A Formative Evaluation of the ICAO TRAINAIR PLUS Program

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ABSTRACT

A Formative Evaluation of the ICAO TRAINAIR PLUS Program

Jie Huang

The ICAO TRAINAIR PLUS Program is a global cooperative training network of civil aviation training organizations and industry partners working together to develop and deliver competency-based training courses (ICAO, 2014). Since the inception of the TRAINAIR PLUS Program in 2010, the Members of the ICAO training network have grown steadily and the available ICAO-recognized training courses have also increased accordingly, however, only one customer satisfaction survey was conducted for the identification of the Members' satisfaction level with the TRAINAIR PLUS Program. After seven years of operation, it is significant to conduct a formative evaluation of the Program. This formative evaluation is an action oriented research, with the purpose to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives and, consequently, determine potential improvements of the Program. In the process of implementing this formative evaluation, four online surveys were deployed using Google Forms and questions were tailored to the TRAINAIR PLUS Program Members, ICAO qualified course developers, ICAO course validators and ICAO instructors respectively. Data collected from the four groups of respondents were analysed separately and then aggregated to generalize the overall results. Subsequently, recommendations and limitations were discussed, and conclusions were summarized from the survey results for the Program improvements.

Keywords: formative evaluation, TRAINAIR PLUS Program, objectives, improvements

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A Formative Evaluation of the ICAO TRAINAIR PLUS Program

Chapter 1 – Introduction

The world of aviation has been fascinating and very fast growing since the first flight was carried out a little more than 100 years ago. Continuous improvement in operating conditions, aviation safety, security, environment, passenger comfort, evolution in technologies, etc., make the aviation field one of the few industries where workers are required to frequently follow mandated training courses in order to remain current and avoid losing their qualifications. With passenger volumes and air traffic movements set to double every 15 years, and current air traffic projections showing that the threshold of six billion passengers per year will be reached by 2030, the aviation industry is now facing major challenges in capacity-building. Although training organizations are setting up evaluation means to assess training effectiveness for their programs, this formative evaluation will assess the effectiveness and user-friendliness of one of the global aviation training programs established by the International Civil Aviation Organization (ICAO), the TRAINAIR PLUS Program.

As a United Nations (UN) specialized agency, ICAO works with its 191 Contracting States and industry groups to reach consensus on the international civil aviation Standards and Recommended Practices (SARPs) and policies in support of a safe, efficient, secure, economically responsible civil aviation sector. Regional coordination of the implementation of ICAO SARPs and programs is conducted through its seven Regional Offices (ROs) namely (ICAO, 2017):

1. Asia and Pacific (APAC) Office: located in Bangkok, Thailand, with a sub-regional office established in 2012, in Beijing, China. The APAC Office is accredited to 38 Contracting States and covers vast airspace.

2. Eastern and Southern African (ESAF) Office: officially inaugurated on 1 December 1983. The ESAF Office is one of the ICAO's implementation arms located in Nairobi, Kenya, and accredited to 24 Contracting States in the region.

3. European and North Atlantic (EUR/NAT) Office: located in Paris, France. The EUR/NAT office promotes and monitors the implementation of ICAO SARPs in 56 Contracting States of ICAO.

4. Middle East (MID) Office: established in Cairo, Egypt, in 1953. The MID Office encompasses 15 Contracting States in the region.

5. North American, Central American and Caribbean (NACC) Office: established in Mexico City, Mexico, in 1957. The NACC Office is accredited to, and responsible for, working very closely with a diverse mix of 21 Contracting States and 19 Territories.

6. South American (SAM) Office: established in Lima, Peru, in 1948. The SAM Office is accredited to all South American States.

7. Western and Central African (WACAF) Office: established in Dakar, Senegal, in 1963. The WACAF Office is accredited to 24 Contracting States in the African and Indian Ocean (AFI) Region.

Aviation training is defined as a support function of ICAO. The *ICAO Civil Aviation Training Policy* (ICAO, 2014) states that ICAO's objective in aviation training is to support the human resources development strategies established by Contracting States and the aviation community to ensure that they have access to a sufficient number of qualified and competent personnel to operate, manage and maintain the current and future air transport system at prescribed international standards for Safety, Air Navigation Capacity and Efficiency, Security and Facilitation, Economic Development of Air Transport, and Environmental Protection.

For the implementation of the *ICAO Civil Aviation Training Policy* (ICAO, 2014), and in response to the global aviation training needs for capacity-building, ICAO upgraded its TRAINAIR Program to TRAINAIR PLUS Program in 2010, with the objectives to ensure its Contracting States and the industry have access to a pool of qualified professionals required to support the safe, secure, and sustainable development of air transport on a worldwide basis and in a cost-effective manner. As described in the *TRAINAIR PLUS Operations Manual* (ICAO, 2016), two fundamental tools used by the Program Members to achieve the objectives are the use of a practical Instructional Systems Design (ISD) methodology contained in the ICAO *Training Development Guide* (ICAO, 2011) for the development of ICAO-recognized training courses, as well as the application of a sharing system to deliver these courses.

To support the Program objectives, the TRAINAIR PLUS Electronic Management System (TPEMS) serves as a web-based platform managing all aspects of the Program. Currently, the system functions include membership application, assessment processes, development of ICAO-recognized courses, ordering of courses through the TRAINAIR PLUS library, hosting of

TRAINAIR PLUS courses, production of course certificates, submission of training evaluation forms, communication with each other through Member News and qualification process of instructors. New functions of the system are under discussion to address the operational issues and the program development needs.

Along with the rapid development of the Program, it has become one of ICAO's leading training programs by establishing a cooperative network of civil aviation training organizations and industry partners working together to develop and deliver ICAO-recognized training courses. Currently the Program network is composed of 92 Members, and the ICAO training portfolio consists of more than 140 training packages covering the following seven subject areas: Aerodromes, Air Navigation Services, Air Transport, Environment, Flight Safety and Safety Management, Security and Facilitation, and Training Competency Development.

Statement of the Problem

Since the inception of the TRAINAIR PLUS Program in 2010, the Members of the ICAO training network have grown steadily and the available ICAO-recognized training courses have also increased accordingly; however, only one customer satisfaction survey was conducted for the identification of the Members' satisfaction level with the TRAINAIR PLUS Program. After seven years of operation, it is necessary to conduct a formative evaluation of the Program in order to identify what the current status of the Program is, how the Program meets its set objectives and, as a result, determine how the Program can be further developed in order to standardize and harmonize the training of qualified and competent personnel in civil aviation, and to support the rapid growth of the civil aviation industry.

This formative evaluation is an action oriented research, with the purpose to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives and, consequently, determine potential improvements of the Program.

Research Questions

In addressing the purpose of this formative evaluation, two main research questions are as follows:

1. How does the TRAINAIR PLUS Program meet its prescribed objectives?

2. How does the TRAINAIR PLUS Electronic Management System (TPEMS) contribute to the achievements of the Program objectives?

Significance of the Study

The 38th ICAO Assembly (Sept. 2013) mandated ICAO to assist Contracting States in achieving and maintaining competency of aviation personnel through ICAO's aviation training programs. In line with the Assembly Resolution A38-12, Appendix D, the *ICAO Civil Aviation Training Policy* (ICAO, 2014) was endorsed by the Council with the objective of supporting human resources development of Contracting States to ensure they have access to a sufficient number of qualified and competent personnel.

The 39th ICAO Assembly (Sept. 2016) also unanimously supported the ICAO Civil Aviation Training Program and endorsed its work plan for the next triennium. Contracting States proposed a periodic review of the TRANAIR PLUS Program, in order to assess its effectiveness and work to reduce the cost for training organizations in the development and delivery of standardized training.

The significance of this study is best expressed by the fact that aviation training is defined as a support function of ICAO. With the expansion of the TRAINAIR PLUS Program, it is significant to evaluate the current status of the Program and determine the recommendations for its further improvements.

Chapter 2 – Literature Review

Statistics about Civil Aviation and Civil Aviation Training

According to the latest statistics in the ICAO integrated Safety Trend Analysis and Reporting System (iSTARS), the scheduled commercial departures steadily increase by year. As depicted in figure 1, the number of scheduled departures for 2003 is 25.36 million, and the number for 2016 is about 34.72 million which represents an increment of 37% in the recent 13 years (ICAO, 2017).

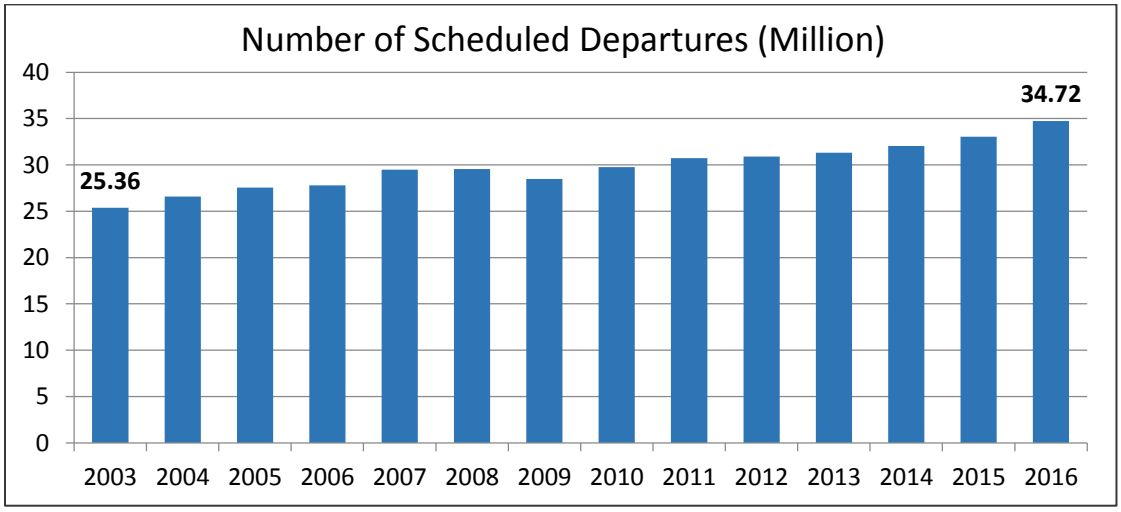

Figure 1. Civil Aviation Traffic Data for World (2003 – 2016)

ICAO study reveals strong demand for qualified aviation personnel up to 2030, particularly, more than two million jobs are projected for pilots, maintenance personnel and air traffic controllers as a result of the retirement of qualified professionals and the anticipated growth of commercial air transport to the year 2030. According to a study published by ICAO – Global and Regional 20–year Forecasts – Pilots, Maintenance Personnel and Air Traffic Controllers, ICAO estimates the number of commercially-operated aircraft will have jumped from 61,833 in 2010 to 151,565 between 2010 and 2030, and the number of departures from around 26 million to almost 52 million. This would more than double the current number of pilots, maintenance personnel and air traffic controllers worldwide. The ICAO study compares the average number of professionals worldwide that will need to be trained annually with the training capacity of existing facilities. The comparison reveals a shortfall of training capacity equivalent to 160,000 pilots, 360,000 maintenance personnel, and 40,000 air traffic controllers (ICAO, 2011).

"If no action to increase training capacity is initiated early, shortages in qualified aviation personnel are likely." remarked Mr. Raymond Benjamin, the former ICAO Secretary General (ICAO, 2011). Without a doubt, the rapid growth of the civil aviation industry is a double-edged sword. In view of the extremely demanding training needs, no training organization is able to respond to the global training needs timely and independently. In this regard, ICAO's role for the standardization and harmonization of civil aviation training activities is highlighted and well recognized.

TRAINAIR PLUS Program Update

For the implementation of the *ICAO Civil Aviation Training Policy* (ICAO, 2014), the TRAINAIR PLUS Program was updated subsequently. The *Training Policy* emphasizes that competency-based training is the approach the organization recommends for training aviation professionals. *Training Development Guide* (ICAO, 2011) details ICAO's competency-based training methodology for the development of ICAO-recognized training courses. Fundamentally, aviation training is standardized based on the analysis of competencies, is job-oriented, material-dependent, and continuously improved, taking into account the advance of technology and changes in regulations impacting job and performance.

The ICAO Electronic Bulletin (EB) 2014/73 entitled *TRAINAIR PLUS Program Update* (ICAO, 2014) was published in December 2014. Since then, ICAO has revised the Program significantly by introducing new categories of memberships and courses, and by upgrading the various tools available to its Members through the TPEMS.

The different membership status of the Program is defined as follows (ICAO, 2014):

1. Associate Members: are training organizations that successfully pass an on-site assessment;

2. Full Members: are Associate Members that have developed at least one Standardized Training Package (STP);

3. Regional Training Centres of Excellence (RTCEs): are leading Full Members in any of the ICAO regions that develop courses using ICAO SARPs and Guidance Material in cooperation with ICAO;

4. Corporate Members: are aviation institutions or industry organizations that wish to participate in the various Program activities and have access to members of the Program network.

The updated Program broadened the categories of ICAO-recognized training courses into following (ICAO, 2014):

1. ICAO Training Package (ITP): A competency-based training course developed by ICAO, or a Regional Training Centre of Excellence (RTCE) in cooperation with ICAO, in compliance with ICAO Doc 9941, focusing on the implementation of ICAO SARPs and guidance material.

2. Standardized Training Package (STP): A competency-based training course developed by a TRAINAIR PLUS Program Full Member or an Associate Member for its first STP, in compliance with ICAO Doc 9941, focusing on operational practices, using national regulations and procedures, and/or industry requirements.

3. Compliant Training Package (CTP): An existing course adapted to comply with ICAO Doc 9941, focusing on operational practices, using national regulations and procedures, and/or industry requirements, referencing ICAO SARPs and guidance material.

4. Partnership Training Package (PTP): A training or educational program in aviation developed within the framework of a partnership agreement with a Corporate Member or an industry partner, mainly for aviation management training.

The Program Members coordinate and work together to develop and deliver competency-based training courses. Meanwhile, the Program is driven by self-sustaining approach and a reward system for dedicated and active Members that have developed training packages and shared with other Members.

Also, the Program Members have access to the TRAINAIR PLUS Electronic Management System (TPEMS), an efficient and constantly available web-based application that implements all functions on one central platform, including membership application, assessment processes, training package development, training session request, production of training certificates, conduct of training evaluation, communication with other Members and so forth.

Civil aviation training organizations all over the world are welcome to join the Program, no matter whether it is a government training organization or a private one, and consequently, benefit from this cooperative membership network.

The main advantages of being a TRAINAIR PLUS Program Member include the following (ICAO, 2016):

1. Continuous access to the TPEMS;

2. Technical assistance to develop competency-based training courses, such as ITPs/STPs/CTPs;

3. Support to establish a Course Development Unit (CDU);

4. Host the delivery of ICAO Training Packages (ITPs);

5. Production of the certificates with the ICAO TRAINAIIR PLUS Program logo;

6. Participation in the ICAO training activities;

7. Listing in the ICAO Aviation Training Directory (ATD); and

8. Return on Investment (ROI) from course delivery and sharing with other Members.

TRAINAIR PLUS Program Achievements

Since its inception in 2010, the TRAINAIR PLUS Program has made remarkable achievements. The Program has drawn attention of civil aviation training organizations all over the world to join the Program and collaborate with other Members on training activities. According to *TRAINAIR PLUS Activities* (ICAO, 2017) presented at the 4th ICAO Global Aviation Training and TRAINAIR PLUS Symposium, in Addis Ababa, Ethiopia, in April 2017, the achievements of the TRAINAIR PLUS Program can be summarized in the following areas:

1. TRAINAIR PLUS Membership

With the aim to establish a global cooperative network, 92 training organizations have joined the TRAINAIR PLUS Program as of December 2016. Figure 2 shows that the number of TRAINAIR PLUS Members has steadily increased between 2011and 2016. The network is expanding continuously, meanwhile new applicants are in the membership process. A campaign is launched to celebrate the 100th TRAINAIR PLUS Member who is anticipated to join the Program by the end of 2017.

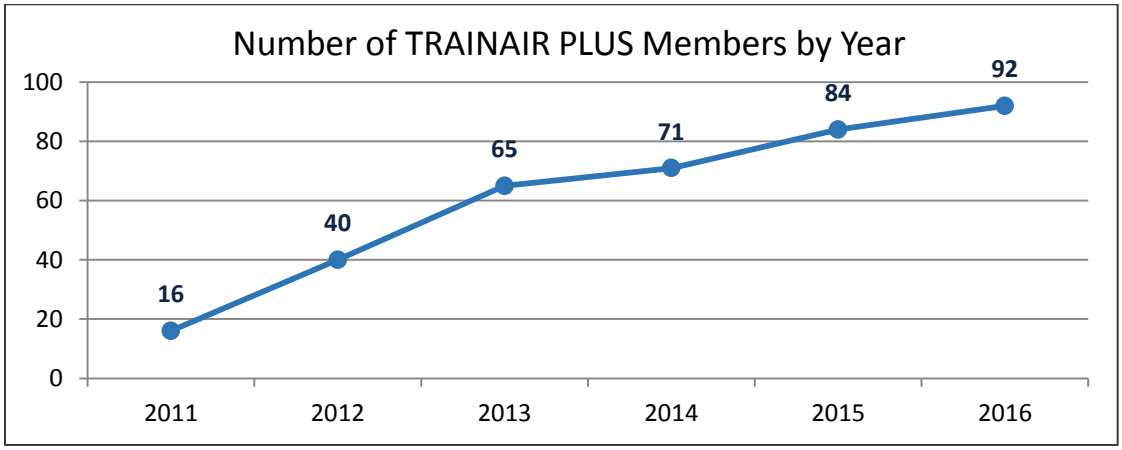

Figure 2. Number of TRAINAIR PLUS Members by Year (2011 – 2016)

Among these 92 Members, there are 40 Associate Members, 28 Full Members, 21 RTCEs and 3 Corporate Members. The Members' membership status with the Program is shown in table 1.

Membership category	Associate Member	Full Member	RTCE	Corporate Member	Total
Number	40	28	21	3	92

Table 1. TRAINAIR PLUS Membership by category (December 2016)

In terms of geographical locations, the Members are distributed in all ICAO regions. Table 2 shows the TRAINAIR PLUS Membership by ICAO Region.

Region	APAC	EUR/NAT	NACC	MID	SAM	ESAF	WACAF	Total
Number	25	23	13	12	9	6	4	92

Table 2. TRAINAIR PLUS Membership by ICAO Region (December 2016)

2. Training Organization Assessment

When a training organization applies to join the TRAINAIR PLUS Program, the first requirement is for the training organization to undergo an assessment. The assessment is composed of three phases namely online self-assessment, on-site assessment conducted by an ICAO qualified assessor, and post-assessment corrective action plan. The purpose of such assessment is to evaluate a training organization's conformity to the relevant ICAO provisions before joining the Program and identify critical areas for its improvements. The assessment not only offers an independent assessment report of a training organization, but also assists the training organization in justifying extra funding to enhance its training operations. To this end, the implementation of the corrective action plan can actually help a training organization obtain additional resources and enhance its capacity-building. In addition, re-assessment is required every three years to ensure the corrective action plan has been taken in place on schedule and the Program Member' continuous compliance with the relevant ICAO provisions.

Figure 3 shows the yearly number of assessments between 2010 and 2016. As it is shown, there is a rapid increase of assessments from 2010 to 2011, then the number of assessments gradually grows and reaches the peak in 2015. And in 2016, the number of assessments returned to a comparatively stable level. In total, 27 assessments were conducted in 2016 including 11 new assessments and 16 re-assessments. The column chart depicts the three major development stages of the Program: the initial stage of rapid development from 2010 to 2011; the steady

development stage from 2012 to 2015; and the saturation development stage from 2016 to present.

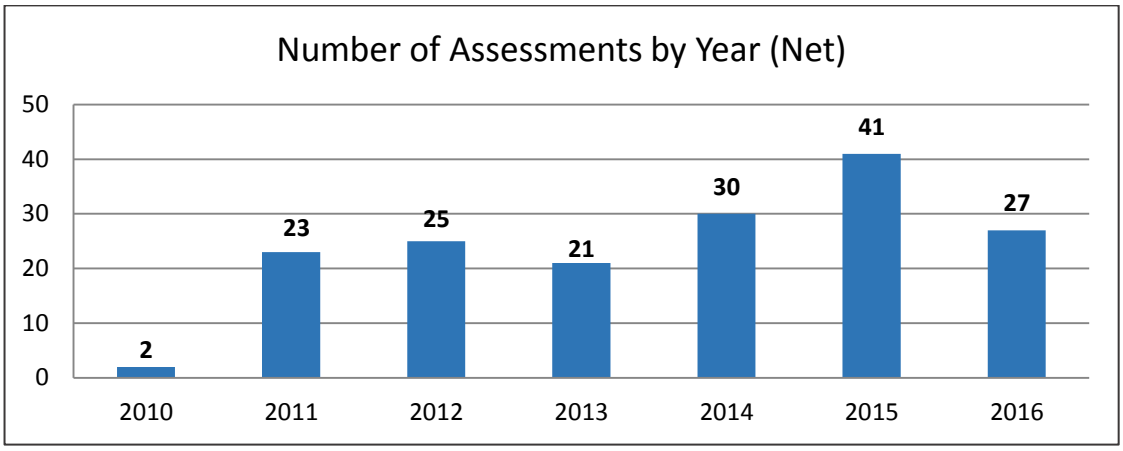

Figure 3. Net Number of Assessments by Year (2010 – 2016)

Cumulative number of assessments by year is shown in the figure 4. Since 2010, 169 assessments have been conducted. Among them, 104 assessments are new assessments and 65 are re-assessments. It is obvious that there will be more and more re-assessments over time, and the third round of assessments has started in 2017.

