is a growing demand for gifted and motivated individuals capable of thinking “outside the box,” with developed communicative, team building and self-management skills, as well as high performance. Therefore, the development of leadership potential, especially that of young people, becomes a crucial issue. From the pedagogical perspective, we support the opinion of Klymov (1998), who claimed that professionally important qualities and the level of professional training are formed gradually in vocational education and when performing professional activities.

Today, professionalism and developed leadership potential are especially important for a job in aviation, since these characteristics ensure the safety of passengers and failure-free flights (Xue and Fu, 2018; Liao, 2015). Aviation professionals have to perform two or more operations simultaneously, in order to solve problems of varying complexity, especially in an unforeseen or extremely difficult situation. This requires aviation professionals to carry great responsibility for the outcome of their actions (Hong et al., 2016; Chen and Chen, 2014). These specific features of a job in aviation determine the high requirements for personal qualities and skills of civil aviation professionals—in particular, leadership potential. Having analyzed several modern scientific publications, we found that a significant share of young civil aviation professionals, more than 71%, do not possess developed leadership skills (Valkov, 2015). Many of them lack self-control in difficult and unforeseen situations or required skills such as: an ability to adapt quickly to a new environment, responsibility, autonomy, initiative, flexibility in building relationships with subordinates and colleagues, empathy and tact when solving personal problems, an ability to resist negative leaders, will-

power, and organizational skills that underlie the authority of a leader (Dranko, 2019; Hong et al., 2016). Therefore, it can be concluded that regarding the activities performed, civil aviation requires a wide number of management professionals; however, there is an acute shortage of leaders. This has a detrimental effect in rapidly changing conditions, when, as a rule, leadership skills are required for dealing with unforeseen situations (Dranko, 2019).

We believe that the leadership potential of civil aviation professionals should be developed not at a work place, but through professional training. A university graduate, a future civil aviation professional, should be ready to play the role of a leader when performing his official duties. At the same time, in civil aviation, psychological characteristics of a person as a leader are just as important as professional skills (Gupta and Bajaj, 2017; Tuncdogan, Van Den Bosch and Volberda, 2015). Thus, physical activity is an indispensable part of students' training—it is an effective way of developing leadership potential (Kocaeksi et al., 2015; Kang and Svensson, 2019). Therefore, we believe that it is viable to apply a personal activity approach to develop and achieve this goal.

Having studied academic papers on the research problem, we revealed some contradictions related to the essence of leadership qualities, specific features and pedagogical conditions of their formation in a civil aviation university course by means of physical training. For instance, there is a need for highly qualified, professionally active and mobile aviation professionals, but the real level of leadership and other necessary professional qualities is insufficient. Furthermore, the traditional organization and content of their physical training do not include innovative technologies and methods of training for future aviation professionals. Additionally, aviation students understand the importance of leadership skills, but underestimate the role of physical training in their formation (Kocaeksi et al., 2015; Kang and Svensson, 2019). New technologies in aviation engineering and modern requirements for aviation professionals necessitate scientific development of personal, psychological, psychophysiological, and physical qualities among aviation students, along with changes in teaching methods. It is necessary to create pedagogical conditions that develop the physical and psychophysical leadership qualities, knowledge, skills, and abilities of aviation students. One should identify the significance of vocational-applied physical training to ensure the success of aviation students.

The aim of this article is to create a pedagogical model to develop the leadership potential of civil aviation students. We prove that it is necessary to develop students' leadership skills to improve their work performance. We analyze the leadership potential of civil aviation students in Ukraine and rank its components—the groups of competencies according to the specifications for their future work. We also assess the level of competencies demonstrated by university students and propose a targeted set of physical exercises to develop the main

components of the students' leadership potential. The effectiveness of this set of exercises has been confirmed in a pedagogical experiment.

### **Literature review**

The development of leadership potential and its various aspects in higher education have been explored in many research papers by scholars such as Alimbekova et al. (2015), Xu et al., (2019), Vezhevych (2001), Kosenchyk (2012), Semychenko (2004), Zazykin and Smirnov (2010), Hander (2007), and Ilin (2002). Some eminent scientists such as Alimbekova et al. (2015), Xu et al., (2019), have focused on the problems of leadership development and the formation of student groups. Pedagogical conditions for the development of leadership qualities were studied by Vezhevych (2001) and Kosenchyk (2012) by exploring the model for leadership qualities formation. Madsen (1985) and many others made a great contribution to the research on the theory of motivation. The nature, specifics, functions, and typology of informal leadership are considered in the works of Yakhodnikova (2004). Manifestations of leadership in children groups at different age stages, its specifics, as well as organizational and coordination functions have been studied in detail by psychologists Semychenko (2004), Zazykin and Smirnov (2010). The issues of educating leaders, creating conditions for the development of leadership skills and the formation of a socially active person have been researched by Hander (2007), Ilin (2002) and others. Some scientists considered leadership within the philosophical and anthropological approach to the value attitudes of students and explored the concepts of leadership, competency-based and situational approaches (Alimbekova et al., 2015). Also, many papers research the processes of the formation of a person's leadership position, the correlation between management and leadership, individual leadership in a competitive environment, and propose formulas of personal growth (Xu et al., 2019; Kang and Svensson, 2019; Daniëls et al., 2019).

