

INFORMATION TECHNOLOGIES

UDC 656.7.052(045)

DOI: 10.18372/2306-1472.87.15672

Volodymyr Kolotusha**THE FUTURE ATCO OFFICERS' INDIVIDUAL PROFILES FORMING**

Ukrainian State Air Traffic Services Enterprise,
Boryspil – 1, Kyiv region, 08301, Ukraine
E-mail: Kolotusha_VP@gmail.com

Abstract

The aim: The aim of this article, taking into account aviation personnel professional training evolution and information technologies development, is a presentation of approach to problems solving, relating to future air traffic controllers training personalization by means of training individual profiles forming, taking into account their cognitive characteristics. **The method:** The approach, which is based on selected criteria – oriented test, by means of which the proper training styles defined, is described in this article. **The results:** depending on the defined training style, the variants of instructor's guidance of knowledge, skills and habits acquisition process will be defined. **The discussion:** In future it provides the possibility to project the training packages according to 'pupils' individualized cognitive abilities, relating to reception of professionally oriented training materials.

Keywords: air traffic controller; training processes individualization, personal cognitive characteristics; training styles

1. Introduction

The evolution of professional training processes understanding and continuous growth of aviation personnel professional activity because of new technologies and working methods implementation, demand the continuous decision-making, relating to development and improvement of training approaches. It is especially critical in case of training time restrictions – 'the required specialist during the shortest terms'.

In conditions of air transportation's market globalization, realization of Ukrainian air navigation system development strategy, the improvement of air traffic controllers professional training becomes, taking into account the socio-political, economical and image meaning for civil aviation state, a socio-economical process, defining the future of state air navigation system, taking into account national, pan European, world projects and programs in the sphere of aviation branch global activity.

The detailed exploration of air traffic controllers (ATC) initial training problems shows that the present approaches to its organization and delivery are morally out of date, taking in to account the fast appearance of new high-tech technologies of great potential and the branch pressure, relating to the

reception of highly qualified specialists in the possibly most short terms.

2. The analysis of researches

It's true, that the modern world and aviation environment move fast: the changes of specialists generations, professional training system, technologies, regulations etc. The processes of future aviation specialists training should reflect new reality, watch table 1. [1]

The learning of outstanding international institutions (ICAO, EUROCONTROL, IATA) tendencies, relating to the directions of future ATC competence-oriented training improvement and further development and minimization of deductions, relating to inability to pass training program and optimization of human and financial resources as of customer, as of educational institution, show that the most perspective from training intensification and time shortage point of view is the individualization of future ATC training processes and presentation of training packages on the base of training events types, training methods, training tools taking into account the learner personal cognitive characteristics.

3. Problem statement

This axiom is supported by almost all world institutions in the sphere of aviation specialists professional training, but there are no real

'mechanisms' of future specialists training processes individualization problem solving. There is still no 'necessary training package in proper time for concrete learner'.

Table 1

Future specialists training: as it was and as it now	
Previous generation	Present generation
Class training Teacher is in the center Information access: by means of local media of educational institution, library etc. Limited nature of training materials (mainly textbooks and conspectus) In general blackboard and static models	Blended training styles 'Pupil' is in the center Information access: by means of Internet, e-mail, tablet PC, mobile phones, social media The great variation of training materials (virtual study books, Internet, CD, USB etc.) The great number of training sources: interactive boards, e-Learning, computer-based training, augmented reality technology, virtual classes

4. Problem solving

In this article the author, as the possible variant of this problem's solving, suggests an approach, which is based on implementation of Peter Khani and Allan Mamford criteria-oriented test [2], by means of which it is possible to define the training styles, which are the most suitable for proper learners (or groups of learners). In future, it will give the possibility to project training packets according to 'pupils' individual cognitive abilities, relating to reception of information.

In this sphere of research the testing of 157 future ATC was held.

The test included 80 tasks, which answers should refer the learners to one of the following four types: Activist, Thinker, Theorist, Pragmatist.

The analysis of testing results showed the following, watch table 2.

Table 2

The analysis of testing results, relating to the individual style of learning definition	
Person according to the learning type	Number of learners
<i>Activist</i>	43
<i>Thinker</i>	50
<i>Theorist</i>	36
<i>Pragmatist</i>	28
<i>Total</i>	157

The radar chart, watch Fig. 1, includes, as an example, the middle range areas of learners, whose training style is 'Activist' - 43 persons. The distribution (average in points): activist - 15, 2; thinker - 11, 11; theorist - 10, 46; pragmatist - 10, 19.