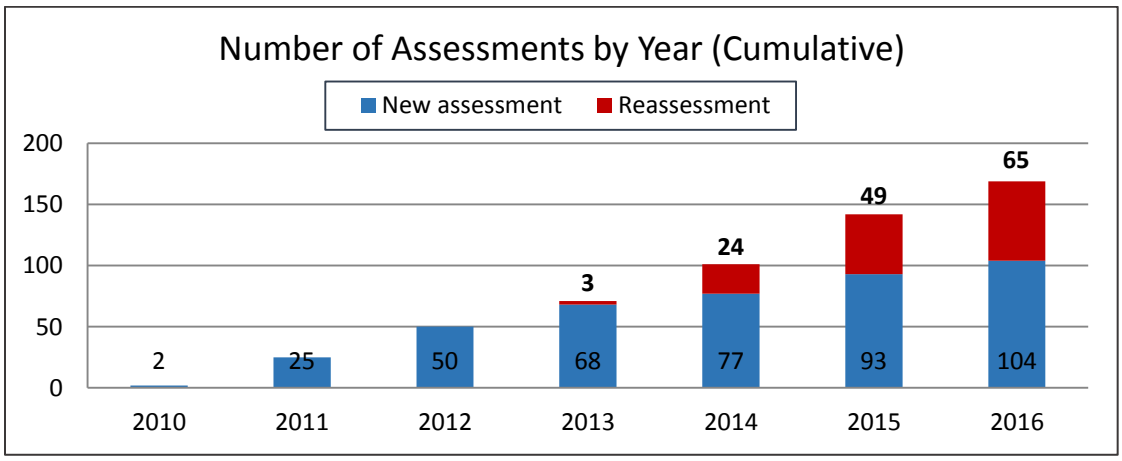

Figure 4. Cumulative Number of Assessments by Year (2010 – 2016)

Assessments aim to evaluate a training organization's compliance with the relevant ICAO provisions. Findings identified from assessments and re-assessments are categorized as observations and recommendations, which result in the preparation of corrective action plan. Figure 5 shows the percentage of assessment findings by area as of December 2016. The top findings are related to Training and Procedures Manual (44%), followed by the findings about quality system (28%). Overall, these two areas of findings constitute 72% of all findings. Other

areas cover personnel (9%), training programs and training delivery (9%), facilities (4%), records (3%), organization (2%), and safety management (1%).

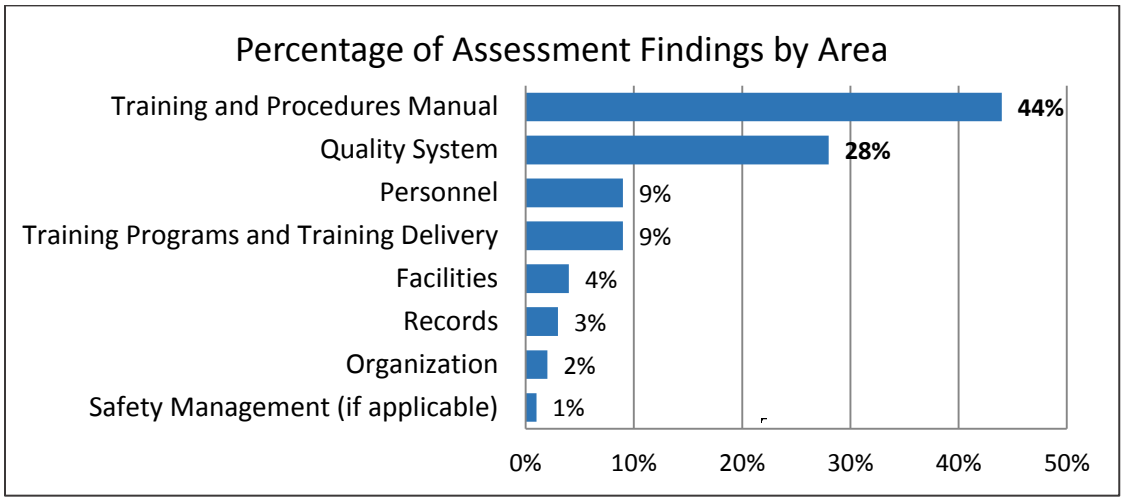

Figure 5. Percentage of Assessment Findings by Area (December 2016)

3. Training Course Development

The TRAINAIR PLUS Program promotes the competency-based training methodology detailed in the *Training Development Guide* (ICAO, 2011). First, a training organization trains their in-house course developers to establish a Course Development Unit (CDU). After that, the course developers work with Subject Matter Experts to identify performance problem, and subsequently, develop an ICAO-recognized training course through the TRAINAIR PLUS Electronic Management System (TPEMS). Meanwhile, an ICAO course validator will need to be contracted by the training organization to provide guidance to the course development team throughout the course development process, and assess the deliverables step by step against the quality assurance criteria prescribed in the *Training Development Guide* (ICAO, 2011).

Figure 6 shows the yearly number of courses developed between 2011 and 2016. The number of courses is in relation to the number of the Members, since the TRAINAIR PLUS Program is a membership Program and the requirement for an Associate Member to become a Full Member is the successful development of its first Standardized Training Package (STP). With the expansion of the ICAO-recognized training courses at the end of 2014, four categories of training courses can be developed by the Program Members, which leads to a rapid growth of course development and the number reaches the peak in 2016.

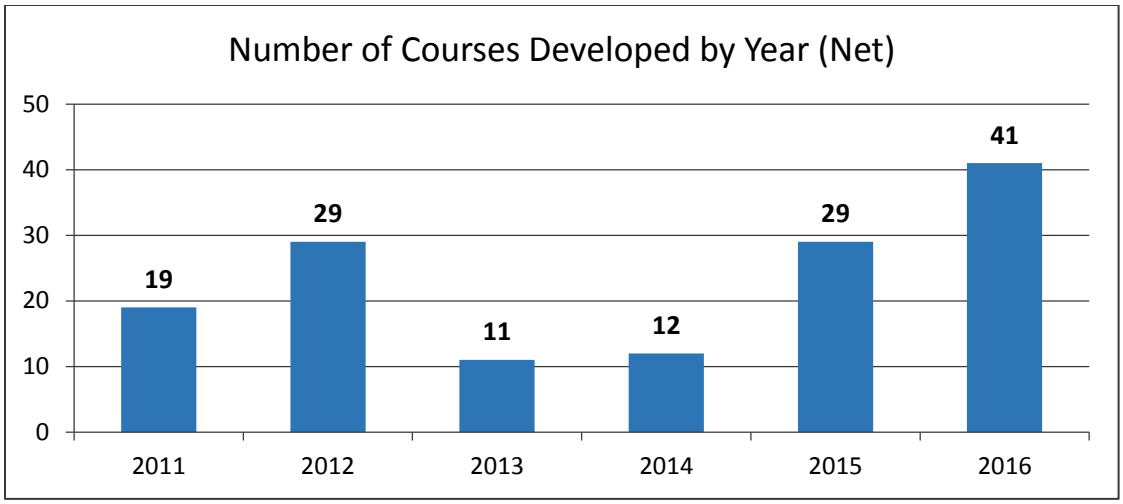

Figure 6. Net Number of Courses Developed by Year (2011 – 2016)

As indicated in the figure 7, the cumulative number of courses developed starts from 19 in 2011 to 141 as of December 2016. The number has increased steadily, more courses are currently under development by the Program Members.

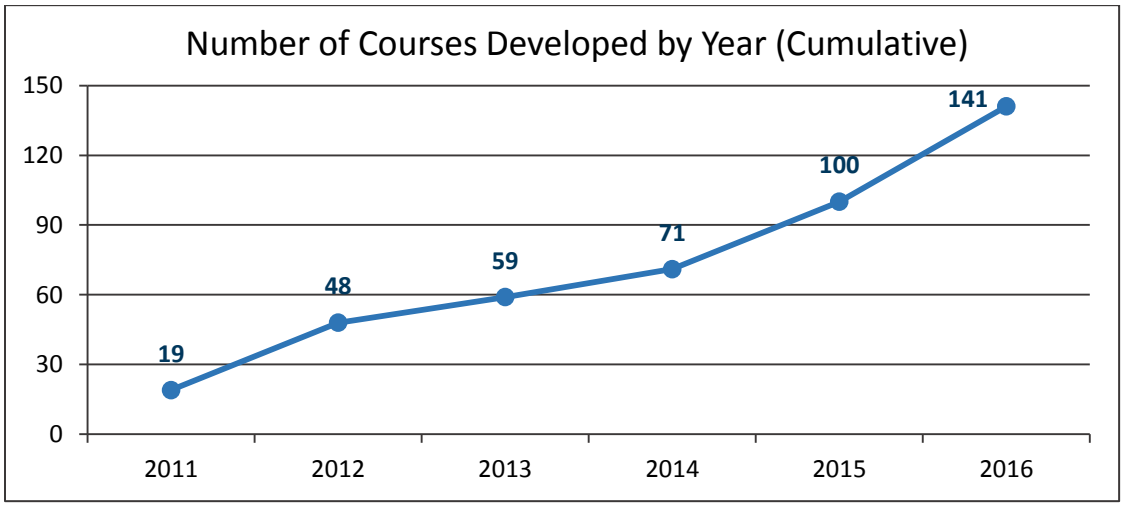

Figure 7. Cumulative Number of Course Developed by Year (2011 – 2016)

All the validated courses are accepted in the TPEMS course library for sharing among the Program Members. For ease of reference, these courses are segregated by subject areas including Aerodromes, Air Navigation Services, Air Transport, Environment, Flight Safety and Safety Management, Security and Facilitation, Training Competency Development and Aviation Management.

Table 3 shows the number of ICAO-recognized training courses by subject area as of December 2016, comprising courses developed and courses currently under development.

Subject Areas	Courses Developed	Courses under development
Aerodromes (AGA)	42	21
Air Navigation Services (ANS)	47	18
Air Transport (ATR)	4	4
Environment (ENV)	2	1
Flight Safety and Safety Management (FSM)	21	15
Security and Facilitation (ASF)	11	3
Training Competency Development (TCD)	12	1
Aviation Management	2	0
Total	141	63

Table 3. Number of ICAO-recognized Training Courses by Area (December 2016)

4. Training Course Delivery

Civil aviation is a highly regulated industry and, as a UN specialized organization, ICAO plays an important role at a global level. Specifically, ICAO is not only the driving force for the establishment of SARPs and guidance material, but also provides guidance through training to Contracting States on the implementation of those provisions. Figure 8 shows the yearly number of training sessions between 2011 and 2016. With the development of competency-based training courses, more and more training sessions are organized by ICAO and the TRAINAIR PLUS Members. The number of training sessions has steadily increased year by year. 308 sessions were delivered in 2016, which is more than 30 times comparing to the number in 2011.

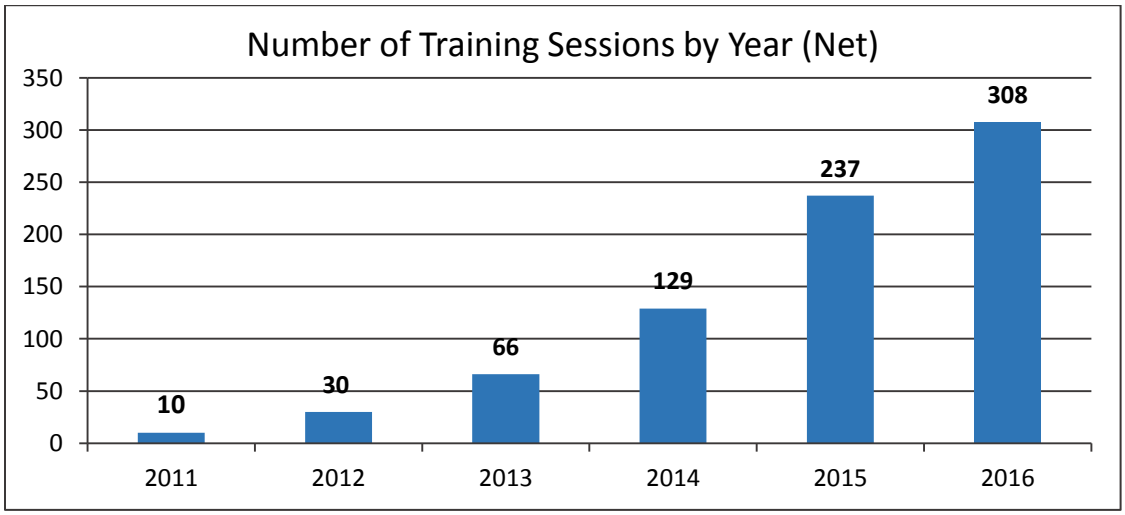

Figure 8. Net Number of Training Sessions by Year (2011 – 2016)

Cumulatively, the total number of training sessions starts from 10 sessions in 2011 to 780 in 2016. A steady increasing trend is obviously observed from the figure 9.

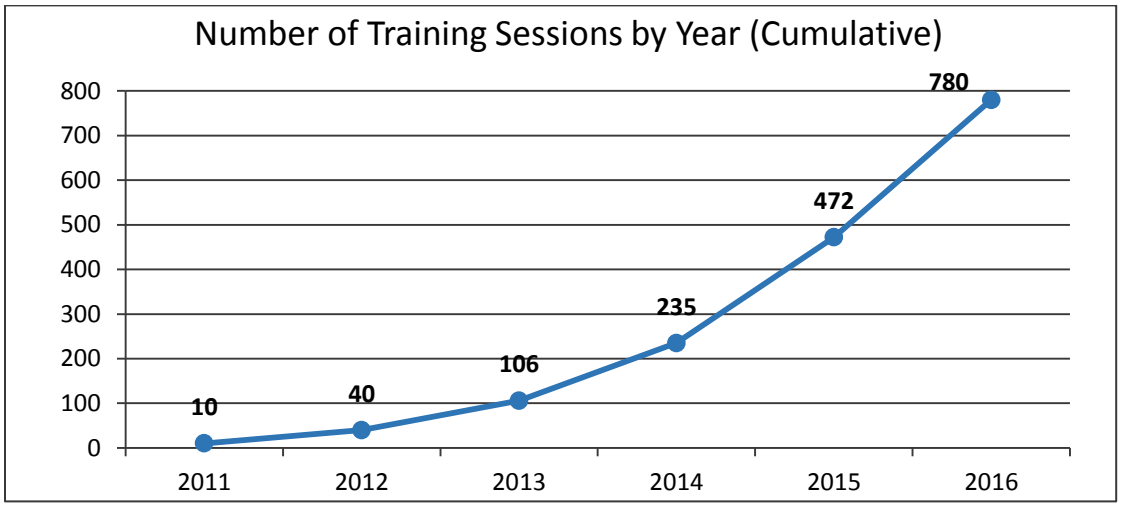

Figure 9. Cumulative Number of Training Sessions by Year (2011 – 2016)

To ensure training effectiveness, the average number of trainees per sessions is around 12 for ICAO training courses. The actual number slightly varies depending on the course subject and its specific delivery requirements. For example, if specialised equipment are required for hands-on exercises or tests in a training course, enough time should be allocated to each trainee for practice to ensure their achievements of the course objectives. There is also consideration about the ratio of instructors versus trainees to ensure that sufficient guidance is provided to each trainee. In particular, individualized feedback for exercises and tests is more important than the general comments. Figure 10 shows the yearly number of trainees from 193 in 2011 to 3200 in 2016, which represents a steady increase of 16 times.

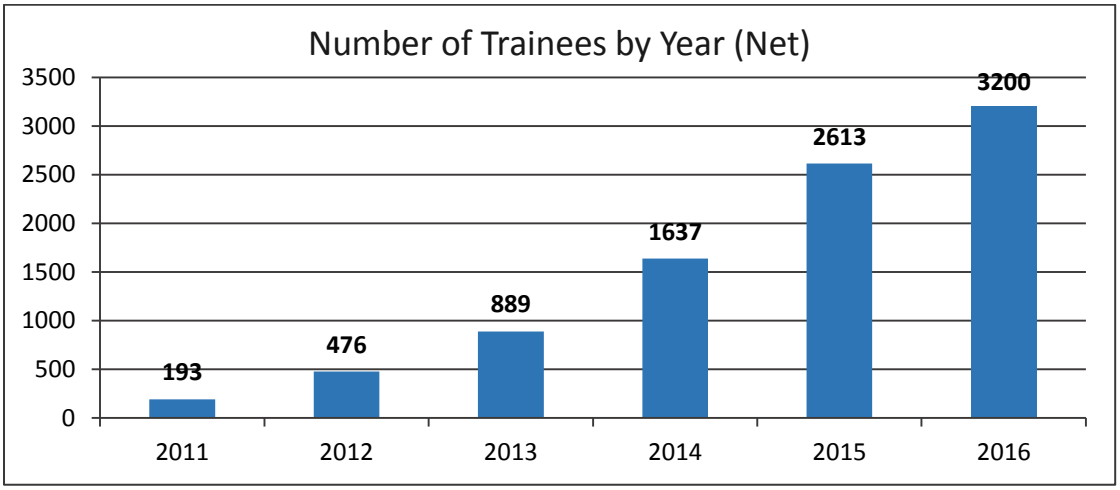

Figure 10. Net Number of Trainees by Year (2011 – 2016)

As of 31 December 2016, 9008 trainees have attended ICAO training courses. This cumulative number of trainees shown in the figure 11, demonstrates significant achievements of the TRAINAIR PLUS Program in the recent six years.

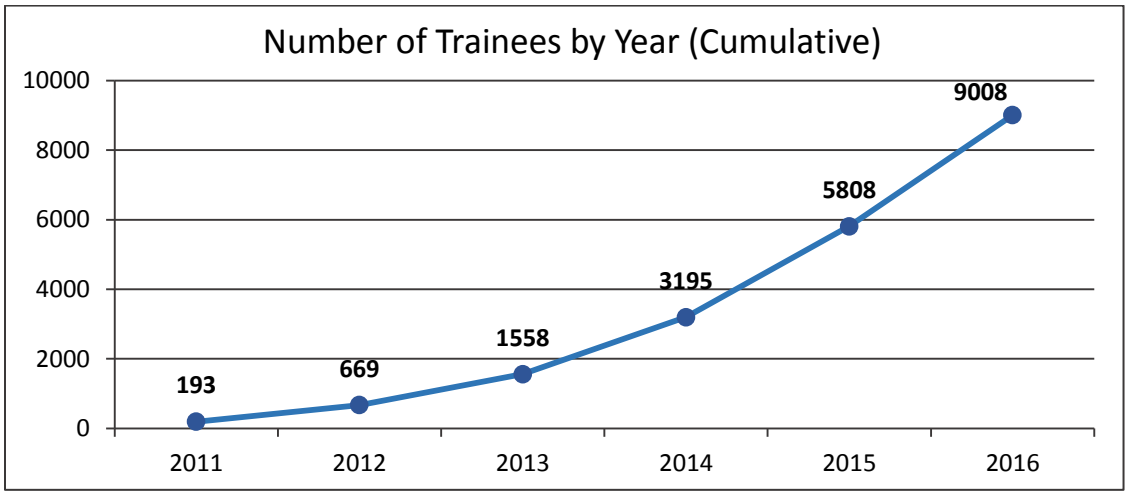

Figure 11. Cumulative Number of Trainees by Year (2011 – 2016)

Practical Program Evaluation

Looking into the history of training evaluation, Michael Scriven created the terms formative evaluation and summative evaluation in 1967. Also he emphasized the differences between formative and summative evaluation in terms of the goals of the information and how the information is used. Originally, formative evaluation means to gather information in order to assess the effectiveness of a curriculum and guide school system choices as to which curriculum to adopt and how to improve it (Scriven, 1967). With the theory evolution, Benjamin Bloom started to consider formative assessment as a tool for improving the teaching-learning process for students (Bloom, 1968). Later on, Bloom worked with Thomas Hasting and George Madaus to link the formative assessment to instructional units in a variety of content areas, with the purpose to make decisions about the next steps in instruction that are likely to be better (Bloom et. all, 1971).

Nowadays, evaluation is often perceived as the most important feature in education and training. In academia, summative evaluation validates the learners' acquisition of knowledge, while formative evaluation ensures that the design of the course material and delivery method is an efficient channel of instruction or education (Martel, 2016).

In contrast to summative evaluation, formative evaluation is intended to foster development and improvement within an ongoing activity, such as a program. Wholey et. all

define the terms "program" and "program evaluation" in the *Handbook of Practical Program Evaluation* (Wholey et. all, 2010, p 5) as follows:

A program is a set of resources and activities directed toward one or more common goals, typically under the direction of a single manager or management team.

Program evaluation is the application of systematic methods to address questions about program operations and results.

In line with these definitions, the purpose of program evaluation should not only assess program results, but also identify ways to improve the program evaluated (Wholey et. all, 2010). That being said, it is particularly important to select an appropriate method for a program evaluation. Accumulated evidence demonstrates that attention to and involvement of key stakeholders enhances the design and implementation of evaluations and the use of evaluation results in decision making (Patton, 2008).

In statistical analysis, surveying representatives of the population is well-recognized as a process for collecting data, however, reaching the appropriate respondents to learn about their experiences and measure their attitudes and opinions can be challenging. With respect to sampling, several factors should be considered, such as the sample size, information rich and representative of the population. If the population is quite large, then a sample has to be selected to ensure the survey is feasible and manageable. Even if the population is not fairly large, selecting a relatively small number of respondents may also provide reasonably precise estimates of the entire population at a reduced cost (Wholey et. all, 2010). In terms of sampling strategies, there are two categories: one is probability and the other is nonprobability. Probability sampling occurs when researchers use a random process to select individuals from the population, such as random sampling, systematic random sampling and stratified random sampling. When researchers select individuals to study because they are available, convenient, and meet some criteria or characteristics, nonprobability sampling occurs, which includes convenience sampling and purposive sampling. As a rule of thumb, the larger the size of the sample, the better. What's more, it is very important to ensure that a representative sample is selected to avoid sampling error (Clark & Creswell, 2010).

Although survey methods have improved over the past two decades, the following five survey modes are widely used: mail, internet, telephone, face-to-face and mixed-mode surveys. There are advantages and disadvantages for each of these options. The oldest method is face-to-

face survey; it usually yields the highest response rates and is the best method for asking open-ended questions, however, these surveys are generally expensive, time-consuming, conducted in a small geographical area. Telephone surveys have become popular because they often produce high response rates and less item nonresponse, and also they provide more control of the question ordering, longer questions and skip patterns. With technological advances, the difficulty in reaching people by phone is particularly problematic for surveys, in addition to the disadvantages similar to face-to-face surveys. Mail surveys are relatively inexpensive, a complete list of addresses obtainable, with less responses bias; on the downside, the response rate is comparatively low and even higher nonresponse rate for individual questions with minimal or no skip patterns. Along with the worldwide growth of Internet access, web surveys have been rapidly developed and increasingly used. On one hand, web surveys provide attractive graphics or visual aids to guide respondents, it is at lower cost with data more secure; one the other hand, the falling survey response rates are almost inevitable. In this respect, many programs use the mixed-mode survey, which is a combination of data collection modes in order to increase participation. Implementing this mode, evaluators should pay attention that the mode of data collection does not influence the results. Regarding data collection, mail and web surveys are self-administration modes, while telephone and face-to-face surveys are interviewer-administered modes (Wholey et. all, 2010).

Getting people to respond to the survey is the main goal of the data collection process. The lower the response rate is, the more likely the study is to be vulnerable to nonresponse bias. Corresponding to different survey modes, in general, the response rate is high for face-to-face surveys, medium for telephone surveys, and low to medium for either mail surveys or web surveys. For web surveys, typically, the researchers send a short e-mail message about the survey with a link to the questionnaire. Recipients are inclined to respond shortly after receiving the link, therefore, reminders sent at different intervals are helpful in case of low response rate (Wholey et. all, 2010).