In general, one can single out three main approaches in the numerous papers on the concepts connected with leadership (Morhulets, 2012). The first approach emphasizes leadership qualities (this one traditionally implies that a person possesses certain unique qualities from birth, as well as a certain level of intelligence and education, means of self-expression, self-confidence, initiative, etc.; some other concepts were based on this approach. The second approach focuses on leadership behavior (researchers now admit that a person is not necessarily born a leader: leadership skills can be successfully developed). The third is the situational approach in which leadership depends directly on the particular situation, but personal qualities and leadership behavior are also important factors that must be taken into account. It can be seen that each of the approaches emphasizes, or at least admits that leadership implies certain personal characteristics.

However, although leadership potential is determined by one's personal characteristics, we should not forget that when developing the leadership potential of students, it is also necessary to pay attention to the field of their future work. From this point of view, each job should be considered not only within a set of socio-political and economic trends, but also regarding certain socio-psychological and individual psychological preconditions required for the formation of leadership aspirations reflecting the specifics of a certain professional activity. Thus, students' leadership potential should be developed according to the particular features of their future job and basic requirements for their personal qualities and skills (Lysytsia, 2019; Shahabinasab A, Ramezanpoor Z, 2018).

In this research we focused on civil aviation students. Scientists have explored different aspects of work of aviation professionals. For instance, Petrenko (1983) studied the psychology of flying crews' activity and psychological aspects of aviation safety management. Antoshkiv (2006) and Fotyniuk (2011) analyzed the qualities required for a modern aircraft expert, as well as basic requirements of job description diagrams and requirements of international civil aviation organizations for aviation jobs. They also studied the specifics of professional-applied physical training of future pilots and aircraft maintenance engineers at higher education institutions. Hlushanytsia (2011) explored the formation of foreign-language vocational and communicative competence of future avionics engineers. Kovtun (2012, 2013) considered the formation of vocational language skills of future aviation operators. Civil aviation pilots, aircraft maintenance engineers, air traffic controllers, and aviation security specialists were also investigated by many scholars. However, having analyzed scientific papers, we concluded that there has been no targeted and comprehensive research on the problem of developing leadership qualities in the aviation industry.

The conducted study of psychological health of aviation specialists' required for performing their professional duties proved the relevance of this problem—developing students' leadership qualities at university. Considering the data on the number of stress situations experienced by aviation professionals, the level of stress resistance of successful aviation professionals and the nature of their activities, we can confirm that it is highly relevant to develop leadership qualities in future aviation professionals. The collected data prove that due to the mentioned job specifics aviation professionals should be able to maintain the level of their psychological health. In turn, such abilities should be considered as an integral part of aviation experts' professional competence and the success of an aviation company. On the other hand, developed emotional intelligence implies that people can understand and manage their own emotions, as well as the emotions of others. We came to the conclusion that aviation professionals incapable of maintaining their psychological health at a proper level will have significant difficulties in developing their professional and leadership qualities, despite the high level of professional training and competence (Makipov and Norbayev,

2018; Amraei A, 2018; Rasooli, M. and Abedini, M., 2017). Therefore, we perceive the development of emotional intelligence a necessary and indispensable condition for the formation of leadership qualities of a future aviation professional while studying at a higher educational institution.

Recent research publications and the practice of physical education of students have expanded the meaning and content of vocational-applied physical training of technical majors (Gladilina et al., 2018). Scientists have found that during vocational-applied physical training students successfully developed a set of psychophysiological and personal qualities required for their future work. Having analyzed the vocational-applied physical education of aviation students, we found out that this training, especially its practical aspect, does not receive enough attention (Kocaeksi et al., 2015). Little emphasis is made on the requirements for students' psychophysiological and psychophysical readiness when developing their leadership potential. These requirements should be systematized and clarified. There has been no comprehensive research on some other fundamental issues of constructing the methodology of vocational-applied physical training of aviation students and its pedagogical structure (the justification of its importance, effectiveness, didactic content, organization, and control), especially in a university course). This makes it impossible to build a general model of the vocational-applied physical training aimed at developing leadership skills (Kang and Svensson, 2019; Xu et al., 2019). Having studied the content and features of physical training of aviation students in the structure of their professional education, we have proven that physical training is one of the main subject areas that can facilitate the development of leadership qualities that are crucial for cadets and aviation students as part of their preparation for future work (Kocaeksi et al., 2015; Ngo PT, et al 2018). This includes general and special physical exercises since vocational-applied physical training is a kind of special physical training, a separate area of physical education, the content of which for aviation majors at technical universities is determined by a number of factors that reflect the modern structure and level of the industry.

