



WORKING PAPER

ASSEMBLY — 40TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 25: ICAO Civil Aviation Training and Capacity Building

BUILDING AVIATION COMPETENCIES FOR THE FUTURE

(Presented by Singapore, and co-sponsored by Nauru, Nigeria, Palau, and the United Kingdom)

EXECUTIVE SUMMARY

This paper discusses the changing learning styles of the Next Generation of Aviation Professionals (NGAP) and the need to embrace learner-centered pedagogies. It explores the increased accessibility of technology today and its use in creating new avenues and opportunities to enhance training in aviation competencies. It further highlights the integration of both learner-centered pedagogies and learning technologies to meet the training needs for the future.

Action: The Assembly is invited to:

- a) recognise the need to adopt learner-centered pedagogies to enhance competency training to equip NGAP to meet the aviation needs of the future; and
- b) request that ICAO develops guidelines to select technological training tools that support competency-based training, using learner-centered pedagogies under the ICAO TRAINAIR PLUS Programme (TPP).

<i>Strategic Objectives:</i>	This working paper relates to all Strategic Objectives.
<i>Financial implications:</i>	Not applicable.
<i>References:</i>	Resolution A39-29, <i>Next Generation of Aviation Professionals</i>

1. INTRODUCTION

1.1 ICAO introduced the Next Generation of Aviation Professional (NGAP) programme in 2009 to address the manpower crunch in global aviation. The projected increase in international civil aviation traffic and the challenges in growing the workforce for the civil aviation industry, have been compounded by the need to replace the large number of retiring baby boomer aviation professionals. Under the auspices of NGAP, States have been embarking on various initiatives to attract, train and retain young professionals in the aviation industry.

2. DISCUSSION

2.1 Learner-centered pedagogies encompass training methods that shift the focus of instruction from the trainer to the learners. In the course of doing this, learners develop autonomy and independence for their learning paths, and construct knowledge from new information and prior experiences. Learner-centered pedagogies are effective in improving learners' motivation, engagement and knowledge retention. When used with mixed-ability groups, learner-centered pedagogies have been effective in reducing the competency gap that develops over time, between high and low ability learners. Such pedagogies also develop positive impact on interpersonal relationships with learners from different countries and ethnic backgrounds. The motivational level of learners remained high throughout the courses. Particularly for Millennials and Generation Z trainees, studies have shown that learner-centered pedagogies are more effective than traditional instructor-led training methodologies.

2.2 The TPP developed Training Instructor and Training Developer courses to equip States with the capability to incorporate learner-centered pedagogies in their training. This has helped to increase the number of ICAO-recognised packages with learner-centered pedagogies to complement the competency-based training methodology. Examples of learner-centered pedagogies include cooperative learning, collaborative learning, role playing, team-based learning and guided participation. However, the courses have limited coverage and guidelines on integrating learner-centered pedagogies with technology for training.

2.3 Harnessing the right technology can provide effective support for learner-centered pedagogies for aviation training, which itself is a tech-heavy industry. The use of computer-based learning, multimedia materials and communication networks could enhance the experience of the learners, expand the modes of training options and facilitate assessment and evaluation for the trainer. Increasingly, it is expected that technology would be deployed more to suit the digital generation of the Millennials and Generation Z workforce who are accustomed and exposed to technology as their main interface in life.

2.4 The TPP is currently fine-tuning the development of e-learning courses using its competency-based course development methodology. E-learning has the benefits of allowing learners to progress at their own pace, providing consistency in quality standards of training delivery, having accessibility across geographical regions and enabling scalability.

2.5 A broader application of technology can be incorporated with learner-centered pedagogies on a large scale successfully in aviation training. Two examples are:

- a) **Blended Learning** – Blended learning is an approach to training that combines e-learning with classroom training. In blended learning, learner-centered pedagogies can be further integrated with e-learning to add value to learning. For example, e-learning materials can serve to complement classroom-based training by providing knowledge-based information in advance and free up face-to-face classroom sessions for higher-order thinking activities that incorporate learner-centered pedagogies. Studies conducted by the U.S. Department of Education, the Teachers College, and Columbia University found that blended learning improves the efficacy and efficiency of the learning process compared to fully online learning or classroom training. Further guidelines should thus be explored to facilitate the approval of curriculum-based blended courses that incorporate learner-centered pedagogies to benefit the aviation industry.
- b) **Virtual Reality** - Virtual reality technology enables a simulated training environment involving multimedia graphics displays and features that replicate real-life events. These include simulators for flight, aerodrome, radar and foam tender driving. Recent developments in wearable technology have facilitated the adoption of virtual reality using head-mounted displays. This technology provides for real life-like, multi-party interactive simulations to provide learners with a first-hand experience to hone their skills in a fail-safe environment. It is particularly useful to simulate difficult-to-replicate environment or high intensity repetitive injections such as multiple flights. The sense of realism and incorporation of learner-centered pedagogies such as team-based learning enhance development of competencies.

2.6 Studies conducted by the Human-Computer Interaction Lab, University of Udine, Italy, have shown that the appropriate use of technology in training such as simulation improves knowledge retention, knowledge transfer, engagement, efficiency, error prevention, resilience and self-efficacy. The digital nature of many of these training technologies also allow for data analytics and play-back that provide for more targeted reviews and guided learning. When further integrated with learner-centered pedagogies, learning technologies refine team dynamics, response time, impulse-decisions, and emotional intelligence under adverse conditions.

2.7 As technology advances and becomes more accessible and affordable, it would be beneficial for the aviation industry to have available more training tools and equipment that integrate with learner-centered pedagogies, such as blended learning and virtual reality. Through the TPP, ICAO could look into providing such guidelines to help with the promulgation of technology and learner-centered pedagogies to build up aviation competencies for the future.