Meanwhile, web surveys have the distinct advantage of providing a useful data file immediately after the data have been collected. For example, all responses to Google Forms can be exported to an excel sheet when a survey is closed, then tables and graphs can be generated for data analysis, and subsequently, survey results can be summarized. With Internet access increasing, web surveys are becoming an increasingly important mode of data collection.

Chapter 3 – Methodology

Michael Scriven's formative evaluation methodology was applied in this study. The entire process consists of the following six phases:

Phase One: Setting the Objectives of the Formative Evaluation

The objective of this formative evaluation is to assess the effectiveness and user-friendliness of the ICAO TRAINAIR PLUS Program in order to determine if an update of the Program is required, and what recommendations could be considered in this regard.

Specifically, the following two main research questions were studied in this formative evaluation:

1. How does the TRAINAIR PLUS Program meet its prescribed objectives?

2. How does the TRAINAIR PLUS Electronic Management System (TPEMS) contribute to the achievements of the Program objectives?

Phase Two: Selecting the Phases and Timing of the Evaluation

Since the Program was launched in 2010 on the basis of the former TRAINAIR Program, this formative evaluation was conducted during the implementation of the Program. The Program has achieved sound progress with growing Members in the Program network and increasing numbers of ICAO-recognized training courses for aviation professional training; hence, more and more training organizations are interested in joining the Program and wish to evaluate the opportunity to participate in and, subsequently, benefit from the Program. On the other hand, the program development presents higher management requirements, which leads to a severe challenge between limited resources and constantly increasing requests.

Based on the results of this formative evaluation, the frequency of the Program evaluation will also be discussed for its long-term development.

Phase Three: Selecting the Source of the Information

Given the TRAINAIR PLUS Program is a global cooperative network of civil aviation training organizations and industry partners with the goal of improving safety and efficiency of air transport through the establishment, maintenance and monitoring of high standards for training aviation personnel on a worldwide basis and in a cost-effective manner, the following four groups of participants were selected as the source of information:

1. The focal point of each TRAINAIR PLUS Member who is responsible for the management and coordination of the Program activities at the operational level;

2. ICAO qualified course developers who have developed more than one Standardized Training Packages (STP) through the TPEMS;

3. ICAO course validators who are qualified to conduct the methodology validation for ICAO-recognized training courses through the TPEMS;

4. ICAO instructors who are qualified to teach TRAINAIR PLUS training competency development courses using the TPEMS.

Phase Four: Developing the Data Collection Tools

To collect data, a series of online survey questionnaires were prepared using Google Forms and questions were tailored to the TRAINAIR PLUS Members, ICAO qualified course developers, ICAO course validators and ICAO instructors, respectively. An invitation message with the link to the online survey was sent to all potential participants who meet the selection criteria. And the consent form was set up at the beginning of each survey questionnaire: every participant must declare his/her consent before actually starting the online survey. The tools for this study include the following four online surveys:

1. An online survey to TRAINAIR PLUS Members

The TRAINAIR PLUS Program establishes a global cooperative training network. Therefore, the Program Members play a significant role in the Program who not only develop ICAO-recognized training courses through the TPEMS, but also deliver these packages in the network using the TPEMS. The focal point of each training organization is responsible for managing the Program activities at the operational level, and coordinating with the ICAO TRAINAIR PLUS team and other Members as well.

This survey contains 16 multiple choice questions (quantitative), 2 yes/no alternative questions (quantitative), and 2 open-ended questions (qualitative). The questionnaire focuses on the TRAINAIR PLUS Members' experience with the Program including course development, course delivery and other activities associated with the TPEMS, which supports the achievements of the Program objectives. The survey also addresses the Program Members' overall remark about the Program and their recommendations for the Program improvements.

Due to the breadth of the survey, the purpose of this survey is not only to collect information as much as possible, but also to compare the feedback from different Members in order to generalize the Program Members' overall evaluation of the Program from the training organizations' perspective. The survey corresponds to the research question 1 and question 2.

2. An online survey to ICAO qualified course developers

Course developers become qualified upon the successful development of their first Standardized Training Package (STP) through the TPEMS. ICAO qualified course developers who developed more than one STPs are training specialists who master the ICAO competency-based training methodology and obtain extensive experience about the application of the methodology to the development of ICAO-recognized training courses (STP/CTP/ITP).

This survey contains 8 multiple choice questions (quantitative), 1 yes/no alternative question (quantitative), and 3 open-ended questions (qualitative). The questionnaire focuses on the qualified course developers' individual experience about the development of competency-based training courses through the TPEMS process. The survey also addresses the course developers' overall remarks about the Program and their recommendations for the Program improvements.

The purpose of this survey is to collect information from course developers who are TPEMS users with real experience about the development of competency-based training courses. Their response reflects the achievements of the Program objectives and the user-friendliness of the TPEMS from the qualified course developers' perspective, which corresponds to the research question 1 and question 2.

3. An online survey to ICAO course validators

ICAO course validators are selected among senior course developers who have developed more than three competency-based training courses and qualified to conduct the methodology validation for ICAO-recognized training courses through the TPEMS. They are training specialists who are qualified by ICAO to validate the competency-based training methodology for ICAO-recognized training courses (STP/CTP/ITP), and provide On-the-Job Training (OJT) to new course developers during their first STP development.

This survey contains 8 multiple choice questions (quantitative), 1 yes/no alternative question (quantitative), and 3 open-ended questions (qualitative). The questionnaire focuses on the course validators' individual experience about the validation of competency-based training courses through the TPEMS process. The survey also addresses the course validators' overall remark about the Program and their recommendations for the Program improvements.

The purpose of this survey is to collect information from course validators who are TPEMS users with real experience about the validation of competence-based training courses.

Their response reflects the achievements of the Program objectives and the user-friendliness of the TPEMS from the course validators' perspective, which corresponds to the research question 1 and question 2.

4. An online survey to ICAO instructors

ICAO instructors are qualified to teach specific ICAO-recognized training course/s in an ICAO official language. The courses selected for this study include the Training Developers Course (TDC), Training Instructors Course (TIC) and Training Managers Course (TMC). ICAO instructors are selected and trained in accordance with the *ICAO Instructor Competency Framework* (ICAO, 2014), and subsequently, conduct the courses that he/she is qualified to teach using the TPEMS.

This survey contains 6 multiple choice questions (quantitative), 3 yes/no alternative questions (quantitative), and 3 open-ended questions (qualitative). The questionnaire focuses on the ICAO instructors' individual experience about the delivery of competency-based training course using the TPEMS. The survey also addresses the ICAO instructors' overall remark about the Program and their recommendations for the Program improvements.

The purpose of this survey is to collect information from ICAO instructors who are TPEMS users with real experience of course delivery. Their response reflects the achievements of the Program objectives and the user-friendliness of the TPEMS from ICAO instructors' perspective, which corresponds to the research question 1 and question 2.

Phase Five: Determining the Threshold of Intervention

In line with the Pareto principle, for many events, roughly 80% of the effects come from 20% of the causes. The law of the vital few (80/20 rule) is applied to determine the threshold of intervention. To be specific:

1. If more than 20% of the Program Members comment that the TRAINAIR PLUS Program meets less than 80% of its prescribed objectives, interventions should be considered;

2. If more than 20% of the ICAO qualified course developers comment that the Program meets less than 80% of its prescribed objectives, interventions should be considered;

3. If more than 20% of the ICAO course validators comment that the Program meets less than 80% of its prescribed objectives, interventions should be considered;

4. If more than 20% of the ICAO instructors comment that the Program meets less than 80% of its prescribed objectives, interventions should be considered;

Furthermore, responses to the qualitative questions were also analysed and aggregated in order to generalize the recommendations for the Program improvements and prioritize the list of proposed actions.

Phase Six: Developing a Formative Evaluation Report

A formative evaluation report was compiled after conducting the formative evaluation and analysing the data collected. The final report consists of the following chapters:

- Introduction
- Literature Review
- Methodology
- Results
- Discussion and Conclusion
- References
- Appendices

Chapter 4 – Results

Following the invitation message sent to all the potential participants, four survey questionnaires were launched using Google Forms and open to the four groups of target population respectively. Research findings are presented in this chapter.

Analysis of Survey to TRAINAIR PLUS Members

The survey questionnaire was sent to all TRAINAIR PLUS Members excluding the three Corporate Members. As a result, 39 responses were received from the 89 Members, which represents a response rate of 44%.

Figure 12 shows the responses by ICAO region. The most responses received are from APAC (36%), followed by EUR/NAT (20%), ESAF (15%), MID (10%), NACC (8%) and SAM (8%), and the least one is from WACAF (3%).

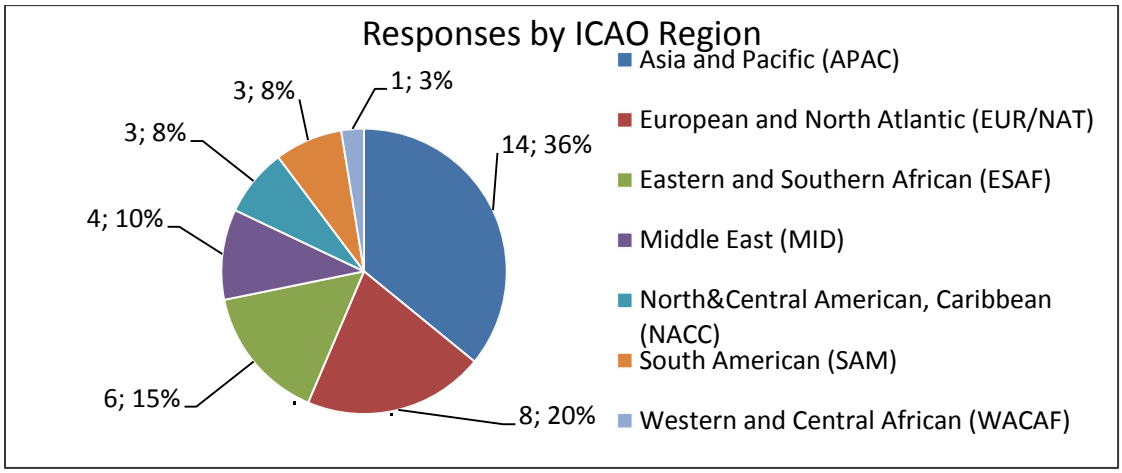

Figure 12. Responses by ICAO Region

In comparison with the current Program Members located in each region, Figure 13 shows the geographical distribution of current Members and the number of respondents.

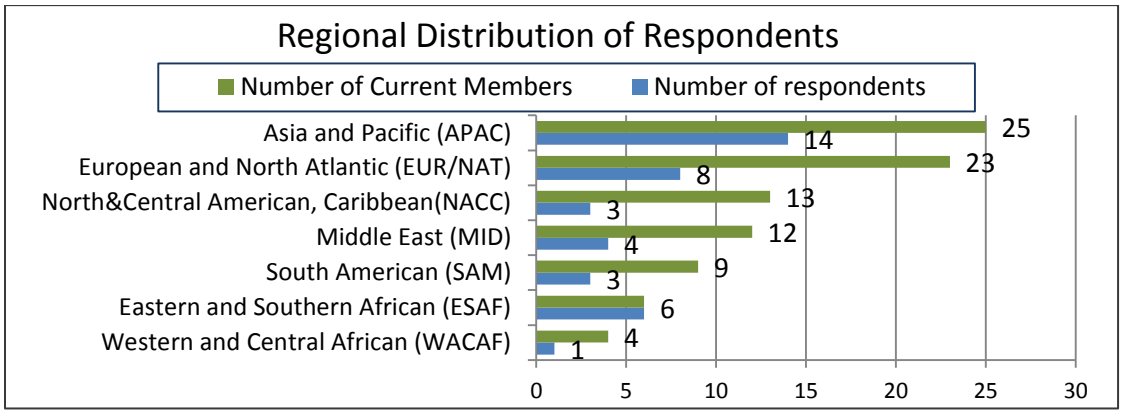

Figure 13. Regional Distribution of Respondents

With respect to the membership category, 26% of the respondents are Associate Member, 41% are Full Member and 33% are Regional Training Centres of Excellence (RTCEs), as shown in figure 14.

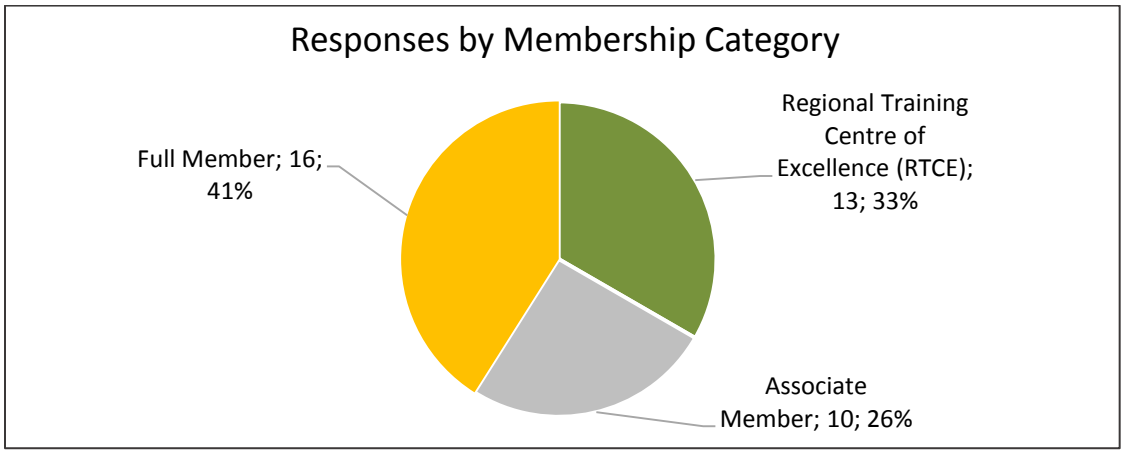

Figure 14. Responses by Membership Category

Regarding the responses received by membership category, 10 respondents are Associate Members, 16 are Full Members and 13 are RTCEs, representing respectively 25% of Associate Members, 57% of Full Members and 62% of RTCEs currently in the Program network, as shown in figure 15. It is worth mentioning that the response rate goes higher with the upgrade of the membership status, which also demonstrates that a training organization has an increasing involvement in the Program activities from an Associate Member to a Full Member, and from a Full Member to an RTCE.

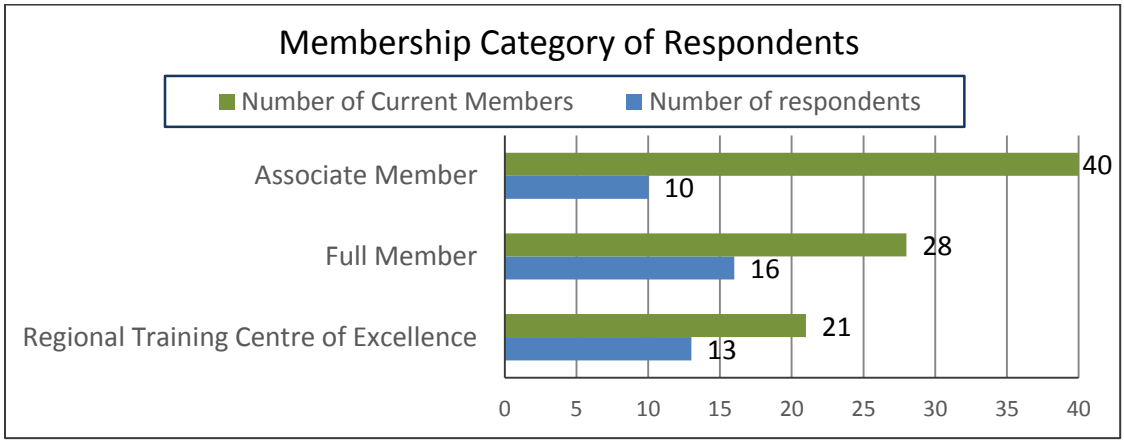

Figure 15. Membership Category of Respondents

More involvement is also reflected by the number of years of membership in the Program. Figure 16 shows that 74% (28%+46%) of the respondents have more than 3 years of experience

in the Program. These respondents have participated in a variety of the Program activities, thus they are more likely to provide sufficient and reliable feedback based on their real experience.

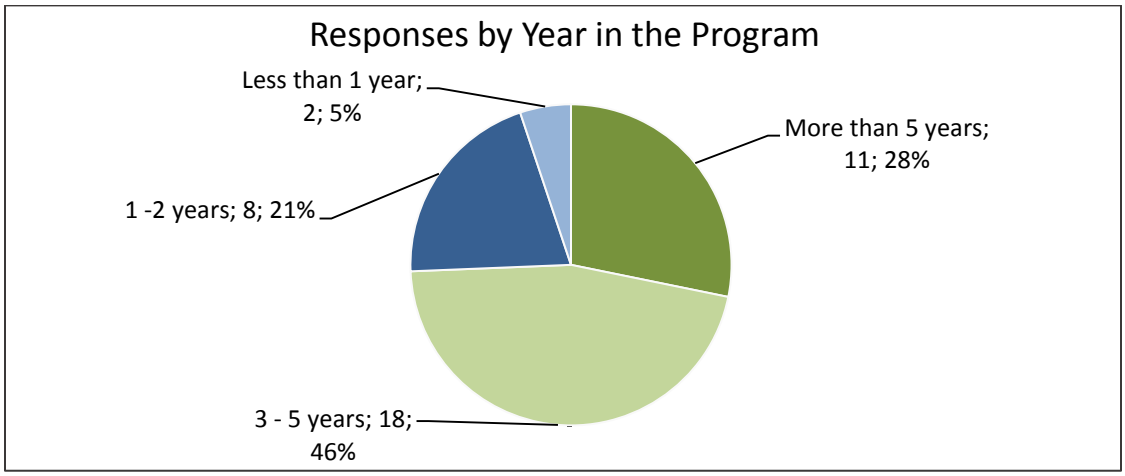

Figure 16. Responses by Year in the Program

With regard to the scope of training activities, the respondents are categorized in the following seven subject areas: Safety, Air Navigation Services, Aerodromes, Security and Facilitation, Air Transport, Environment, and Aviation Management. Among the 39 respondents, Safety and Air Navigation Services courses are delivered by 29 (74%) training organizations, followed by Aerodromes 19 (49%), Security and Facilitation 18 (46%), Aviation Management 14 (36%), Air Transport 13 (33%), and Environment 6 (15%), as shown in figure 17.

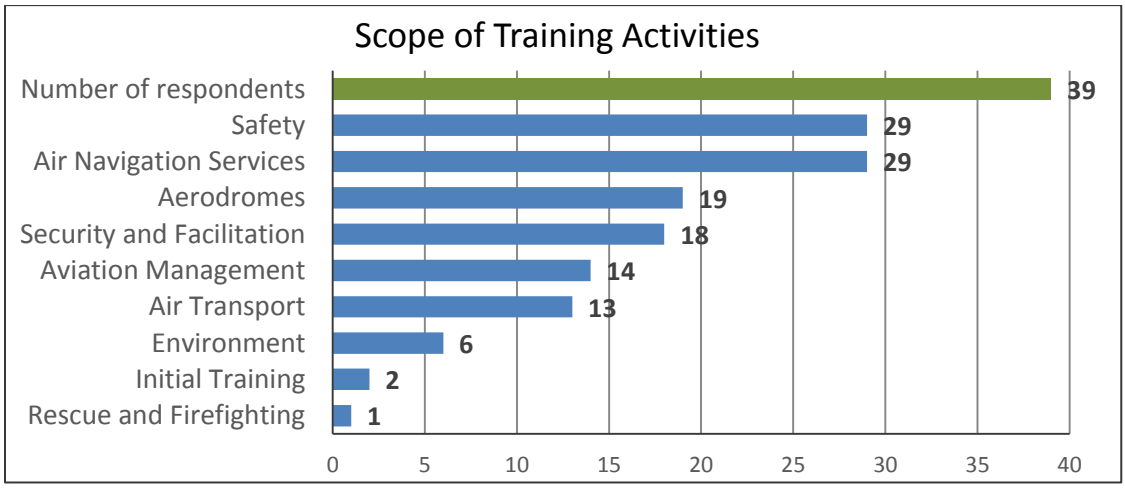

Figure 17. Scope of Training Activities

Regarding the level of activities, 15 respondents representing 38% of training organizations train more than 1000 trainees per year, 10 respondents (26%) train 501 to 1000 trainees per year; in total, for these two categories, 64% (38%+26%) of the respondents train

more than 500 trainees per year. They are actually the backbone of the network who organize training sessions on a regular basis and provide the highest number of qualified professionals to the aviation industry. Figure 18 also shows that 28% (13%+15%) of the respondents are small training organizations who train less than 250 trainees per year.

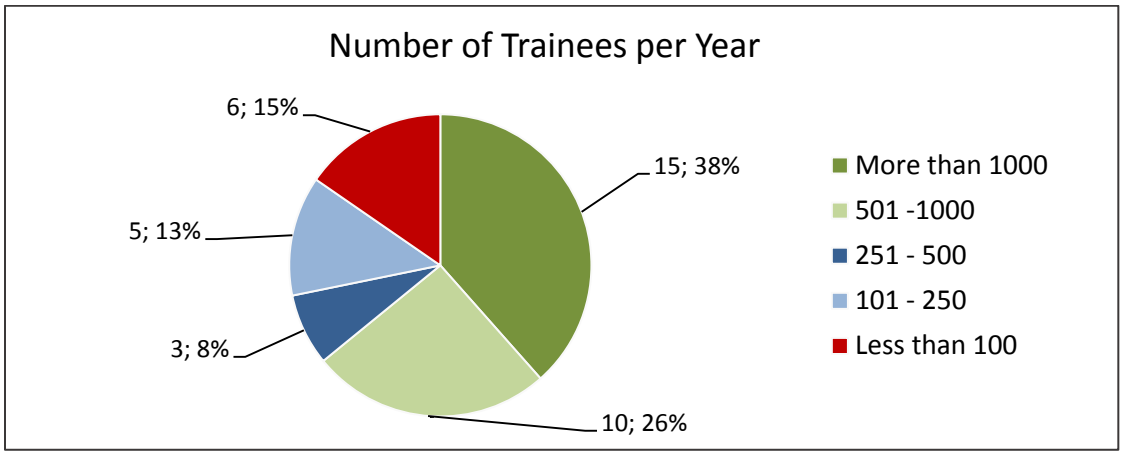

Figure 18. Number of Trainees per Year

Development of training courses is one of the core activities of training organizations. In terms of course production, the survey focuses on the three major ICAO-recognized competency-based training courses: STP, CTP and ITP. As shown in figure 19, since joining the Program, one training organization has developed more than 6 STPs, four organizations developed 4 or 5 STPs, six organizations developed 3 STPs, seven organizations developed 2 STPs and 13 organizations developed 1 STP, while eight organizations has not yet completed an STP and are still Associate Members. For CTP category, only one organization developed 1 CTP out of the 39 respondents. For ITP category, only Regional Training Centres of Excellence (RTCEs) are eligible to develop ITPs and 3 ITPs were successfully developed so far.