### **Methods and materials**

The methodological basis of the study implied systemic and factor analyses and testing, along with expert evaluation and a pedagogical experiment. These methods were applied to assess the effectiveness of physical exercise on the leadership potential of civil aviation students.

As a part of the present investigation, first-year bachelor students whose majors included obligatory physical education courses took part in a pedagogical experiment. This enabled us to study the effect of physical exercise on the development of leadership potential. Consequently, the test sample consisted of 300 full-time aircraft students majoring in "Aircraft Flight Operation," "Maintenance and Repair of Aircraft and Aircraft Engines," and



“Air Navigation” at the National Aviation University (NAU), NAU Flight Academy (Kropyvnytskyi), NAU Kremenchug Flight College, Kremenchug Flight College of Kharkiv National University of Internal Affairs, and I. Kozhedub Kharkiv National University of the Air Force. For the pedagogical experiment, we selected students from all Ukrainian universities that train future aviation professionals. This sample size was chosen, as 273 participants are deemed sufficient to ensure the representativeness of the research results.

Students’ leadership potential was assessed by adopting the questionnaire developed by Zharikov and Krushelnitsky (2019) and the Quick Leadership Test (2019), allowing us to adjust the list of evaluated student qualities and ensure the adequacy of the results yielded by the analyses. The testing was conducted online and aimed to identify the main factors contributing to the development of students’ leadership potential. For this purpose, we evaluated the significance of different groups of leadership qualities for civil aviation professionals. These groups had previously been determined by aviation experts.

After the students completed the assessment proposed by Zharikov and Krushelnitsky (50 questions) and the Quick Leadership Test (33 statements), their answers were subjected to factor analysis. Since indicators are required for factor analysis, in the questionnaire developed by Zharikov and Krushelnitsky, the response options positively characterizing leadership potential was assigned the numerical value of 1, and 0 otherwise. In the Quick Leadership Test, similar coding procedure was adopted, whereby “Yes” was evaluated as 1, while “No” and “Not sure” were assigned 0. Thus, in both methods, the answers positively characterizing leadership skills were awarded 1 point, while 0 was assigned otherwise, generating a binary data array for factor analysis, which was performed using Statistica 10.0 computer software. The optimal number of factors was determined by the Kaiser criterion, according to which significant factors should have eigenvalues exceeding 1.0 (Menke, 2018; Lopes IM, Oliveira P, 2018). In addition, the composition of the factors is determined as the factor loads between the indicators (questions/statements included in the tests) and the corresponding factors, with the significant factor loads exceeding 0.7 (Menke, 2018).

The expert group for assessing the impact of the identified leadership factors (groups of leadership qualities) of civil aviation professionals included 50 representatives of civil aviation flight crews—aircraft commanders and certified copilots with at least 10 years of flight experience. These factors were deemed to objectively prove the competence of these experts. Moreover, including 50 experts was sufficient to generate valid findings, given that this number substantially surpassed the required minimum of 30 people (at a significance level of 95%). The experts were asked to evaluate the importance of various leadership skills that had been identified and grouped via factor analysis for civil aviation specialists using a 5-point scale.

Finally, we substantiated pedagogical conditions for developing students' leadership potential through physical education classes and proved their effectiveness in a pedagogical experiment. When conducting the pedagogical experiment, we selected students from the main test sample and assigned them to either the control or the experimental group. To ensure that a meaningful between-groups comparison can be made, we chose students of approximately equal level of academic performance and social activity, as this would increase the reliability of the experimental results. The statistical significance of the differences in the level of students' leadership qualities in the control and experimental groups was evaluated with a t-test. The aim of the test was to ascertain if the differences between the leadership qualities of the control and the experimental group are statistically significant, in which case the proposed methodology based on physical education could be considered effective (Rousseau et al., 2018; Ayebo A, et al., 2019).