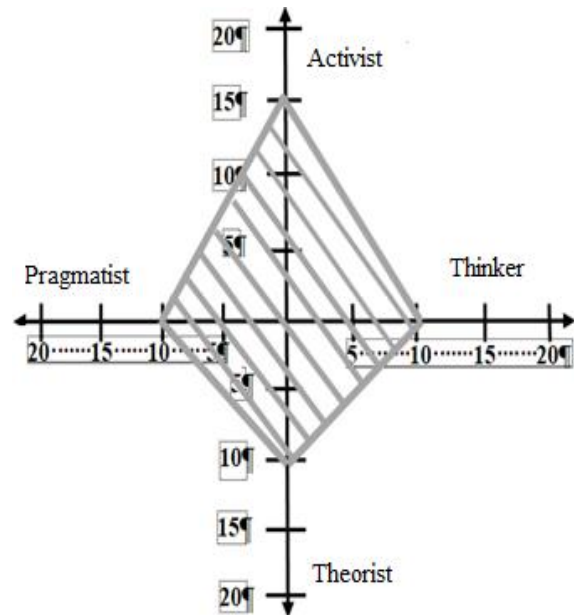


Fig. 1. The range areas according to training style – Activist

Compiling all mentioned in [2,3,4] learner's abilities, relating to reception and adoption of training material, according to training style «Activist», we'll get the following:

Activists learn better when:

- there is a variable range of tasks and possibilities, by means of which they can learn and work out in the process training materials mastering;
- they are charged with the responsible part of general task, which they can consider difficult;
- they have a possibility to generate ideas, play business or role games and the group tasks, in other words to realize active learning, in the 'middle' of

process of which they are;

- they have a possibility to rule or organize other training participants, in other words they are in the focus of attention, for example they rule the process;

- the activists get pleasure from the practical usage of received knowledge (note. The pay attention more to practical activity than to reflection and have a negative attitude to abstract debates and theoretical calculations);

- they have to do a lot of different tasks;

- they can be initiative and make different activities.

Activists learn worse when:

- they have to listen long explanations in the form of lectures about how to do proper task;

- they have to take part in passive learning, for example, listen to lectures, explanations, read on ones own, observe;

- it is necessary to master, analyze and interpret the great massifs of ‘complex’ data. It’s rather difficult for them to pay attention to ‘small’ details;

- they have to work a lot independently: read and make conspectus;

- they do one action (task) a lot of times;

- they are asked not to take part in activity, just to

observe;

- they have to follow manuals or instructions severely (‘no a step to the side’) in other words there is no space for ‘maneuver’;

- they can’t influence on actions (nothing depends on them).

Also, in order to define the validity of calculated individual training style, we supposed the learners, after the results were received, to answer (according to 100% scale) the following question: ‘In what degree the training style, defined for you, meet your individual feeling that it is true?’

The generalized data showed that 80% of learners, who took part in testing, are agree with the defined for them style of learning. So, in my opinion, it is a very high criteria of selected test validity.

In further, depending on the defined individual style of learning, the variants of knowledge, skills and habits reception process by the learner guidance by instructor are defined, watch table 3.

The interaction of the instructor and learner with the proper learning style is defined also. Here is its brief description, using learner – Activist, as an example.

Table 3

The interaction of the instructor and learner, who’s learning style is ‘Activist’

Learner’s type of learning	Instructor’s role	The peculiarities of learner’s training processes according to the proper learning style
Activist	Training process coordinator	<p>The coordinator task is a continuous interaction ‘learner--instructor» (the continuous coordination of his actions with possible consequences).</p> <p>The main coordinator’s task is the realization of the following chain: ‘training aim – training activity – received result (learner’s competence parameters) – searching for gaps between aim and results – creation and delivering the corrective actions to learner’.</p> <p>Because of activists pay more attention to practical activity than to reflections, abstract ‘academic’ debates, analysis and theoretical calculations, the coordinator’s role is to plan activist’s training profile in such a way, that the reception of proper theoretical knowledge (no more no less) could be necessary for successful pass of practical training using controller simulator.</p> <p>Support activist’s enthusiasm but demand from him to plan his practical activity beforehand. Create many different tasks, relating to direct air traffic control. Activists get pleasure from the solving of tasks, demanding great intellectual efforts. However, often activists have a lack of patience to do the work, relating to strengthening of received knowledge and skills.</p>