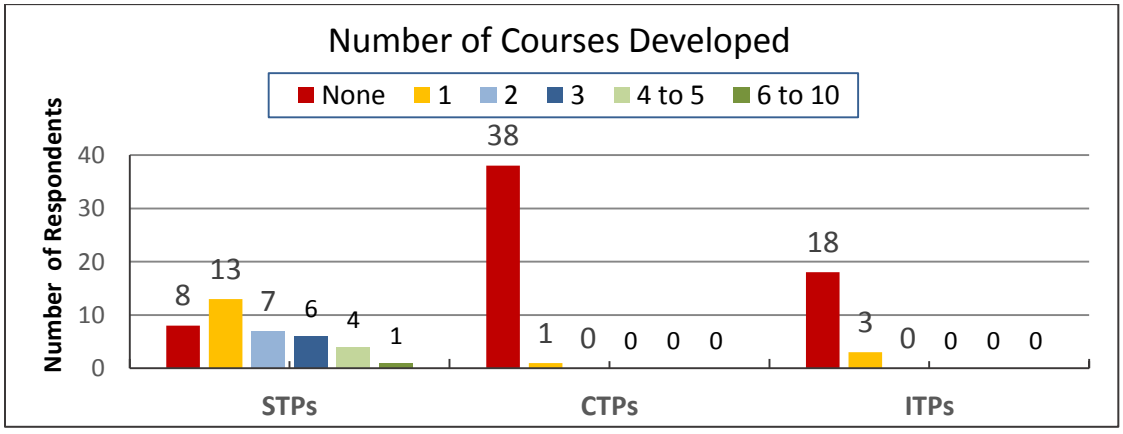

Figure 19. Number of Courses Developed

The Program promotes the application of the Instructional Systems Design (ISD) methodology for the development of ICAO-recognized training courses (STP, CTP, and ITP). Specifically, the Program Members must apply the competency-based training methodology contained in the *Training Development Guide* (ICAO, 2011) to STPs, CTPs and ITPs. The ICAO competency-based training methodology is the adaptation of ADDIE model in the aviation context. It is adopted by ICAO for aviation training and well recognized by civil aviation training organizations worldwide. In practice, the development of ICAO-recognized training courses follows the competency-based training methodology rigorously, and the development process is based on the collaboration among a course development team, including course developers, Subject Matter Experts and a course validator. Also, the Program encourages Members to apply the methodology to training courses in their organizations. Figure 20 shows that 80% (21%+59%) of respondents have applied the competency-based training methodology to all or some training courses in their organizations for standardization.

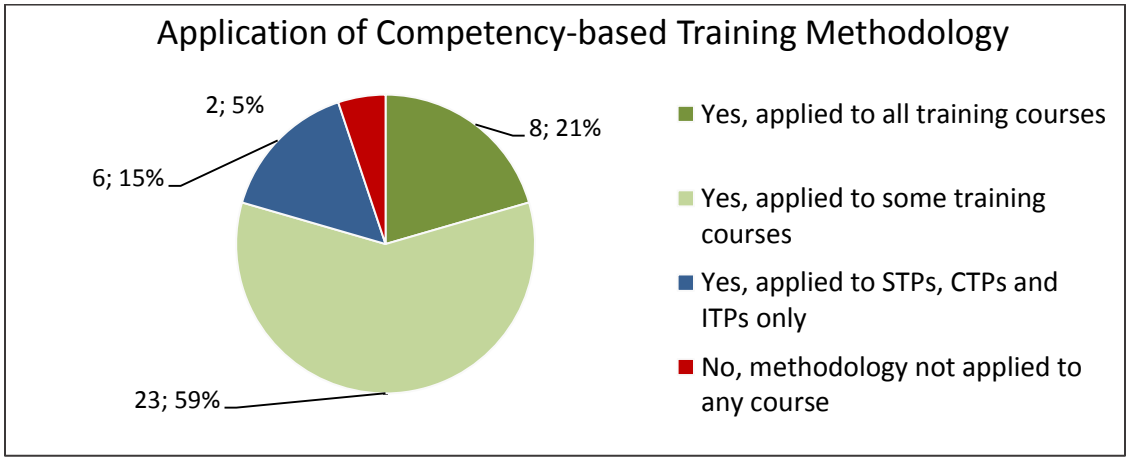

Figure 20. Application of Competency-based Training Methodology

The overall quality of training courses developed by the Program network should be enhanced, as result of use of the competency-based training methodology by most Program Members for the development of ICAO-recognized training courses (STPs, CTPs and ITPs) in addition to their own training courses. Figure 21 shows that a total of 87% (43%+44%) of the respondents recognize the enhancement of course quality in their organizations by applying the competency-based training methodology.

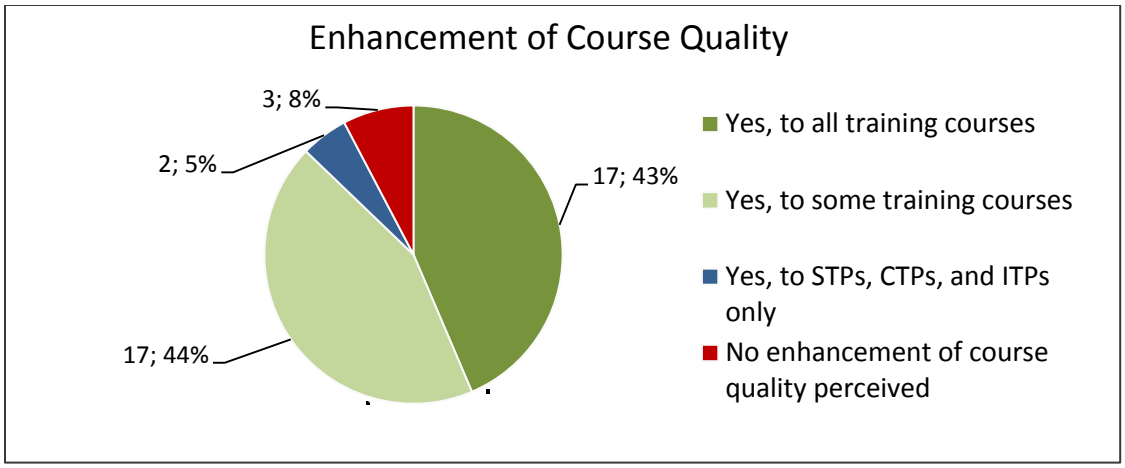

Figure 21. Enhancement of Course Quality

Standardization of training courses requires a lot of effort from training organizations and ICAO. The STP development process has been selected to evaluate the major challenges in course development process because more than 90% of ICAO-recognized training courses are STPs. As shown in figure 22, 25 out of 29 respondents (64%) perceive that limited budget is the number one challenge. Other major challenges include a too-long course development process indicated by 44% of the respondents, lack of qualified course developers (33%), insufficient management support (26%) and unavailability of Subject Matter Experts (23%). Some scatted individual comments are also provided in figure 22. The bars show the number of respondents and the line depicts the percentage of responses.

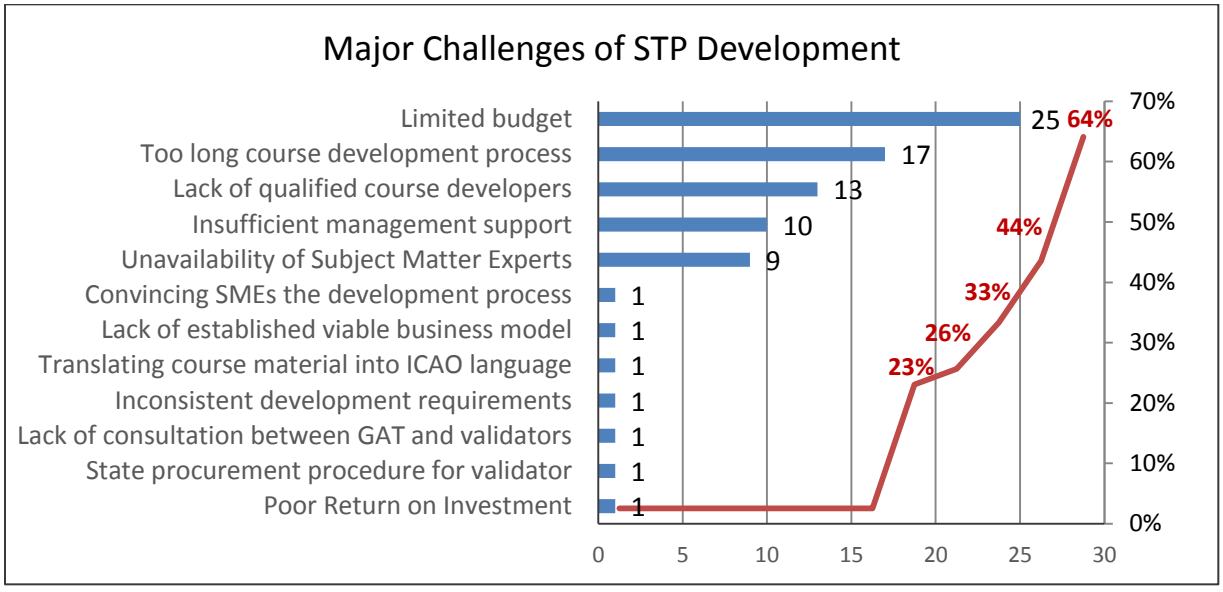

Figure 22. Major Challenges of STP Development

Two core activities are essential for the appropriate functioning of the TRAINAIR PLUS Program, the standardization of training courses and the sharing mechanism among Members which should allow a large implementation of training courses developed by the Program Members on a worldwide basis. Figure 23 shows that 92% of the respondents are interested in STP sharing, while the remaining 8% has no interest.

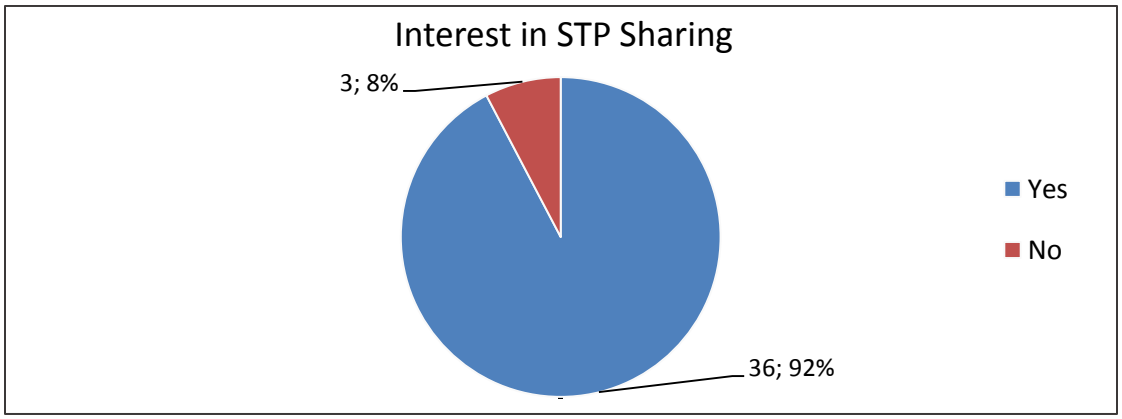

Figure 23. Interest in STP Sharing

In terms of the benefits from STP sharing, opinions vary greatly. As shown in figure 24, 38% of the respondents indicate that STPs purchased met their training needs with no or minor adaptation, while 31% indicate that current STPs don't meet their potential training needs and additional 13% indicate that major adaptation is required for STPs purchased.

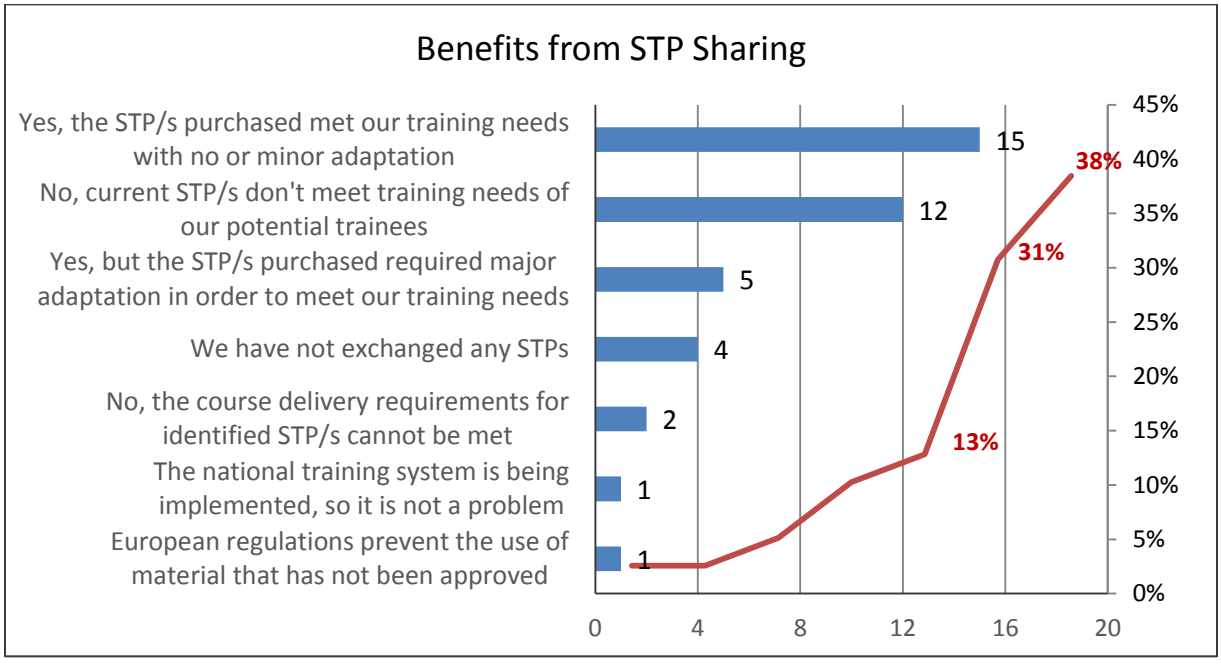

Figure 24. Benefits from STP Sharing

The competency-based training methodology aims to standardize training course development; similarly, the *ICAO Instructor Competency Framework* (ICAO, 2014) is established by ICAO for the standardization of instructional delivery. Figure 25 shows that a total of 77% (31%+46%) of training organizations have applied the framework to all or some instructors in their organizations. An additional 10% of the training organizations have applied the framework to the delivery of STPs, CTPs and ITPs only. In contrast, 13% of the training organizations have yet applied the ICAO Instructor Competency Framework.

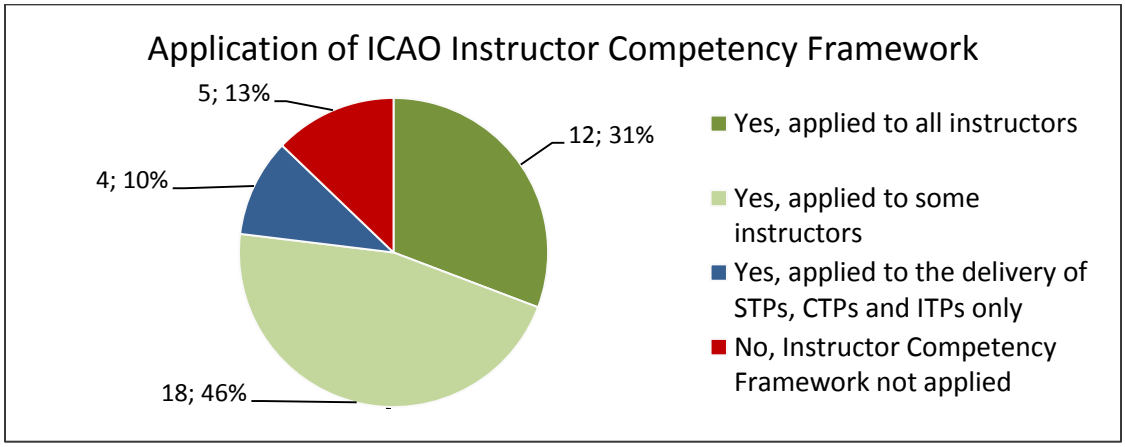

Figure 25. Application of ICAO Instructor Competency Framework

It is likewise the case that Program Members encounter challenges when organizing training course delivery. Figure 26 shows that two major challenges are associated with course delivery and consequently affect the revenue and profitability. The number one challenge is the organization of courses with few trainees in a class indicated by 54% of respondents, and the second challenge is about course cancellation indicated by 44% of respondents. Other challenges include budget constraints, ineffective communication, lack of in-house instructors, ineffective course promotion and so forth. The bars show the number of respondents and the line depicts a steep increase of responses concentrating into the top two challenges.

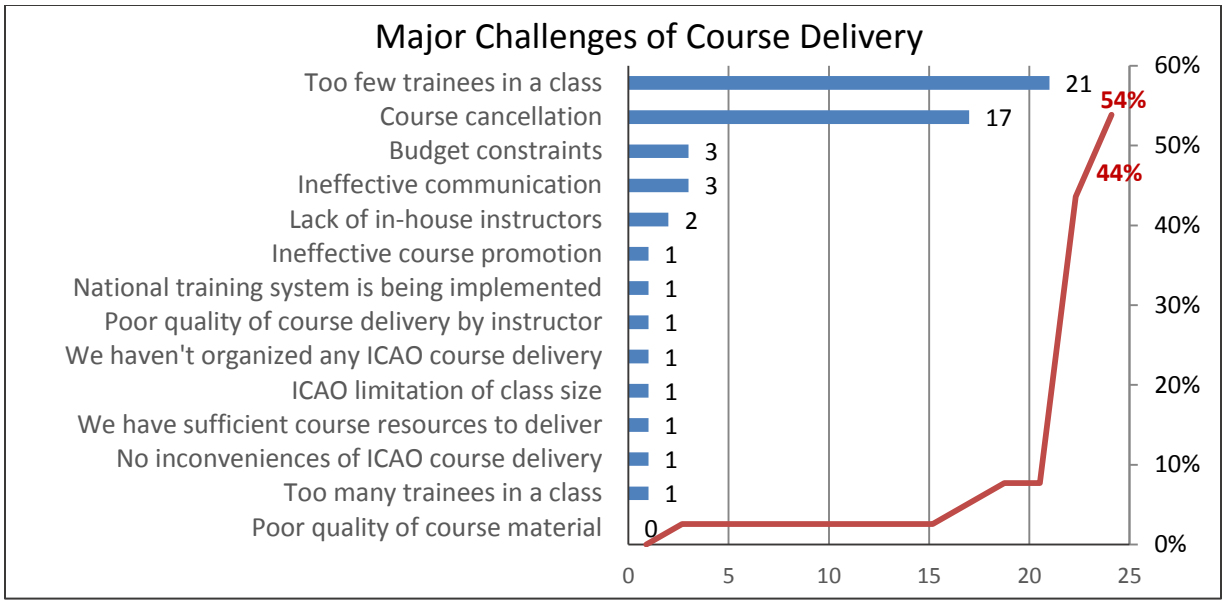

Figure 26. Major Challenges of Course Delivery

The TRAINAIR PLUS Program is intended to establish a cooperative network for the capacity-building of training organizations. In this regard, there are several areas where a training organization can observe its capacity enhancement. In figure 27, the bar shows the number of respondents and the line depicts the percentage of responses. After joining the Program, 82% of the respondents trained more course developers, 62% trained more instructors, 46% developed more training courses, 41% delivered more training sessions, and 26% generated more revenue from training activities. Other areas are listed as quality management system introduced, existing course material updated, and great recognition attained. Meanwhile, a few respondents have indicated that they have not noticed capacity enhancement since joining the Program due to some national regulations limiting the use of other parties' course materials.

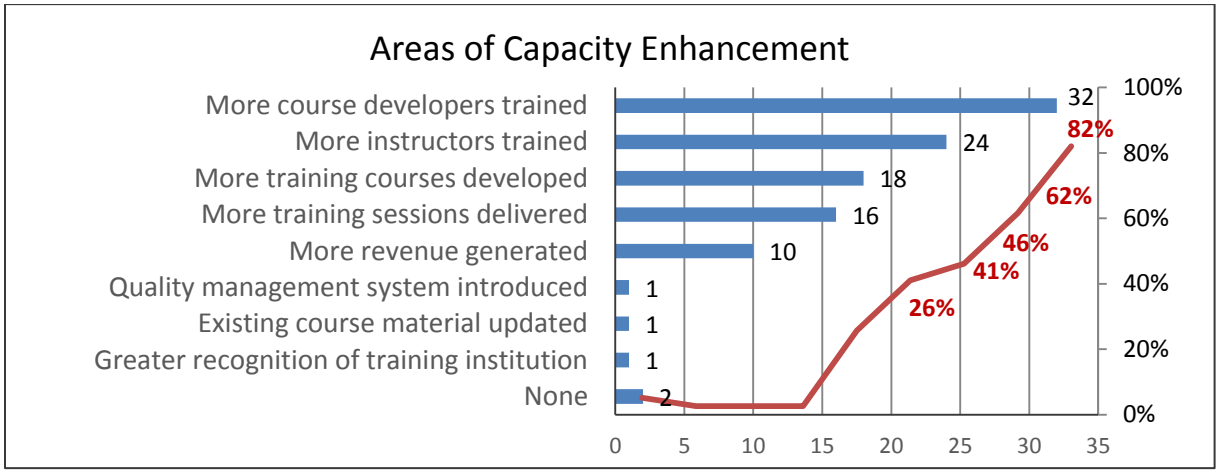

Figure 27. Areas of Capacity Enhancement

Furthermore, 20 out of 39 respondents (51%) observed an annual increase of trainees, while there is no increase of trainees observed by 17 respondents (44%), as shown in the bar chart in the left of figure 28. The right pie chart of figure 28 shows the percentage of responses among the 20 respondents who observed annual increase of trainees, with the legend indicating the percentage of annual increase of trainees. The range of the increase is rather wide, as the highest number is 70% of annual increase and the lowest number is 1% of annual increase. In addition, 35% of the respondents indicate the annual increase of trainees but no statistics are available.