## Results

The testing results showed that according to the methodology of E. Zharikov and E. Krushelnitsky, most civil aviation students participating in the experiment did not possess developed leadership qualities. For instance, according to the survey, 61-63% of the students scored less than 25 points. The Quick Leadership Test demonstrated that 62–64% of students had low leadership potential. There were no statistically significant differences in the levels of leadership potential in different universities and majors, which was confirmed by the results of a t-test (the empirical values of the t-test were lower than the table ones at  $p = 0.05$ ). Therefore, for further analysis, we created one sample for all higher educational institutions and majors included in the research. The results of sample evaluation are presented in Table 1. The test results showed that only 5-6% of civil aviation students had high leadership potential. Both methods used provided similar data, which proves that the test results are reliable.

**Table 1:** The level of the leadership potential of Ukrainian civil aviation students.

The method of E. Zharikov and E. Krushelnitsky			The Quick Leadership Test		
Groups according to the levels of leadership	Results		Groups according to the levels of leadership	Results	
	Number of students	%		Number of students	%
Poor leadership qualities	187	62.3	Low leadership potential	190	63.3
Average leadership qualities	98	32.7	Passive position	93	31.0
Strong leadership qualities	14	4.7	High leadership potential	17	5.7
As a leader, shows signs of authoritarian behavior	1	0.3			



Source: Compiled by the authors.

To identify reasons for low leadership potential, we performed factor analysis for particular indicators (questions/statements) of the selected methods. This analysis enabled to identify six factors—six groups of students' leadership qualities according to the Kaiser criterion: intrinsic motivation (desire to be a leader), responsibility and determination, authority, autonomy, psychological stability, and discipline. The adequacy of the obtained results of factor analysis is ensured by the sufficient sample size (300 observations) and the factorization percent estimating 88.2%. The selected factors were interpreted regarding the questions/statements that had formed the factors based on their factor load.

The importance of these leadership qualities was ranked from the most to the least important ones according to the experts' responses: responsibility and determination (25.3%), psychological stability (23.8%), discipline (19.6%), intrinsic motivation (12.1%), authority (10.9%), and autonomy (8.3%). The relative significance of leadership factors for civil aviation professionals was calculated as the ratio of the average expert scores for the estimated factor to the total score. The statistical significance of the expert assessment is confirmed by the competence of experts and the coefficient of concordance as its value equaled 0.86, so the expert opinions could be considered consistent.

According to the method of E. Zharikov and E. Krushelnitsky, low leadership potential corresponds to the value of 25 points or less. If recalculated into relative values, this is 50% of positive answers. The medium level is 50-70%, and the high level is 70-100%. Using this principle, we determined the development of the selected groups of students' leadership qualities. According to the research results, it was found that the groups of leadership qualities that are the most significant for civil aviation professionals are at the same time the least developed: 2.3% of the first-year students demonstrated highly developed responsibility and determination, psychological stability—2.7%, and discipline—2.3%.

**Table 2:** Levels of leadership qualities development of Ukrainian civil aviation students.

Groups of leadership qualities	Development level					
	Low		Medium		High	
	Number of students	%	Number of students	%	Number of students	%
Responsibility and determination	248	82.7	45	15.0	7	2.3
Psychological stability	223	74.3	69	23.0	8	2.7
Discipline	229	76.4	64	21.3	7	2.3
Inner motivation	129	43.0	143	47.7	28	9.3
Authority	164	54.7	118	39.3	18	6.0



Autonomy	154	51.4	130	43.3	16	5.3
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Source: Compiled by the authors

We conducted a pedagogical experiment to determine the possibility of developing these leadership qualities by means of physical education. It aimed to assess changes in students' leadership qualities facilitated by the proposed methodology. The students from the experimental group attended such classes. The students of the control group had physical education classes according to the previously approved program.

The test sample consisted of students from different universities and majors with different curricula. These training programs for civil aviation students had different number of physical education classes. Therefore, to ensure the reliability of the results, the experimental conditions were created for the experimental group at one class per week (2 academic hours) and implied theoretical and practical training which included information on physical fitness, healthy lifestyle, self-control of one's physical condition, the need for development of physical qualities to improve one's health and professional activity.

Since leadership manifests itself in team work, the proposed set of physical education classes focused on team interaction and competition. To develop responsibility and determination, we used tasks with possible alternative outcomes, time limits and higher responsibility. An example of such activities is team games with different possible scenarios (pass, end of attack, etc.). Increased responsibility is a specific feature of such games: a significant impact of the results of such competitions on the final score, penalty for losing in the form of additional physical exercise and working out. Determination is also developed in games with strict time-limits in which one has to make a decision (chess, checkers with a limited time of a turn, finding one's way through a maze or completing a quest).