In order to demonstrate the different approaches to the learners in the process of their training, the tables 4, 5 and 6 describe the

peculiarities of interaction between instructor and learner, who’s learning types are ‘Theorist’, ‘Thinker’ and ‘Pragmatist’

Table 4

The interaction of the instructor and learner, who's learning style is 'Theorist'

Learner's type of learning	Instructor's role	The peculiarities of learner's training processes according to the proper learning style
Theorist	Consultant	<p>Learners-theorists, solving the complex problems, use their analytical skills, creating the whole system from separate information 'mosaic', in other words the personal mental model 'gathering the big picture from pieces'. The reason is that they have a great intellectual level and are able to create and realize their personal 'training profile'. As for instructor- consultant, for him it is enough only to demonstrate the variants of different situations practical solving, in the first turn in conformity to the practical air traffic management. The support of learners-theorist training by instructor is not so active: the consultant observe and help the learner by his request, in other words the help has a form of 'consultations', 'recommendations' and 'tips'. Instructor - consultant watches for the training material to follow the logical scheme of actions for Activist, and he understands what he has to do (Note. The theorists always have to 'hold' the strictly defined structure of the task and its final aim).</p> <p>Taking into account that theorists pay attention to the information analysis, synthesis processes and logical conclusions in the process of theoretical material learning, the consultant gives them the possibility to learn and make the conclusion individually, he gives them time to think logically about the logical interrelations between facts, events and situations.</p> <p>The tasks for theorists must have clear aim and be difficult enough for their solving, because theorists work effectively when they intellectually tensed, in other words they are in complex situation, in which they have to use the received knowledge and skills.</p>

Table 5

The interaction of the instructor and learner, who's learning style is 'Thinker'

Learner's type of learning	Instructor's role	The peculiarities of learner's training processes according to the proper learning style
Thinker	Expert	<p>The expert defines the training aims of the learner according to his professional competencies exit model and create the most suitable training 'profile' for him. Working with the 'thinker' the experts tasks are:</p> <ul style="list-style-type: none"> - the learner support in case of theoretical material practical usage; - to define factors, which influence negatively on training, and create corrective actions beforehand; - the organization of time and media environment for individual and continuous training and skills and habits practical usage and structure experience gaining (with clear defined activity algorithms) relating to training tasks. <p>Because of thinkers pay attention to actions according to instructions, the expert has to plan learners' step-by-step training, with clear defined entry and exit parameters of each training stage.</p>

Table 6

The interaction of the instructor and learner, who's learning style is 'Pragmatist'

Learner's type of learning	Instructor's role	The peculiarities of learner's training processes according to the proper learning style
Pragmatist	Mentor	<p>The learners-pragmatists had better learn when they could quickly realize the received information, in other words they like to get those knowledge that could be used immediately in practical activity. It is a case, when they can make experiments, and the advices of the instructor help to solve the concrete practical situations (Note. So called guided practical training).</p> <p>So the mentor helps the learner-pragmatist:</p> <ul style="list-style-type: none"> - to define (better in quantitate meanings) the intermediate aims of training and the concrete ways of their achievement; - to motivate the learner (taking into account that the learner is a pragmatist, the motivating factors for him in the first turn are material: more payment after training, goof job etc.); - to diagnose as fast as possible the reasons of factors, impeding the training, and to create effective (with an immediate practical effect) corrective actions. <p>The pragmatists usually learn in the process of activity, in other words they pay their main attention to practice, not theory. So, for pragmatist the presented information (training material) has to be applied to practical training (when there is a defined relation between training material and real problems, for example, situations). And the techniques relating to actions in the process of direct air traffic control must have clearly defined executive points (without extra theoretical references).</p>

5. Conclusions

It is obvious that there is no clearly delineated activists, thinkers, theorists and pragmatists. Each person has a definite complex of these 4 types' characteristics. However, the learner's dominating tendencies will define the peculiarities of his training process and his proper reaction for methods, means and forms of training material presentation by the instructor.

And knowing the dominating learning type of the learner it is possible to increase the training effectiveness (the future specialist will gain the necessary competences during less period of time) due to projecting of more individualized training packets, which are maximum oriented on the peculiarities of learner's training type. Moreover, the instructor can realize, from the very beginning, the learner's individual training, based on the dominative learning style. In this case, the learner himself becomes an active participant of his personal training profile creation.