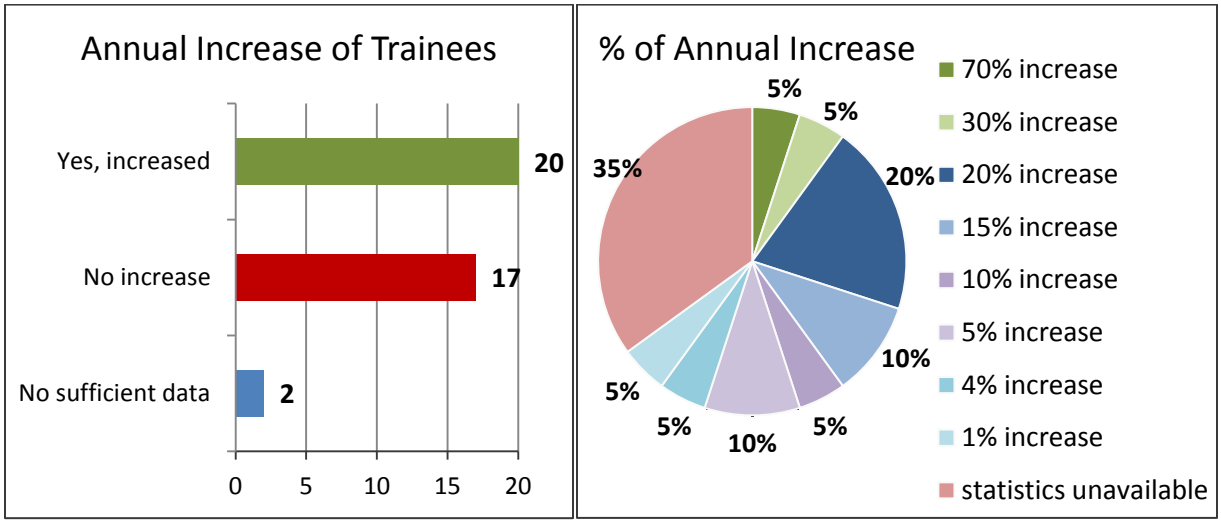

Figure 28. Annual Increase of Trainees

The survey also addresses the perceived benefits from the Program, which is illustrated by figure 29. The bars indicate the number of respondents and the line depicts the percentage of responses for each area where Members are expecting benefits. As shown in the figure 29, standardization of training courses is recognized by 77% of the respondents, followed by continuous access to the TPEMS (72%) , communication with other Members (67%), capacity-building through training professionals (67%), technical assistance for course development (64%) and delivery of ICAO training courses (62%).

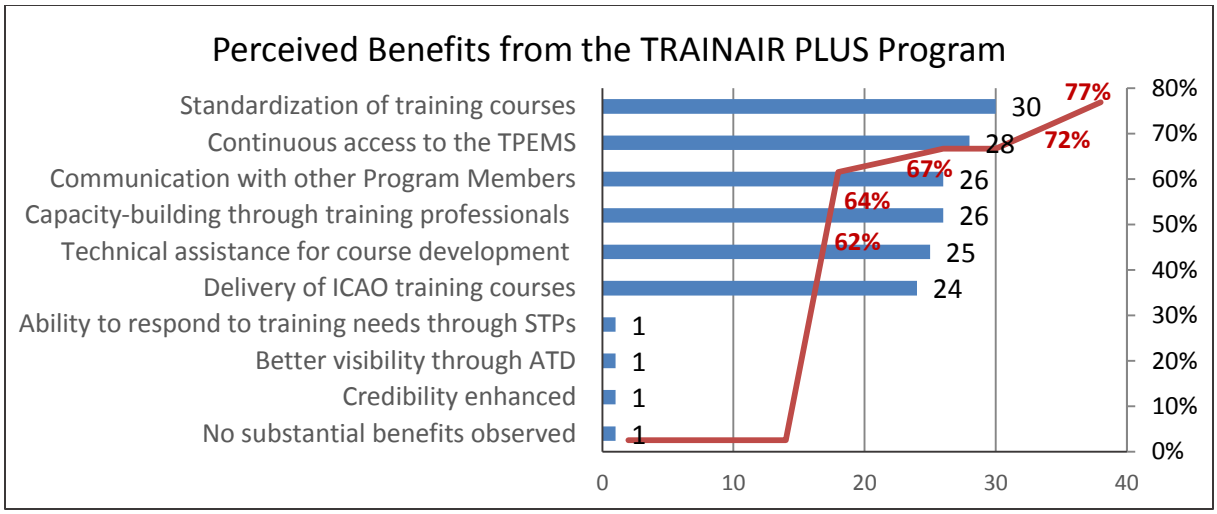

Figure 29. Perceived Benefits from the TRAINAIR PLUS Program

Since 2013, all TRAINAIR PLUS Program processes have been integrated in a web-based suite of applications, the TRAINAIR PLUS Electronic Management System (TPEMS). Together with other Program functions, TPEMS serves as a web-based tool contributing to the achievements of the Program objectives. It provides a central platform to the Program Members for all Program activities. With respect to the perceived contribution of the TPEMS to the TRAINAIR PLUS Program, the nine current TPEMS functions have been evaluated through the survey. Figure 30 shows that the top four functions of the TPEMS recognized by respondents as key activities of the Program, with more than 80% of responses are: development of ICAO-recognized training courses (97%), training organization assessment processes (95%), hosting of TRAINAIR PLUS courses (92%), followed by the production of certificates (85%).

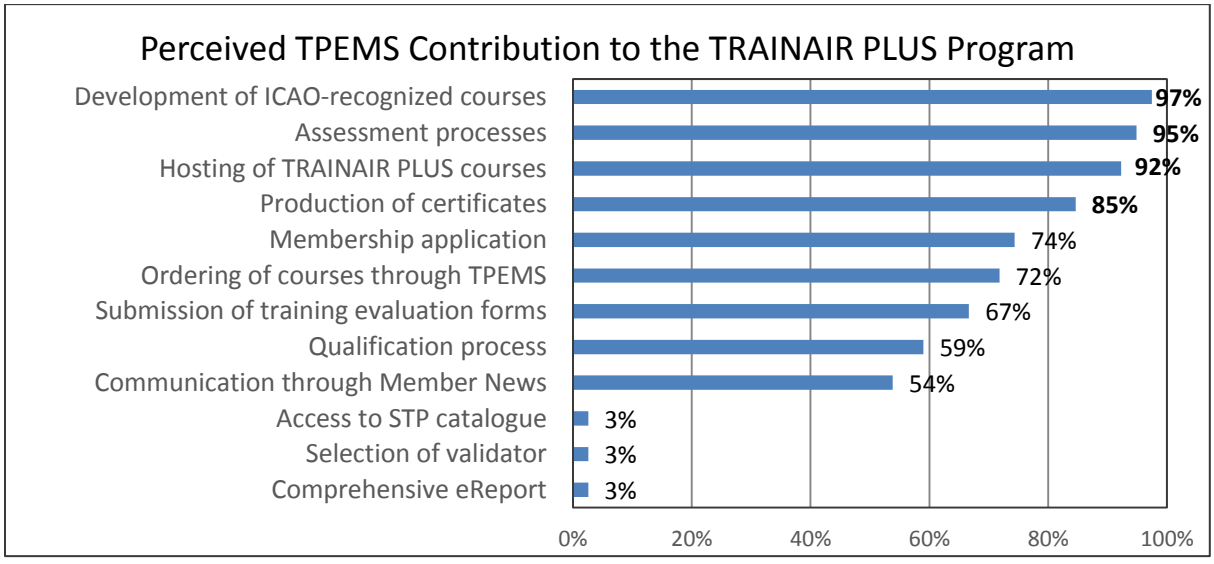

Figure 30. Perceived TPEMS Contribution to the TRAINAIR PLUS Program

With respect to the overal perception, figure 31 shows the perceived Program achievements by Members. In this regard, 44% (21%+23%) of the respondents indicate that the Program achieved more than 80% of its objectives, while 56% (26%+10%+21%) of the respondents indicate that less than 80% of the objectives has been met. The columns in the figure depict that the range of the data is wide with both the mode and mean in the centre column "70-79%". Also there are two equally big ends of the distribution, the high end "more than 90%" indicated by 21% of respondents and the low end "less than 60%" also indicated by 21% of respondents. The results reveal that Members' experience with the Program is far from each other, which is an indication that some improvements and communication are required.

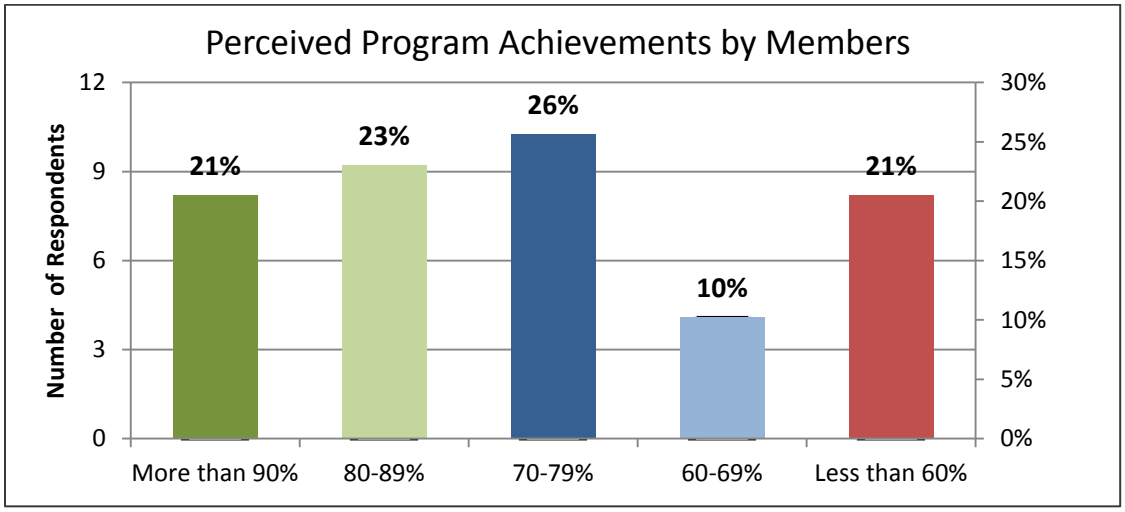

Figure 31. Perceived Program Achievements by Members

Two additional open-ended questions were included in the survey to gather qualitative data and identify further improvements of the Program, from the Program Members' perspective.

Although the overall perception of the Program achievements in terms of percentage is not high (only 44% of the respondents perceived more than 80% of program objectives were accomplished), 90% of the respondents indicated that they would recommend the Program to others due to the competency-based training methodology and the network of training organizations for sharing resources and training products. The top concerns of the Members include the costs associated with the Program, implementation and updating of the competency-based training methodology, collaboration in the network, need for promotion of training activities to the general public and communication between Members and the Program team.

Following are examples of comments from the respondents that are transcribed verbatim:

- *Definitely would. It is a good platform for sharing resources and training products.*

- *Of course would recommend the program because it allows through the STP that the participants acquire the competencies that they require in the workstations.*
- *Yes, because of its great benefits in training and manpower development.*
- *Yes, the programme increases the quality of training and the sharing of training programmes become easier.*
- *Low costs and increase of cooperation between the training centres.*
- *Streamlining the methodology and enhancing course sharing.*
- *Simplify validation process of STPs and reduce associated costs.*
- *Appeal to a wider market through better marketing.*
- *Implementation of pragmatic requirements that reflect today's commercial training environment and resource constraints.*
- *To increase collaboration between member organizations.*
- *In-house validator to reduce cost of developing new courses.*

Analysis of Survey to ICAO Qualified Course Developers

The survey questionnaire was sent to 51 ICAO qualified course developers who have developed more than one STPs through the TPEMS. 26 responses were received from the 51 ICAO qualified course developers, which represents a response rate of 51%.

Figure 32 shows the responses by ICAO region. 53% of respondents are from APAC, followed by 29% from NACC, 11% from EUR/NAT, 3% from ESAF and 4% from SAM. There is no response received from MID and WACAF.

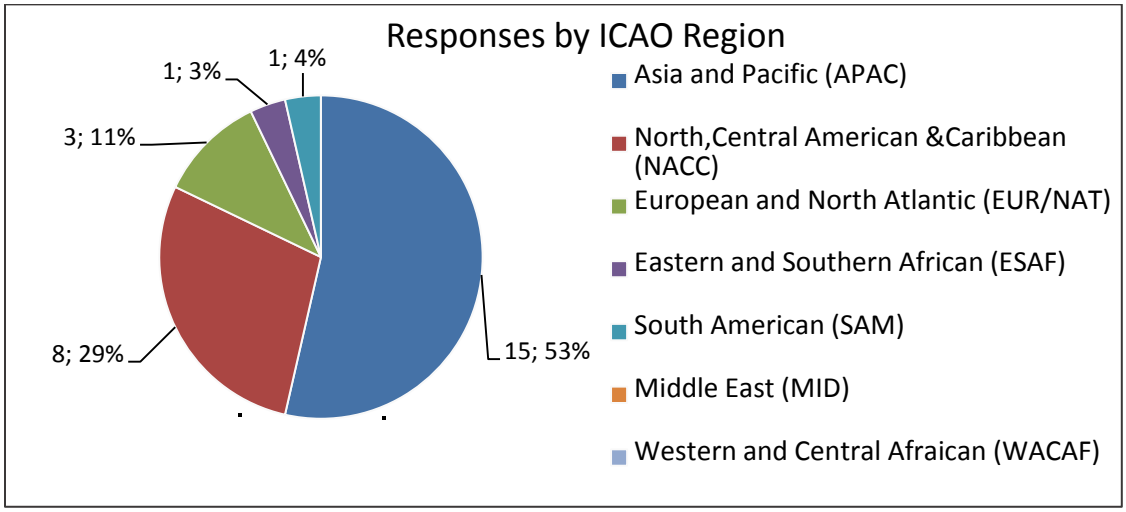

Figure 32. Responses by ICAO Region

In comparison with the current Program Members located in each region, figure 33 shows the geographical distribution of current Members and the number of respondents. The respondents represent five out of seven regions, with no geographical representative from MID or WACAF.

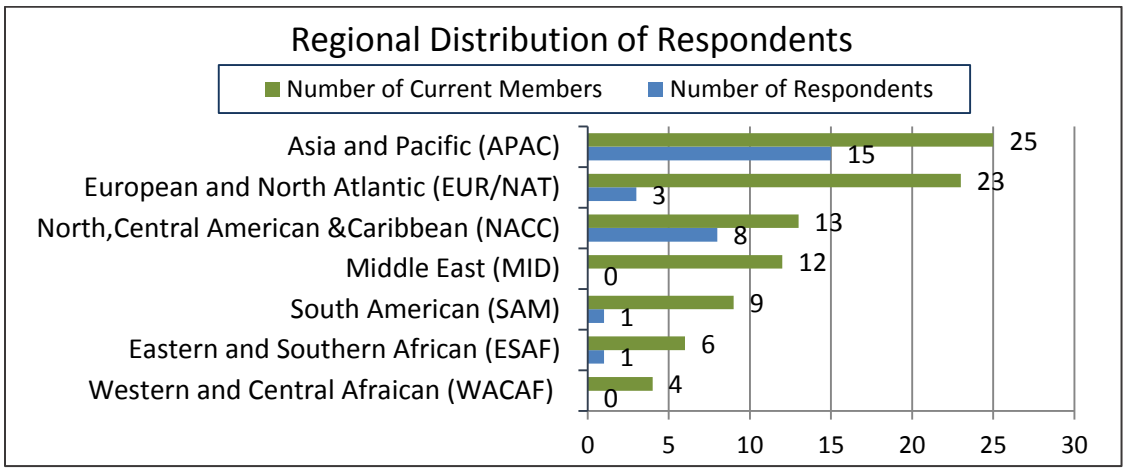

Figure 33. Regional Distribution of Respondents

Among these 26 qualified course developers, 81% are full time employees of a training organization while the rest 19% are freelancers, as shown in figure 34.

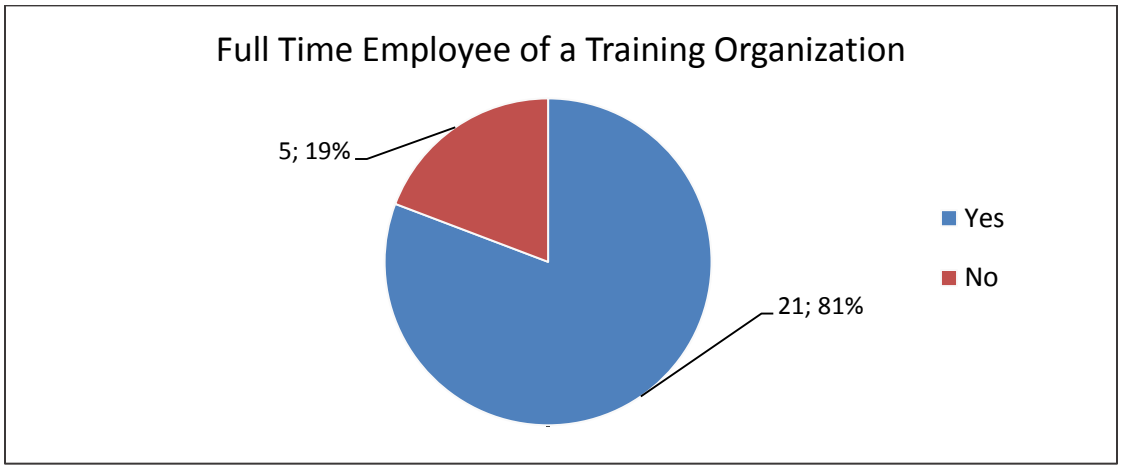

Figure 34. Full Time Employee of a Training Organization

In line with the selection criteria, all the respondents have developed more than one STP. Figure 35 shows that 89% (27%+62%) of the respondents have more than 3 years of experience in the Program, and the remaining 11% have been in the Program for 1 or 2 years.

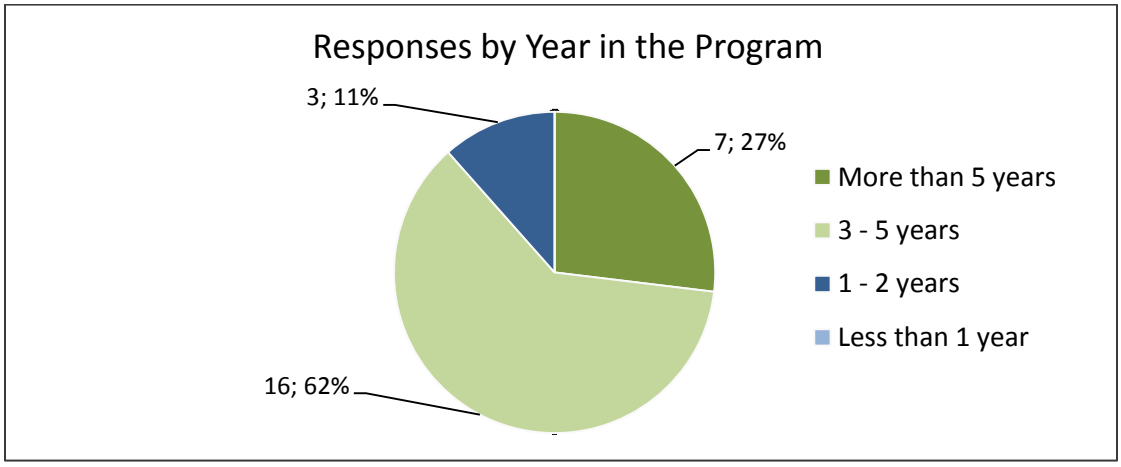

Figure 35. Responses by Year in the Program

With respect to the involvement in course development, figure 36 depicts the percentage of work time dedicated to course development: the columns show the percentage of respondents and the line depicts the percentage of work time. Only 31% (19%+12%) of the respondents dedicate more than 50% of their work time to course development, while 69% (27%+27%+15%) have less than 50% of their work time on course development. Looking into the data, there are two equally big columns indicated by 27% of respondents ("25-50%" and "less than 25%"), which pulls the mode and mean of the distribution somewhere in-between but definitely less than

50%. In addition, the range of the distribution is wide with the high end indicated by 19% of the respondents and the low end indicated by 15% of the respondents. The results reveal that currently 15% of qualified course developers are not involved in course development any more after having been trained and qualified.

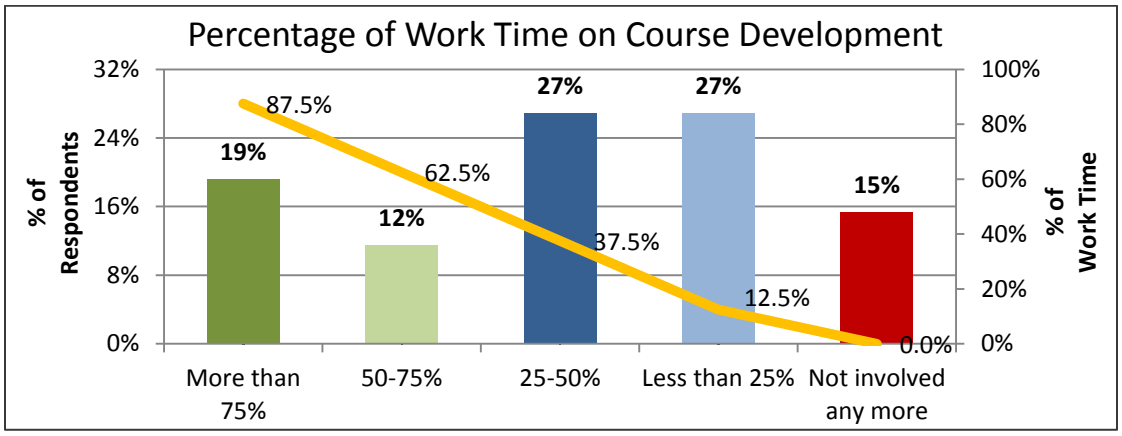

Figure 36. Percentage of Work Time on Course Development

Figure 37 depicts the number of courses developed by course developers, including STPs, CTPs and ITPs. It shows that only one qualified course developer has developed more than six STPs, four course developers have developed four or five STPs, nine course developers developed three STPs, ten course developers developed two STPs, and two course developers developed only one STP. Additionally, one course developer has developed one CTP, while the large majority (25 course developers) have not been involved in CTP development. Three course developers have developed one ITP, while 23 course developers not yet completed ITP. Considering course development is a teamwork and normally two or more course developers work on a course development project together, the total number of courses developed is much less than the arithmetic cumulative value of the course developers' individual data in the figure.