It was proposed to develop psychological stability with non-standard, distracting conditions of competitions: hurdling, running target shooting, by including external factors, relay races, or team games in adverse weather conditions (rain, snow, wind, cold, or heat). It was proposed to use some distracting actions such as throwing the second ball or foreign items onto the pitch, unwanted sound and lighting effects during the competition.

Discipline and honesty were developed with various types of rewards and penalties for discipline, as well as educational activities (lectures, discussions, watching sports games of disciplined teams) and the method of circuit training.

Intrinsic motivation can be developed by public rewarding of competition winners, additional encouragement of a team captain, the best player, or a student coach.

The conducted experiment showed that authority can be effectively developed if the team captain is regularly changed and is assigned with a wider range of responsibilities such as determining the composition of the team and the strategy of the game.

It follows from the above that the most effective tools for developing responsibility and determination, psychological stability, discipline, intrinsic motivation and authority are team games with the minimal influence of a teacher as a coach and a strategist and by including some distracting factors. However, such pedagogical conditions hinder the development of autonomy, since the behavior of an individual player (with the exception of the captain), largely depends on the game strategy and the captain's instructions. As the experiment showed, the autonomy for civil aviation students can be increased by playing chess, checkers, shooting, wrestling, or individual endurance exercises (squats with diagonal touching the ground, back bends with twists and wave push-ups.) All endurance exercises are to be performed for 40 seconds with a 20 second break.

The technology of conducting physical education classes includes a 10 minute warm-up; individual strength competitions (alternating weekly sessions of running, jumping, shooting, wrestling, squats, pushups, dumbbell sports) or mental exercise (checkers and chess) for 35–40 minutes; team games under extreme conditions for 35–40 min. The alternation of individual and team classes, mental and strength exercise will increase individual and team leadership skills of students. They increase the speed of reaction and thinking due to changes in the task type and conditions, and develop psychological stability. We used the same technology when conducting physical education classes in all the universities studied: the same exercises were used in the same sequence with the same extra elements, rules, competitions, number of participants, rewards, penalties, and the same awarding procedure. After two months of physical education classes conducted with the proposed technology, we registered the following changes in the level of students' leadership potential (Table 3).

**Table 3:** Levels of the development of students' leadership qualities (the results of the pedagogical experiment).

Groups of leadership qualities	Share of students with a certain level of leadership qualities, %						t-test
	Low		Medium		High		
	CG	EG	CG	EG	CG	EG	
Responsibility and determination	76.3	61.3	19.7	29.4	4.0	9.3	8.11
Psychological stability	69.3	59.3	26.4	29.7	4.3	11.0	8.43
Discipline	70.7	64.3	24.3	26.4	5.0	9.3	7.59
Inner motivation	39.3	33.3	49.7	50.4	11.0	16.3	4.96
Authority	49.0	45.7	44	44.6	7.0	9.7	3.08
Autonomy	46.3	40.3	45.4	45.0	8.3	14.7	6.27

*Abbreviations:*

CG– control group;

EG–experimental group.

Source: Compiled by the authors

After implementing the proposed technology, the number of students with a high level of responsibility and determination increased by 5.3 percent, while those with the low level decreased by 15 percent (comparing the low level of the experimental and the control groups). Regarding the high level of psychological stability, there is an increase by 6.7 percent with a 10 percent decrease in the low level. There were 4.3 percent more students with a high level of discipline, and the number of students with a low level decreased by 6.4 percent. The high level of intrinsic motivation increased by 5.3 percent, while the low level decreased by 6 percent. There were 2.7 percent more students with the high level of authority, and the low level decreased by 3.3 percent. The high level of autonomy increased by 6.4 percent, while the low level decreased by 6 percent. The empirical values of the t-test (Table 3) exceeded the table one of 1.96 for all groups of leadership qualities, which, with a probability of 95%, indicates that these changes were not random and confirmed the effectiveness of the proposed technology for physical education to develop the leadership potential of civil aviation students.

### **Conclusion**

Despite the high level of professional training and competence, aviation professionals who fail to maintain their psychological health will experience considerable difficulties in developing their professional and leadership qualities. Therefore, the development of emotional intelligence is a necessary and indispensable condition for the formation of leadership qualities of aviation university students. This goal can be achieved by means of students' physical education which is primarily aimed at the development of such leadership competencies as responsibility and determination, psychological stability, discipline, inner motivation, authority and autonomy. These competencies predetermine the formation and development of the leadership potential of future civil aviation professionals, but Ukrainian students of civil aviation have them at a low level. The proposed set of physical exercise for students focuses on teamwork and competition and allows increasing the level of all the key leadership competencies in the learning process.



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