Taking into account, everything mentioned above it is possible to define the following main stages of learner's training individualized system design:

a) learners training style diagnostics;

b) to project individualized multimedia training packages, relating to provision of knowledge and forming of skills and habits according to the customer's demands to the exit model of the proper air traffic controller (Note. ACC, APP, Tower);

c) design of individualized training profiles with the definition of the main training 'markers' according to time and place, by means of which we can define the learning progress;

d) training provision;

e) feedback from learner;

f) correction (if it is necessary) of individualized multimedia training packages.

Remark. This article is the expression of the personal opinion of the author. Any information from this article can't be interpreted as an official position of the state or the enterprise.

References

[1] The ICAO Next Generation of Aviation Professionals [NGAP] and TRAINAIR PLUS Regional Symposium. Istanbul, Turkey, 17-20 June 2013.

[2] Thorne K., McKay D. Training. Handbook of Trainer. –Saint-Petersburg: Piter, 2001. –2008p.

- [3] Logistics and Transport, Nr 2(30), 2016. Consideration of Individual Learning Styles in the Process of Professional Training of Future Air Traffic Controllers. Available at: <http://www.logistics-and-transport.eu/pl/o-czasopismie/aktualny-numer#9-consideration-of-individual-learning-styles-in-the-process-of-professional-training-of-future-air-traffic-controllers-volodymyr-kolotusha-volodymyr-kharchenko>.
- [4] Stili obucheniya (in Russian). Available at: <https://studfile.net/preview/1773111/page:2/>

В.П. Колотуша

Врахування персональних когнітивних характеристик при початковій підготовці диспетчерів УПР

Державне підприємство обслуговування повітряного руху України, Бориспіль-1, Київська область, Україна, 08301.

E-mail: Kolotusha_VP@gmail.com

Мета: Метою цієї статті, з урахуванням еволюції процесів професійної підготовки авіаційного персоналу та розвитку інформаційних технологій, є презентація підходу до вирішення питання персоналізації навчання майбутніх диспетчерів УПР за рахунок формування індивідуальних профілів підготовки з врахуванням їх когнітивних характеристик. **Метод:** Стаття описує підхід, що базується на застосуванні обраного критеріально - орієнтованого тесту, за допомогою якого будуть визначатися певні стилі навчання. **Результати:** В залежності від виявленого індивідуального стилю навчання, будуть визначатися варіанти супроводження процесу отримання знань, умінь та навиків слухачем з боку керівника підготовки (інструктора). **Обговорення:** У наступному це надає можливість проектувати навчально-методичні пакети в відповідності до індивідуалізованих когнітивних здібностей «учнів» стосовно отримання та засвоєння професійно-орієнтованих навчальних матеріалів.

Ключові слова: диспетчер УПР; індивідуалізація процесів підготовки, персональні когнітивні характеристики; стилі навчання

В.П. Колотуша

Учет персональных когнитивных характеристик при первоначальной подготовке диспетчеров УВД

Государственное предприятие обслуживания воздушного движения Украины, Борисполь-1, Киевская область, Украина, 08301.

E-mail: Kolotusha_VP@gmail.com

Цель: Целью данной статьи, с учетом эволюции процессов подготовки авиационного персонала и развития информационных технологий, является презентация подхода к решению вопроса персонализации обучения будущих диспетчеров УВД за счет формирования индивидуальных профилей подготовки с учетом их когнитивных характеристик. **Метод:** Статья описывает подход, который основывается на применении избранного критериально-ориентированного теста, при помощи которого будут определяться определенные стили обучения. **Результаты:** В зависимости от выявленного индивидуального стиля обучения, будут определяться варианты сопровождения процесса приобретения знаний, умений и навыков слушателем со стороны руководителя подготовки (инструктора). **Обсуждение:** В последующем это позволит проектировать учебно-методические пакеты в соответствии с индивидуальными когнитивными способностями «учеников» относительно получения и усвоения профессионально-ориентированных учебных материалов.

Volodymyr Kolotusha. PhD in engineering, assistant professor.

Ukrainian State Air Traffic Services Enterprise.

Education: State Flight Academy of Kirovograd, Ukraine (1990).

Research area: air traffic management, training of air traffic controllers.

E-mail: Kolotusha_VP@gmail.com