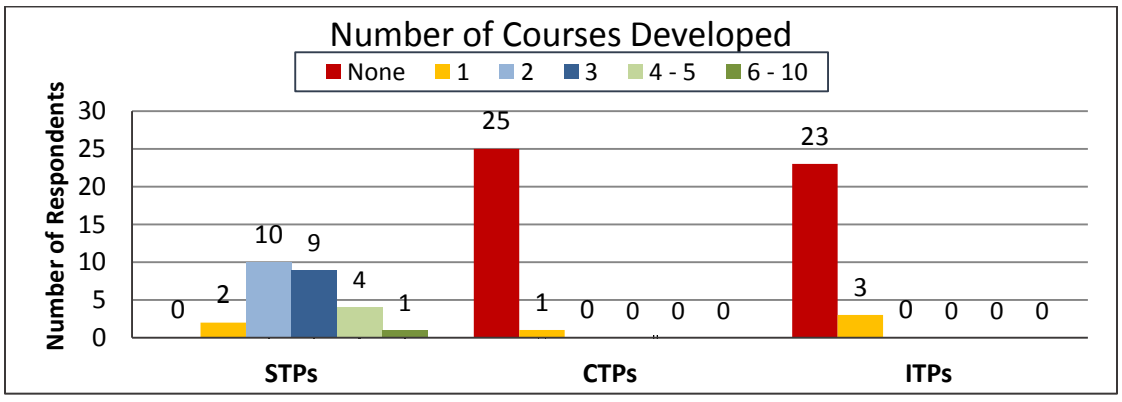

Figure 37. Number of Courses Developed

The competency-based training methodology is recognized as an effective tool for training standardization, which is not only required for the development of ICAO-recognized training courses (STPs, CTPs, and ITPs), but also applicable to other training courses developed by training organizations. To this end, training organizations are strongly recommended to apply the methodology to their own training courses in order to standardize the training course development activities, and consequently, to enhance the course quality and provide quality training to improve performance. Figure 38 shows that 62% of the respondents have applied the methodology to some training courses in their organization, and 38% of the respondents applied the methodology to STPs, CTPs and ITPs only. On one hand, no course developer has observed that the methodology is applied to all training courses in their organization. On the other hand, all qualified course developers have developed at least one STP, which means the methodology has been applied to at least one course in their organization.

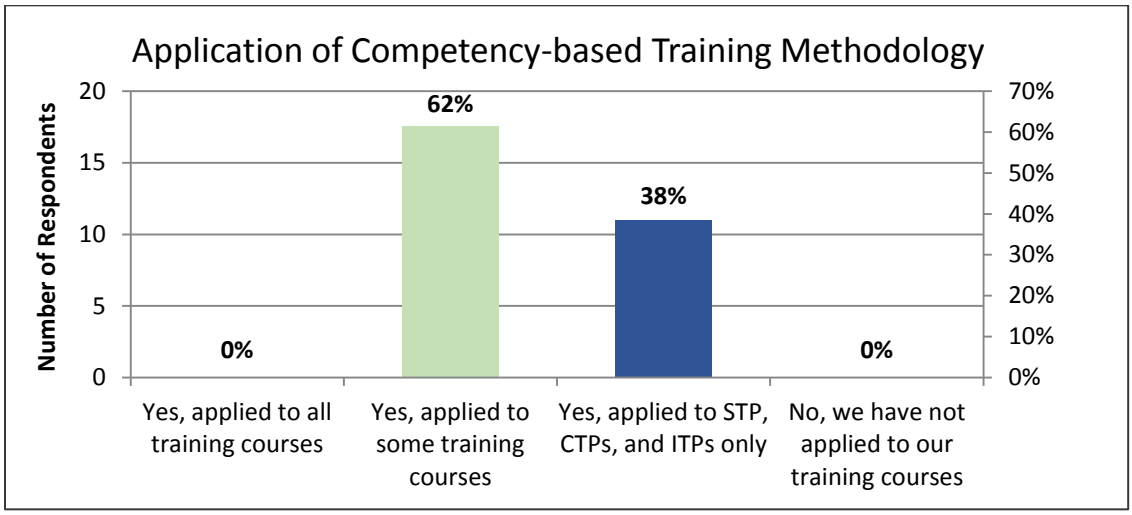

Figure 38. Application of Competency-based Training Methodology

With regard to the enhancement of course quality, as shown in figure 39, 23% of the respondents indicate that the quality of all training courses in their organization has been enhanced, 54% of the respondents indicate that the quality of some training courses has been enhanced, and 23% of respondents relate the enhancement to STPs, CTPs and ITPs only. The results reveal that the enhancement of course quality is well recognized by the respondents, however, it is perceived to different extent in different training organizations.

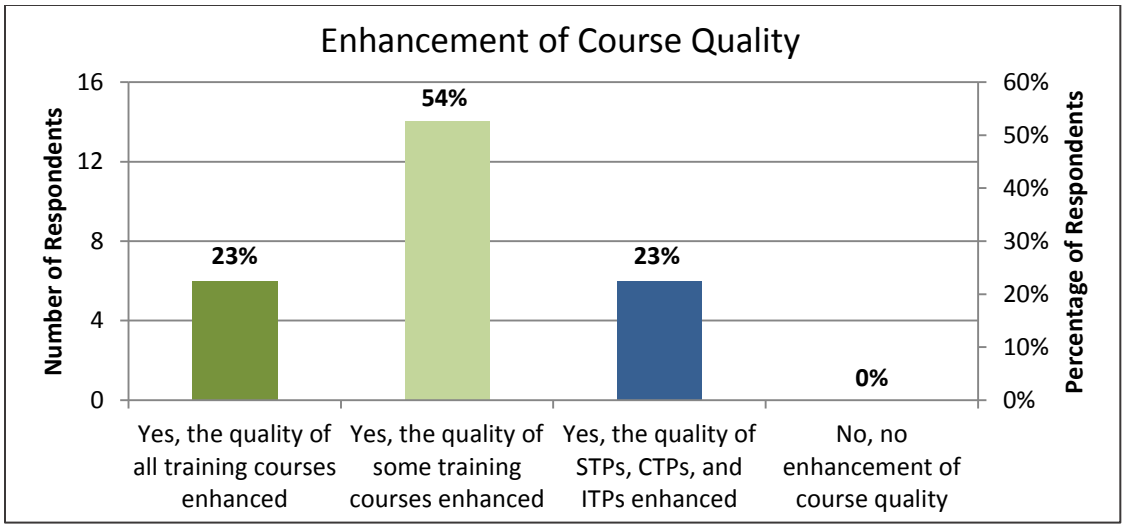

Figure 39. Enhancement of Course Quality

Since all qualified course developers have successfully developed at least one STP, they have real experience about the application of the competency-based training methodology and the collaboration with Subject Matter Experts and course validators throughout the STP development process via the TPEMS. Figure 40 shows the major challenges of STP development perceived by qualified course developers, with the bars representing the number of respondents and the line depicting the percentage of responses. As it is shown in the figure, the number one challenge is the unavailability of Subject Matter Experts as indicated by 38% of the respondents, followed by too long course development process (31%), insufficient management support (28%), limited budget (23%) and lack of qualified course developers (21%). One respondent also indicates that course developers are usually busy with other tasks.

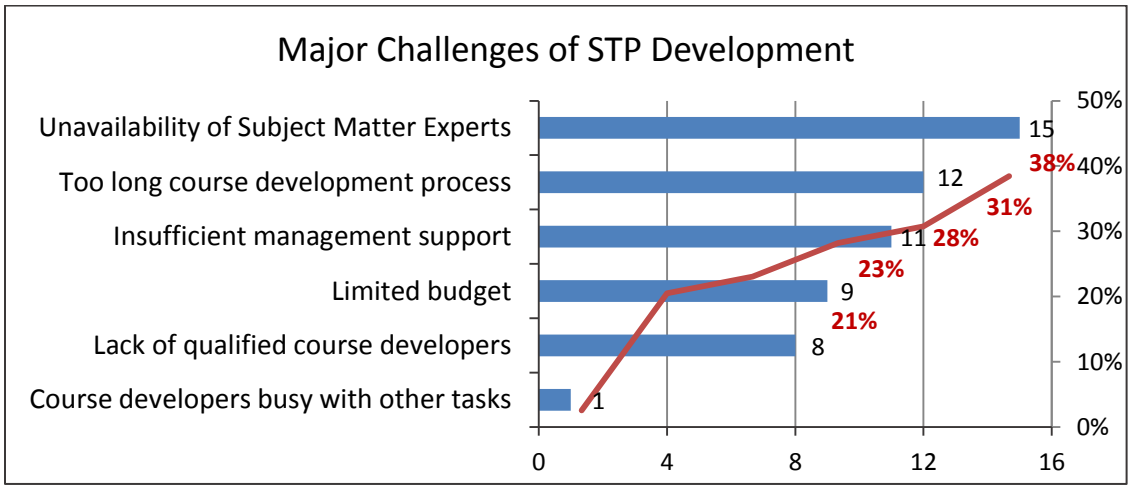

Figure 40. Major Challenges of STP Development

With respect to the perceived Program achievements, the perception of qualified course developers varies greatly. Figure 41 shows that, the perception of "more than 90%", "80-90%" and "70-79%" indicated by 31% of the respondents equally, while only 4% of the respondents indicate "60-69%" and another 4% indicate "less than 60%". In total, 62% (31%+31%) of the respondents indicate that the Program has achieved more than 80% of its objectives, while the rest 38% (31%+4%+4%) of respondents indicate that less than 80% of the Program objectives have been met. Although the range of the distribution is wide, the three big groups pull the mode and mean of the distribution to the high end. Obviously, the mode and mean are located somewhere in-between 80% and 89%.

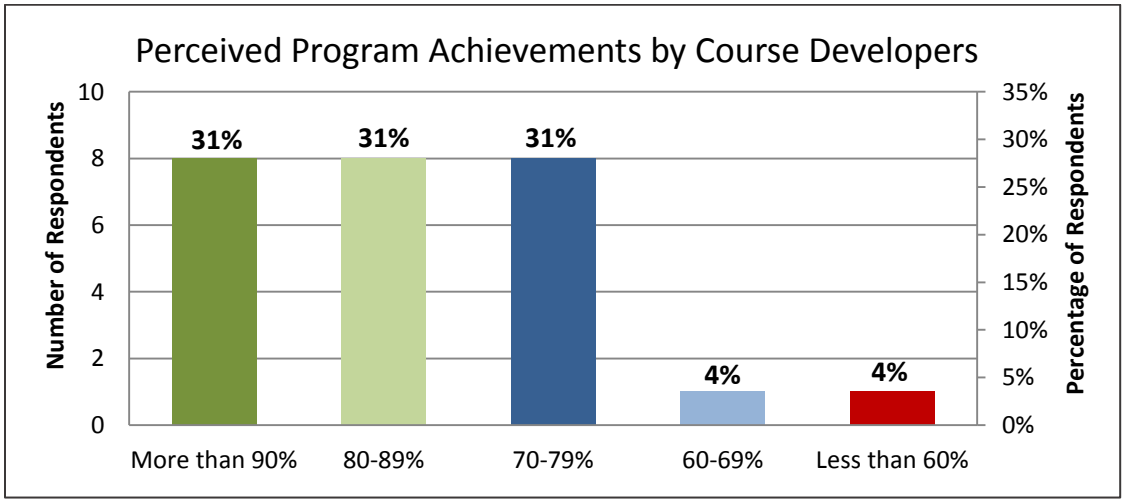

Figure 41. Perceived Program Achievements by Course Developers

Three additional open-ended questions were included in the survey to gather qualitative data and identify further improvements for the Program, from ICAO qualified course developers' perspective.

Although only 62% of the respondents perceive that the Program has achieved more than 80% of its objectives, 85% of them indicate that they would recommend the courses they developed to other training organizations due to the application of competency-based training methodology and the best practices provided by the Subject Matter Experts in the course material. Regarding how to ensure the quality of competency-based training courses, the key word is "methodology". Without a doubt, course developers value the competency-based training methodology and suggest to improve, streamline, and reinforce the methodology. With respect to the course development process in the TPEMS, another key word "automation" comes up since the current process is very rigorous, complicated and time consuming.

Following are examples of comments from the respondents that are transcribed verbatim:

- *Yes, I would recommend the competency-based training courses that we developed to other training organizations, for the following reasons:*
  1. *It is developed using the competency-based training methodology, the quality of the training can be guaranteed.*
  2. *It is based on and summarized from our best practice.*
  3. *For each STP, we paid full attention to the general applicability of the course content, to ensure that the course could be used in other CATCs as well.*
- *I would strongly recommend. Standardisation of training courses is a very good advantage for sharing them with other organisations.*
- *Yes, because this is the joint effort of our organization's experts, which summarizes the work experience and best practices in the past years.*
- *Yes. easy to deliver, easy to adapt to meet training requirements, very comprehensive.*
- *Keep improving the methodology of developing competency-based courses and help the course developers updated with the new methodology.*
- *Reinforcement of job analysis for target population. Regular updated and revised content by SME.*
- *Automate the course development process.*
- *Automatic formats that you have to fill once time and the common information like the STP information refill in the others formats.*
- *Easy Access. Be smart and make full use of the tangible data.*

Analysis of Survey to ICAO Course Validators

The survey questionnaire was sent to ICAO Course Validators who are qualified to validate the ICAO-recognized training courses through the TPEMS. This is a small group consisting of 17 training specialists in the ICAO training network. 12 course validators completed the online survey, representing a response rate of 71%.

As shown in figure 42, 42% (5 out of 12) of the respondents are full time employees of a training organization, while 58% (7 out of 12) of the respondents are freelancer.

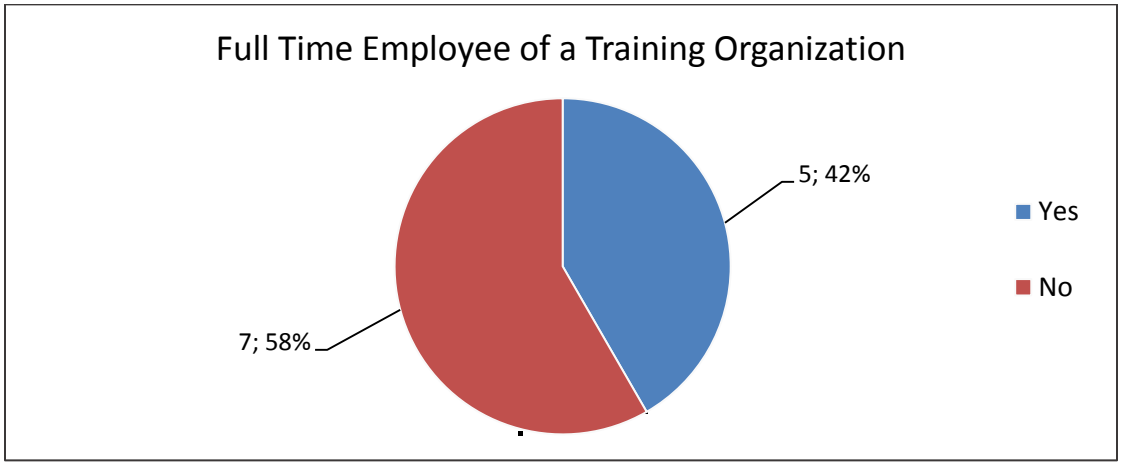

Figure 42. Full Time Employee of a Training Organization

Figure 43 shows the responses by ICAO region. The most responses are from NACC represented by 42% of the respondents, followed by ESAF (17%), EUR/NAT (17%), APAC (8%), MID (8%) and SAM (8%). But there is no respondent from WACAF.

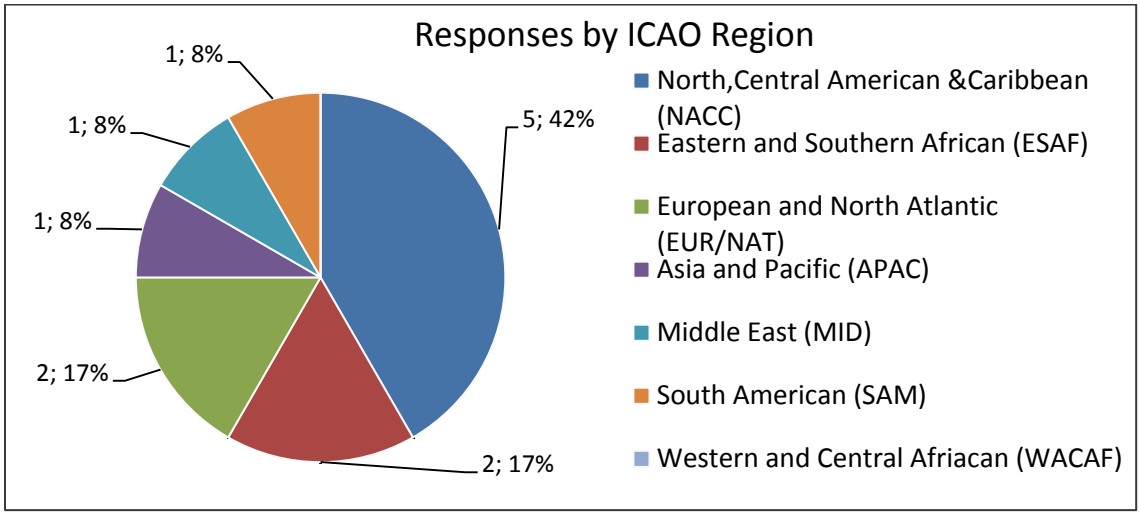

Figure 43. Responses by ICAO Region

With respect to the number of years in the Program, as shown in figure 44, in total, 84% (59%+25%) of the respondents have more than 3 years of experience with the Program, while 16% (8%+8%) of respondents have been in the Program for less than 3 years.

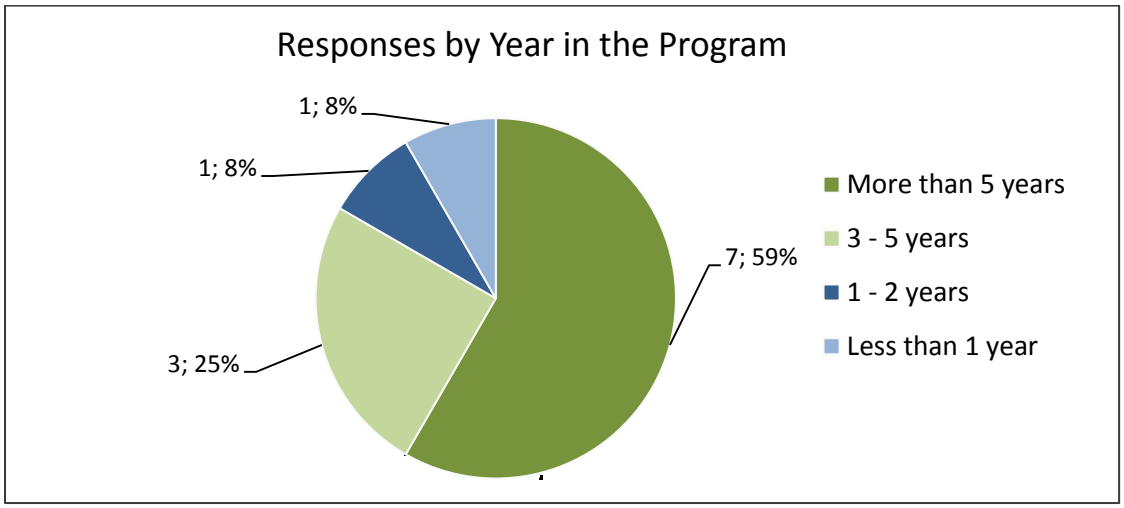

Figure 44. Responses by Year in the Program

Figure 45 shows the number of STPs validated by the course validators. Among these 12 respondents, 42% (25%+17%) of them have validated more than 6 STPs in the Program, and 50% have validated 2 to 5 STPs, and only one respondent validated one STP so far who was recently qualified as a course validator. The more STPs validated by a course validator, the more experience the validator has and the more valuable feedback will be obtained from the validator. To this end, the group of respondents are representatives of the ICAO course validators in terms of their experience with the Program.

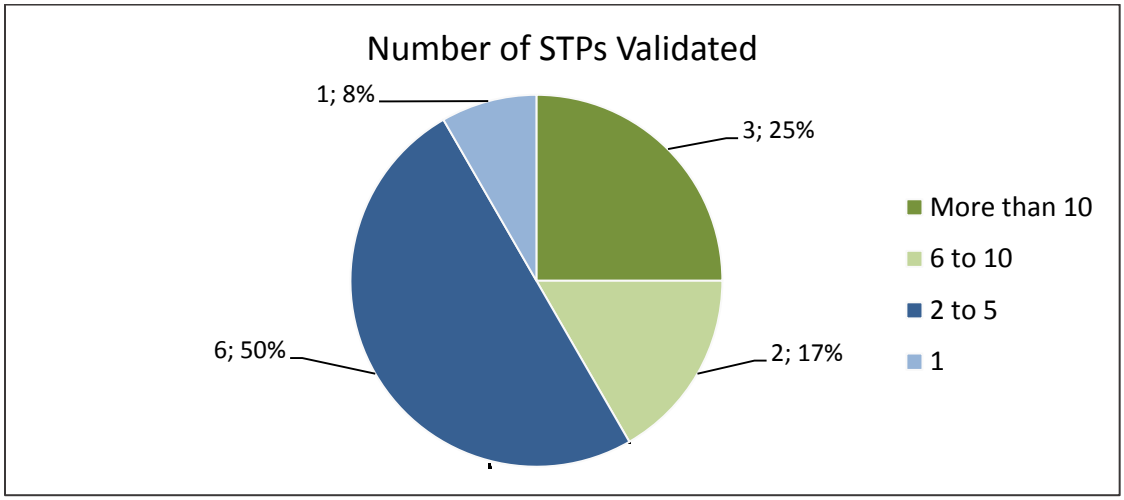

Figure 45. Number of STPs Validated

In the process of validating STPs, the course validator also provides On-the-Job Training (OJT) to new course developers when they participate in their first STP development and ensure they accumulate sufficient experience about the application of the competency-based training methodology to become qualified course developers. In this regard, the number of qualified course developers trained by a validator also reflect one of the major validator's activities. Consistently with the number of STPs validated indicated in figure 45, figure 46 shows that 50% (33%+17%) of the respondents have trained more than 10 qualified course developers, another 42% trained 5 to 10 qualified course developers, and one validator newly qualified last year has trained less than four qualified course developers with one STP validated.

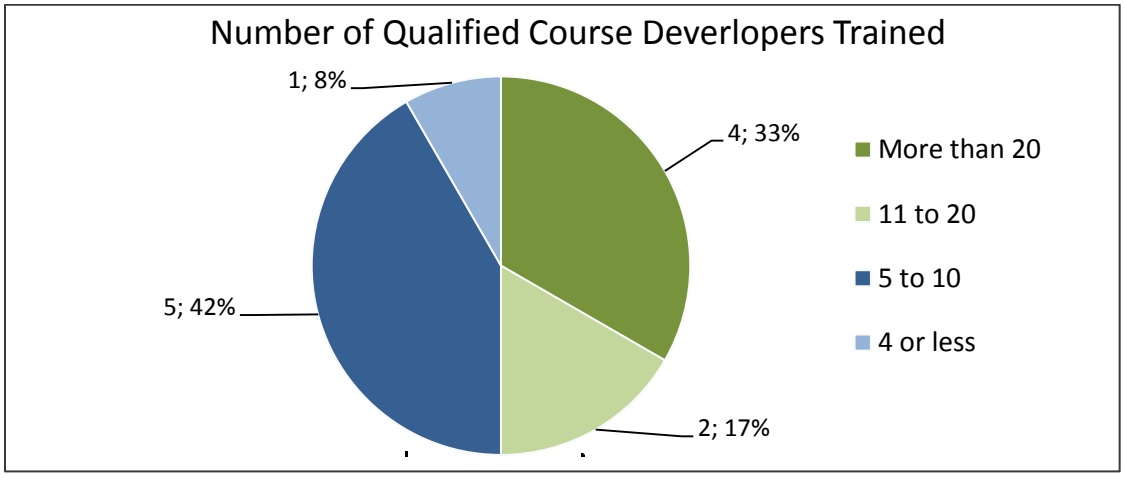

Figure 46. Number of Qualified Course Developers Trained

From the course validators' perspective, the major challenges of STP development are displayed in figure 47. Unavailability of Subject Matter Experts, limited budget and lack of qualified course developers weigh more in the validators' comments, indicated by 26%, 21% and 21% of respondents, respectively. Other two main factors are insufficient management support indicated by 18% of the respondents and too long course development process indicated by 15% of respondents. Some additional personal perceptions are also included in the figure, such as training specialist are not trained properly, no research and development planning, lack of clear understanding of the Program, and unclear management vision and planning.

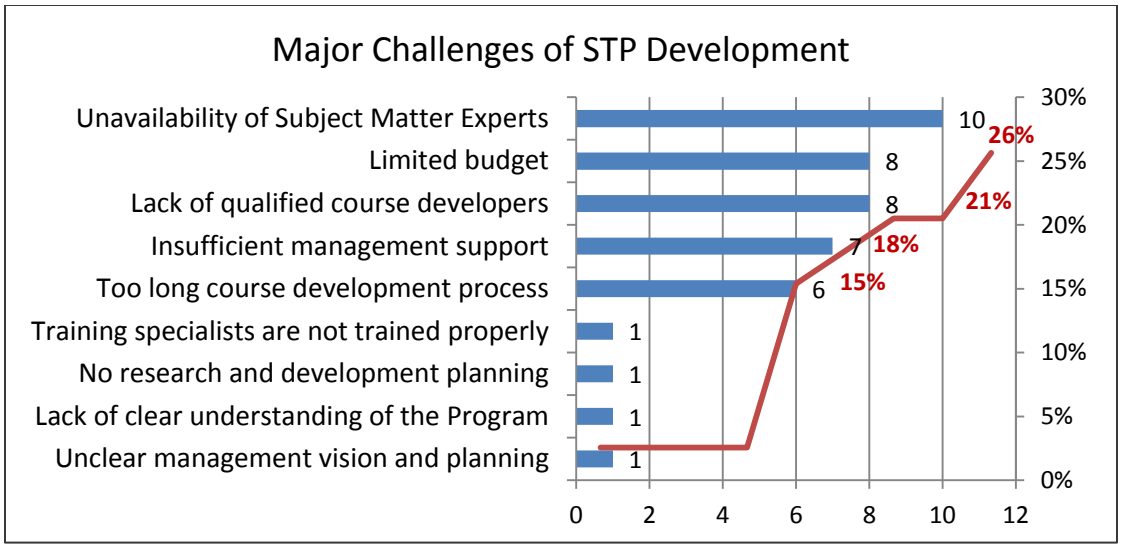

Figure 47. Major Challenges of STP Development

In terms of STP sharing, as shown in figure 48, all respondents indicate that either all or some of the training organizations that they worked with are interested in STP sharing, and the percentage is exactly 50 to 50.

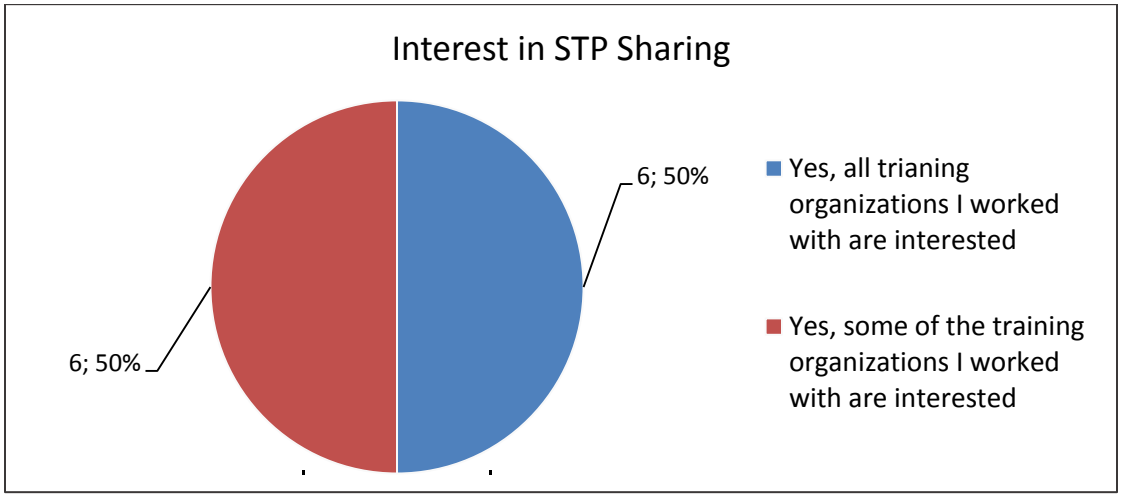

Figure 48. Interest in STP Sharing

With respect to the main reasons for low STP sharing, as shown in figure 49, the number one reason is that STPs require major adaptation in order to be shared indicated by 58% of the respondents, followed by lack of sufficient STP information in the TPEMS (50%), STPs do not meet local training needs (42%), STP delivery requirements are too high (42%) and no local instructors for the STP delivery (42%). Other than that, the Program Members need more guidance on STP sharing and current course promotion and marketing is inadequate are indicated by 17% of the respondents respectively. In addition, cost is a major factor hindering the STP

sharing is indicated by 8% of the respondents. Based on the comments from the course validators, there is potential improvement about STP sharing.

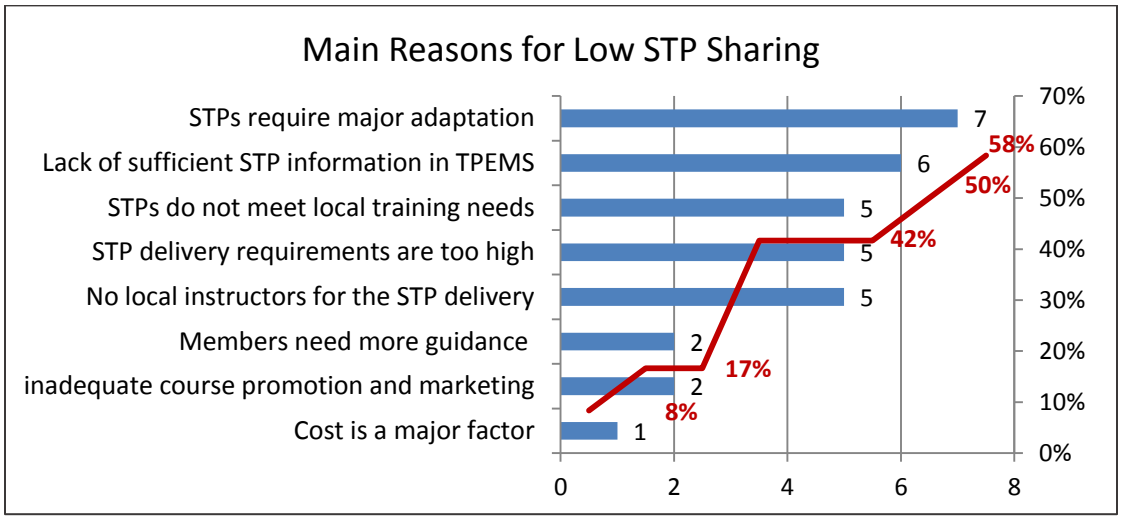

Figure 49. Main Reasons for Low STP Sharing

The perceived Program achievements by course validators are shown in figure 50. Overall, 75% (25%+50%) of the respondents perceive that the Program has achieved more than 80% of its objectives, while 25% (17%+8%) perceive that less than 80% of the Program objectives have been met. Looking into the data, obviously the range of the distribution is not too wide: the mode falls in the "80-89%", and the mean is pulled to the high end due to the 25% of respondents supporting "more than 90%".

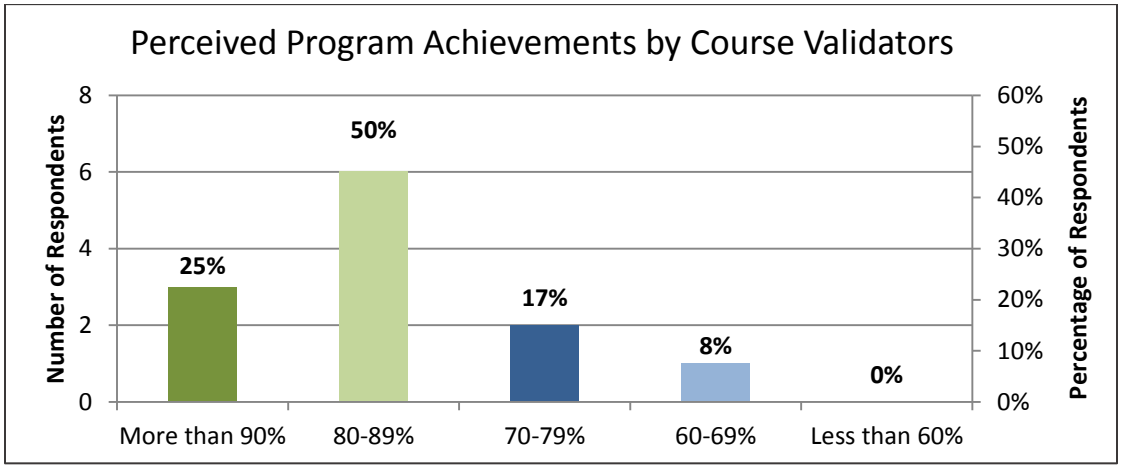

Figure 50. Perceived Program Achievements by Course Validators

Three additional open-ended questions were included in the survey to gather qualitative data and identify further improvements for the Program, from ICAO course validators' perspective.

Although only 75% of the respondents perceive that the Program has achieved more than 80% of its objectives, 92% of them would recommend the courses they validated to other training organizations, because fundamentally, competency-based training improves and harmonizes human performance at work. Regarding how to ensure the quality of competency-based training course, all the responses are around the competency-based training methodology. For example, to follow the methodology, update it and improve it. Respondents also comment that for the application of the methodology, it is important to establish the competency profile of posts, ensure the involvement of qualified course developers, qualified Subject Matter Experts and course validators. In this regard, management support can fully engage the course development team in a course development project. For TPEMS improvements, validators highly recommend automating the course development process using web-based application. Meanwhile, information sharing between the Program team and other stakeholders plays an important role to ensure the Program operations.

Following are examples of comments from the respondents that are transcribed verbatim:

- *I always recommend. All time I am trying to explain the benefits of this sharing possibility.*
- *Yes. I strongly believe that TPP courses (STPs, CTPs and ITPs) are the pillars to improve and harmonize human performance at work which is a key for operators business profitability, oversight obligations of regulators and most importantly ICAO mandate.*
- *Yes. The STPs are short, comprehensive and revenue sources.*
- *Follow TRAINAIR Plus methodology.*
- *Revise the TDG and the TDC to respond to IQCDs needs.*
- *Automating the process so as to ensure consistency and relief of workload.*
- *Develop and implement web-based tool that could help in Course development process ensuring full compliance of the methodology.*
- *Development of a web-based application with tutorials to support the entire TDG processes.*

Analysis of Survey to ICAO Instructors

The survey questionnaire was sent to ICAO Instructors who are qualified to teach the TRAINAIR PLUS training competency development courses. There are 31 instructors meeting the selection criteria and 25 of them responded to the questionnaire, representing a response rate of 81%.

With respect to the responses by ICAO region, figure 51 shows that the most responses are from NACC represented by 28% of the respondents, followed by EUR/NAT (16%), MID (16%), APAC (12%), ESAF (12%), WACAF (12%) and SAM (4%).

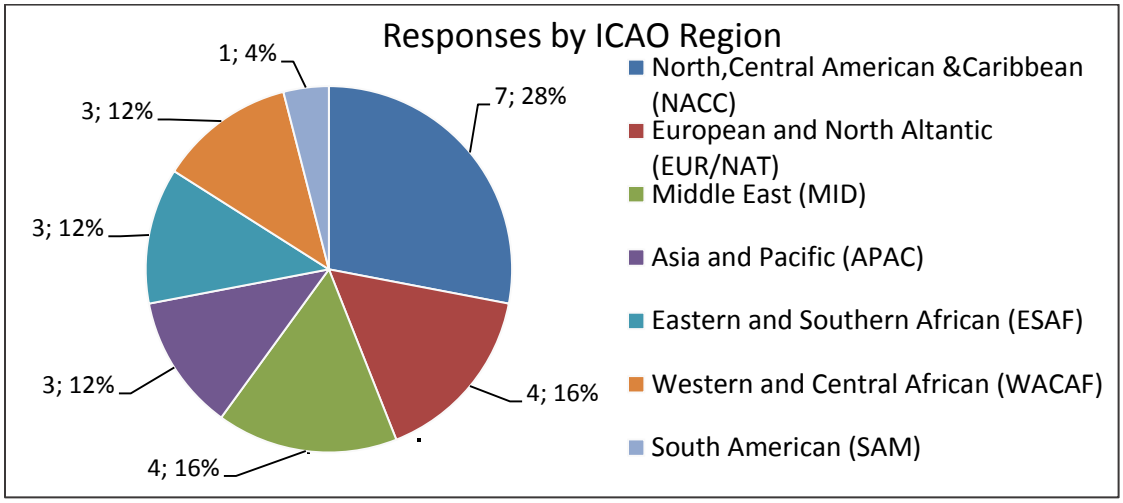

Figure 51. Responses by ICAO Region

As shown in figure 52, 64% (16 out of 25) of the respondents are full time employees of a training organization, while the rest 36% (9 out of 25) are freelancers. This responds to the Program policy, since the Program encourages the Members to train their in-house instructors for the purpose of capacity-building and reduction of the cost associated with course delivery. On the flip side, the fact that most instructors are full time employees of a training organization will limit the opportunities for those instructors to get release from their organization in order to travel to other organizations for course delivery.

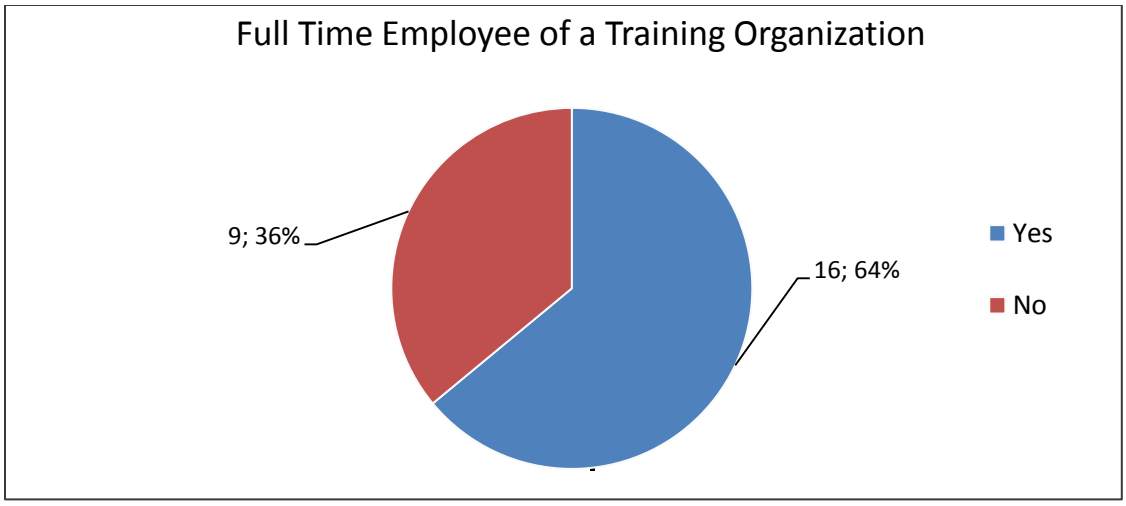

Figure 52. Full Time Employee of a Training Organization

According to the selection criteria, the respondents are from the group of ICAO instructors who are qualified to teach the Training Developers Course (TDC), Training Instructors Course (TIC) and Training Managers Course (TMC). Some of the instructors are qualified to teach several courses due to their specialised expertise and operational experience. As shown in figure 53, there are 16 respondents representing 76% of the total 21 TIC instructors, 16 respondents representing 80% of the total 20 TDC instructors, and 6 respondents representing 86% of the total 7 TMC instructors.

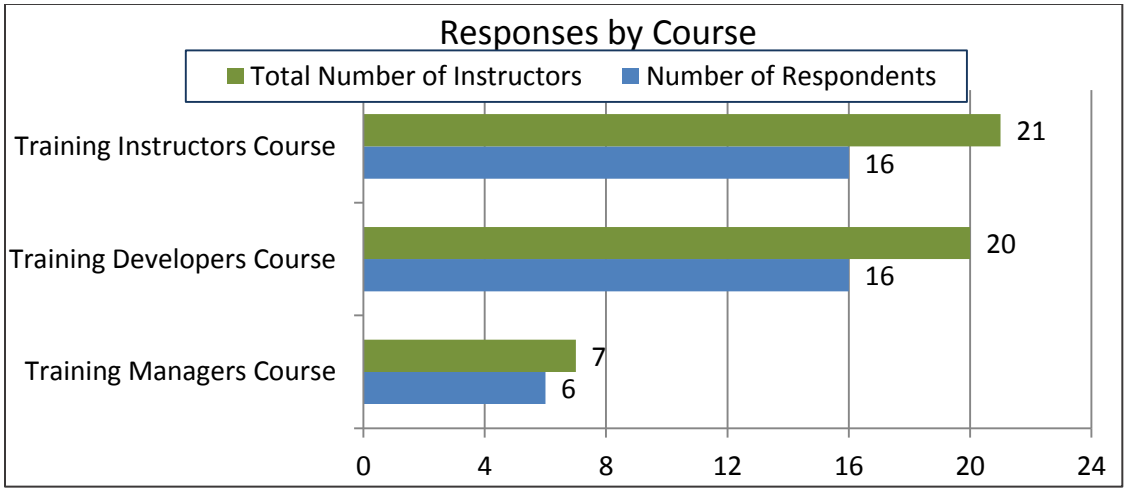

Figure 53. Responses by Course

Among this group of instructors, 68% (44%+24%) of respondents have more than three years of experience with the Program, and the rest 32% (20%+12%) of respondents have been in the Program for less than 3 years. Figure 54 shows that most of the respondents have rather long

experience in the Program and are more likely to provide more information about course delivery in their training organization and with other Members as well.

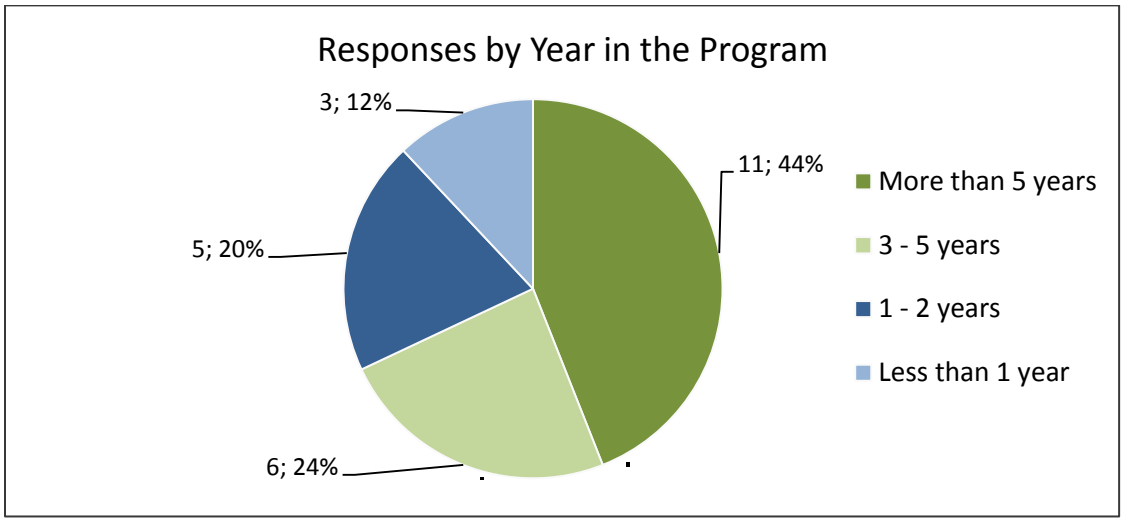

Figure 54. Responses by Year in the Program

Based on the working experience with the Program, 40% (24%+16%) of respondents have delivered more than 10 training sessions, while 12% delivered 6 to 10 sessions and 48% delivered 1 to 5 sessions only, as shown in figure 55.

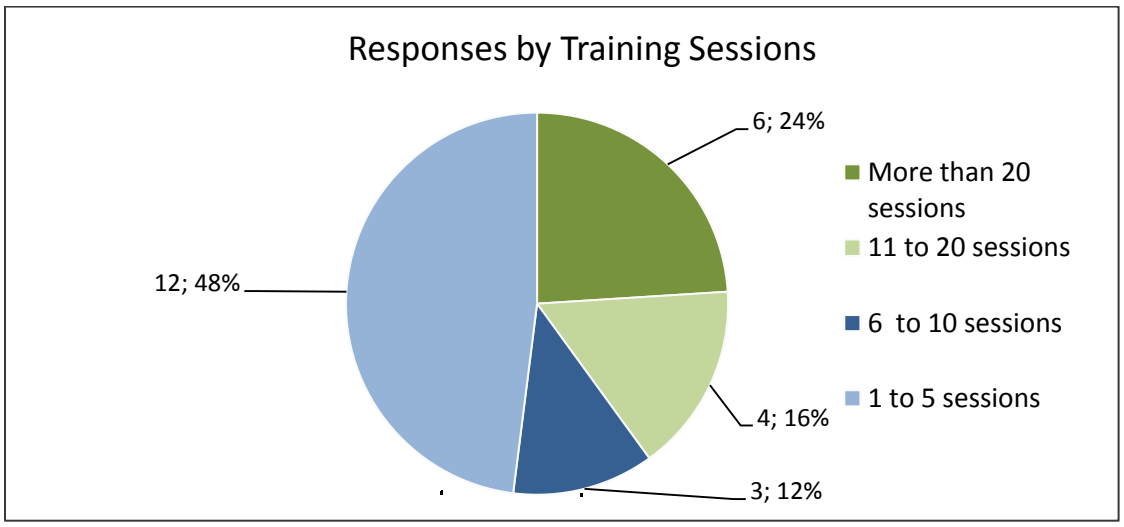

Figure 55. Responses by Year in the Program

In terms of course delivery activity, while 24% of instructors have a vast experience in course delivery and have delivery more than 20 sessions so far (figure 55), the total number of training sessions that ICAO instructors delivered is not high. Figure 56 shows the two major challenges indicated by instructors. The number one challenge is course cancellation and the next one is too few trainees in a class, which represents 52% and 32% of the respondents respectively.

Other challenges have low percentage of responses, including ineffective communication (12%), unstable internet connectivity (8%), poor quality of the course material (8%), too many trainees in a class (8%) and so forth.

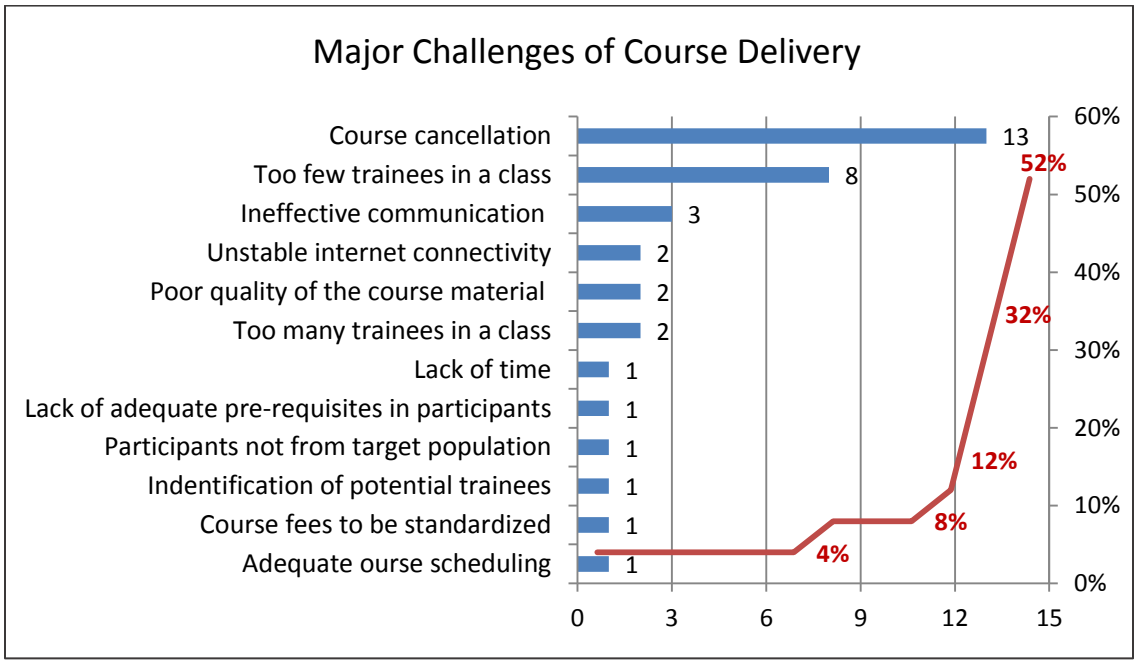

Figure 56. Major Challenges of Course Delivery

For course delivery, ICAO instructors are requested to use the TPEMS to download the latest version of the course material before the delivery of a course and upload the completed e-Report to the system after the delivery. Overall, 64% of the respondents perceive that there is sufficient information provided in the TPEMS. There are some occasions where individual instructors encountered some specific issues related to course delivery, as shown in figure 57.

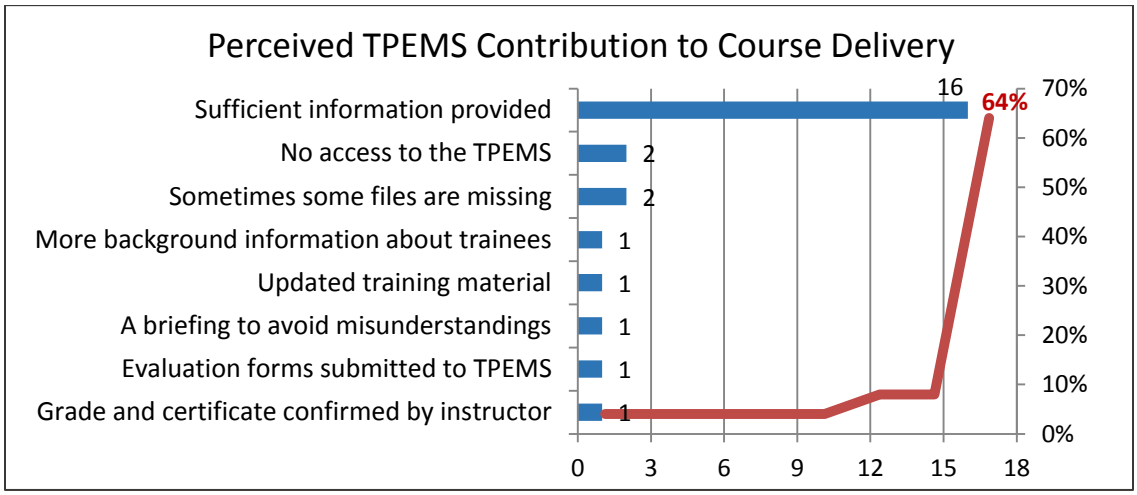

Figure 57. Perceived TPEMS Contribution to Course Delivery

With regard to the e-Report, 88% of the respondents indicate that necessary information is included in the e-Report. Figure 58 also shows that there are some areas to consider for the TPEMS enhancement regarding its effectiveness and user-friendliness.

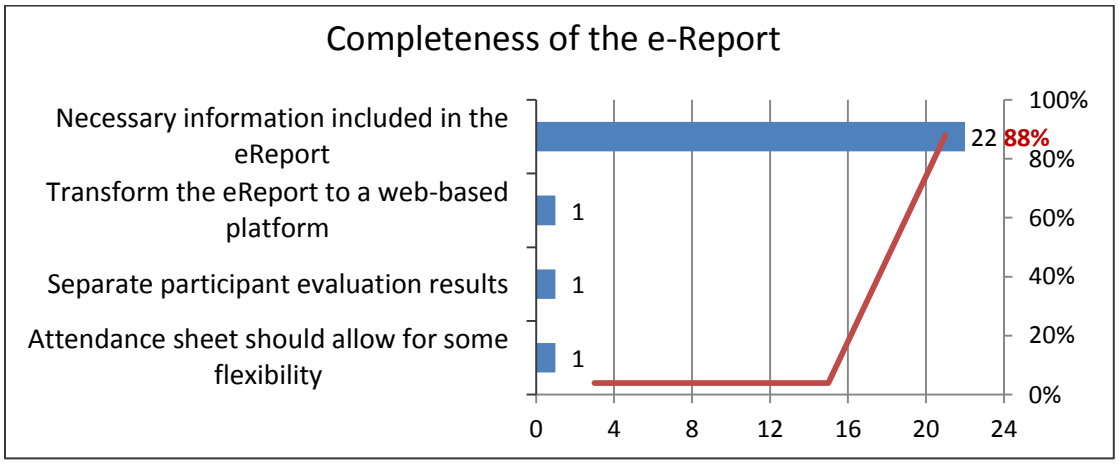

Figure 58. Completeness of the e-Report

With respect to the perceived Program achievements, as shown in figure 59, in total, 52% (24%+28%) of respondents perceive that the Program has achieved more than 80% of its objectives, while 48% (28%+16%+4%) of respondents perceive that less than 80% of the Program objectives have been met. The range of the data is fairly wide, with two equally big groups in the centre, both "80-89%" and "70-79%" supported by 28% of the respondents. Consequently, the mode of the distribution is located in-between "80-89%" and "70-79%", and the mean is pulled to the high end since "more than 90%" is supported by 24% of the respondents while "60-69%" and "less than 60%" are supported by 20% of the respondents at the low end.

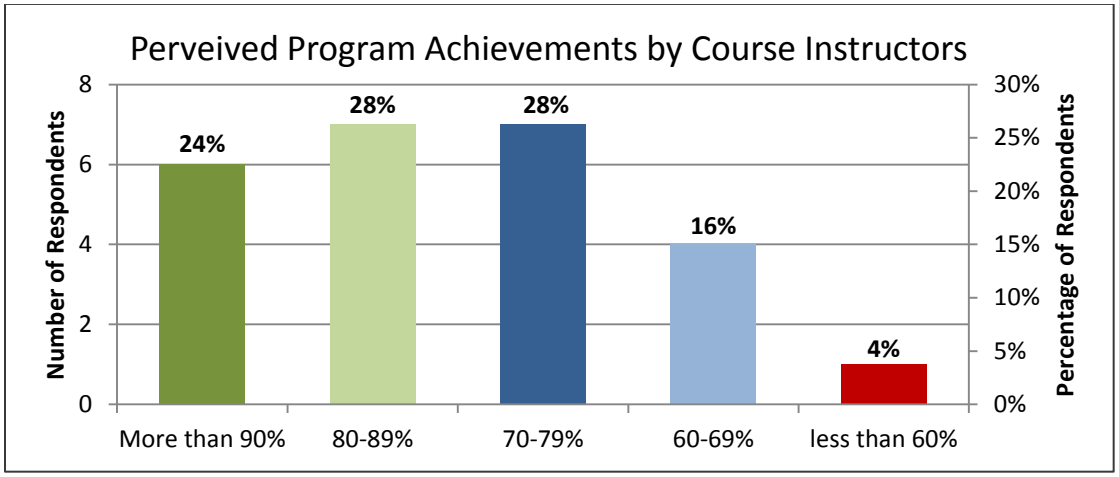

Figure 59. Perceived Program Achievements by Course Instructors

Three additional open-ended questions were included in the survey to gather qualitative data and identify further improvements for the Program, from ICAO instructors' perspective.

Although 52% of the respondents perceive that the Program has achieved more than 80% of its objectives, 84% of them would recommend the courses that they are qualified to teach to other training organizations. The reason is these courses comply with the ICAO competency-based training methodology for human performance improvement. Regarding how to ensure the quality of course delivery, update of course material is instructors' main focus, followed by instructor training, reinforcement of entry requirements for trainees, etc. Instructors also provided comments on how to increase the ICAO course delivery on a worldwide basis. The priority is course promotion and marketing, then the identification of training needs at a local/regional/global level. Cost-effectiveness is also a factor to be considered, in addition to the update of course material and instructor refresher training.

Following are examples of comments from the respondents that are transcribed verbatim:

- *Yes, training courses are the pillars of capacity building and human performance improvement.*
- *Yes, the two I can teach (TIC & TDC) should be taught to everybody. Not just persons wanting to be instructors or course developers but management, other employees and those who interface with training.*
- *TDC can be delivered in any organization providing aviation training. I recommend implementing some procedure allowed this course availability for all aviation training organization.*
- *Yes. TIC is absolutely a most for every instructor.*
- *Regular feedback from the instructors and trainees after the course delivery. Amendments and rectification based on the report in a timely manner. Current survey report will also be a good tool.*
- *ICAO Instructors to undergo training re-currency every two years.*
- *Screening of course participants.*
- *Program needs to be promoted more efficiently. ICAO publications, social medias such as LinkedIn, Facebook and Instagram should be employed by media specialists to introduce the program to the aviation world more effectively.*
- *More marketing and ensure high standard instructors.*

Aggregate Analysis

Looking across the four survey questionnaires to the Program Members, ICAO qualified course developers, ICAO course validators and ICAO instructors, aggregate analysis was conducted for both quantitative and qualitative data, and the overall survey results are presented as follows:

1. Quantitative Analysis

The response rates vary and are shown in figure 60. They are 44%, 51%, 71% and 81% for the survey questionnaires to the Program Members, qualified course developers, course validators, and instructors respectively. To sum up, 102 responses were received from the 188 potential participants which represents a total response rate of 54%. Figure 60 indicates for each category, the total number of potential participants, the number of respondents and the response rate in percentage.

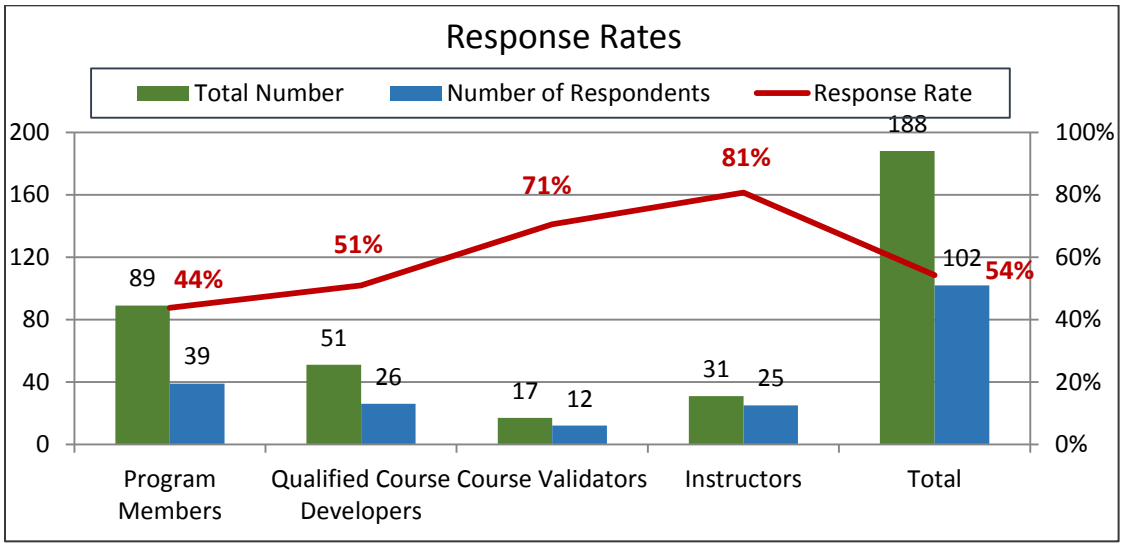

Figure 60. Response Rates

The purpose of this formative evaluation is to identify the current status of the Program and to determine recommendations for the Program improvements. Whether it is trustworthy to generalize conclusions from the survey results, it depends on to what extent, the respondents participating in the surveys are considered as a representative sample of the larger population.

In terms of geographical distribution, the respondents participating in the surveys are composed of representatives from the seven ICAO regions. However, the percentage of participation is different from one region to another, and also different between groups of the

respondents. As shown in figure 61, the respondents from APAC and NACC are relatively more than the respondents from other ICAO regions.

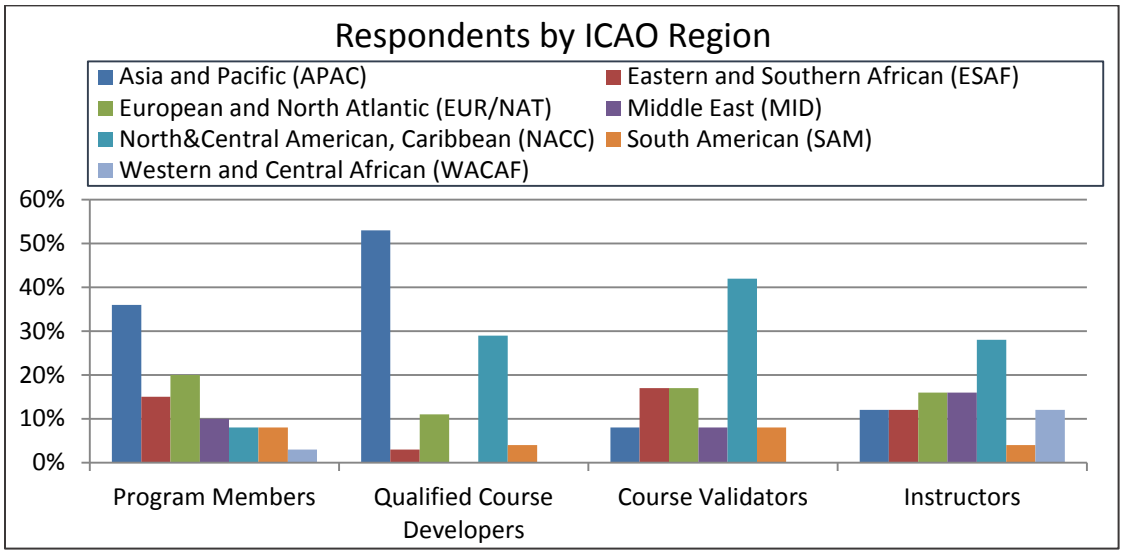

Figure 61. Respondents by ICAO Region

With respect to the respondents' experience with the Program, figure 62 shows that data are concentrated in the left two columns, which indicates that most of the respondents have been in the Program for more than three years. To be specific, 74% (28%+46%) of the respondents from the Program Members have more than three years of experience with the Program, 89% (27%+62%) from qualified course developers, 84% (59%+25%) from course validators, and 68% (44%+24%) from instructors. The longer experience the respondents have with the Program, the more likely they could represent for the population and provide sufficient and reliable opinion.

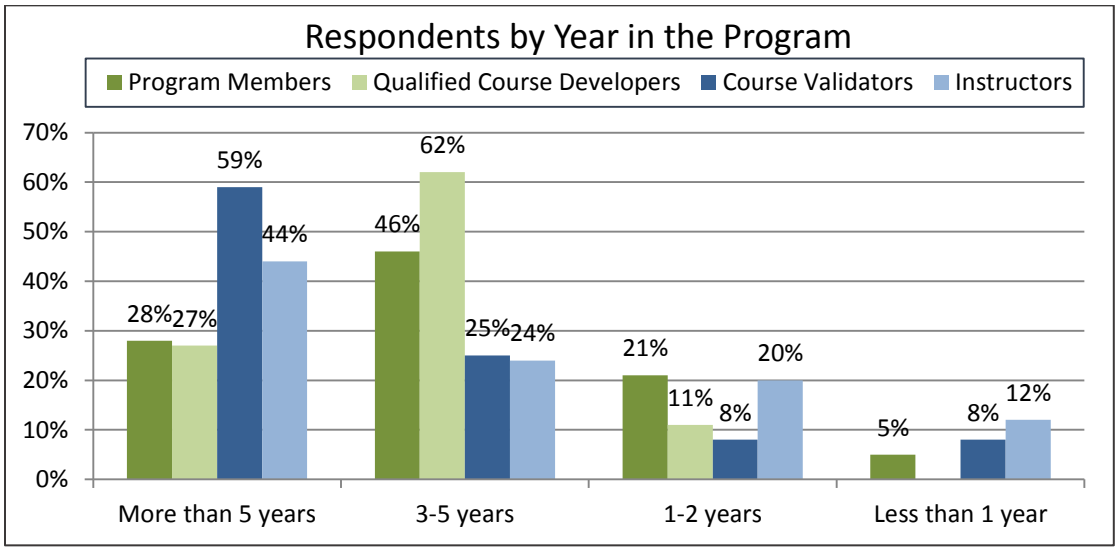

Figure 62. Respondents by Year in the Program

The Program achievements perceived by different groups of respondents are categorized into two clusters as shown in figure 63: more than 80% achievements and less than 80% achievements. The graph of figure 63 is therefore build into two sections, "More than 80% achievements " representing the percentage of respondents from the four categories that indicated they perceived the Program achievements at 80% or higher, while the section "Less than 80% achievements" representing the percentage of respondents who perceived that the Program achievements are below 80%. In general, the perception of the Program achievements by the respondents is at a moderate level, as the overall perception of more than 80% achievements is 58%. Comparatively speaking, course validators' perception about the Program achievements is the highest (75% of respondents indicated that the perceived Program achievements is 80% or higher) and the Program Members' perception is the lowest (44% of respondents indicated that the perceived Program achievements is 80% or higher). Although the range of the data is not so wide, there is more than 30% difference among the perceptions of different groups, which is logical because the responses are based on the roles of respondents and their expectations.

An ideal representation would indicate that the perceived favourable expectations (80% or more of perceived Program achievements) is reported by all groups at 80% minimum with an overall exceeding 80%. Therefore, recommendations to enhance the Program should aim achieving the goal of 80% of respondents indicating that the perceived Program achievement is 80% or higher.

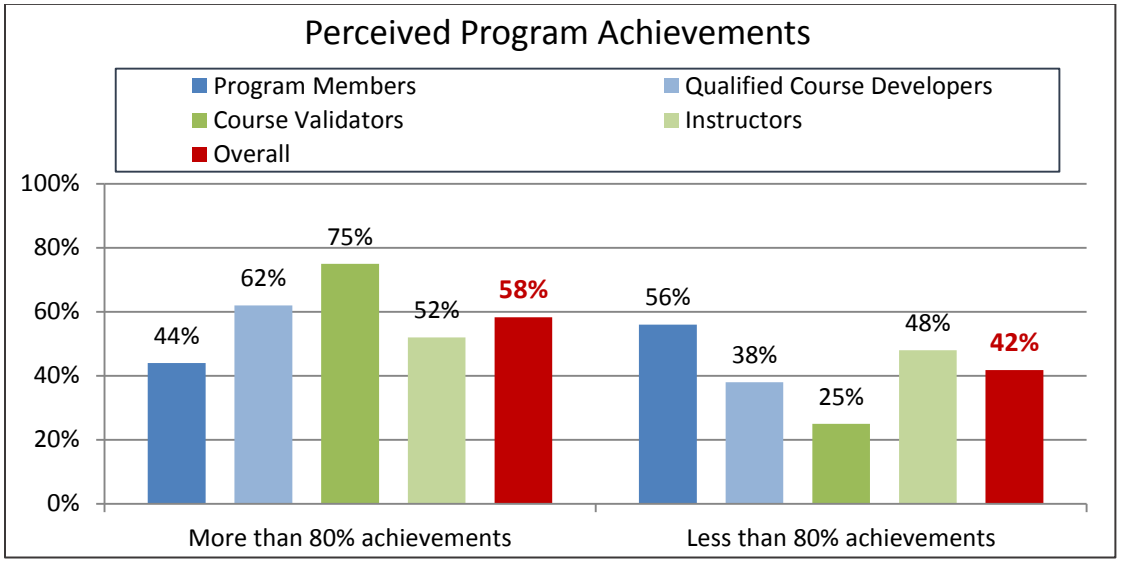

Figure 63. Perceived Program Achievements

2. Qualitative Analysis

Qualitative data collected from the respondents participating in the four surveys are also analysed for triangulation and generalization of the overall survey results. To this end, the top three opinions from different perspectives are selected and compared across groups of respondents in order to identify what are the common views and what are the priority levels associated with each point of view.

Regarding the major challenges of STP development, table 4 presents the summary of opinions received from the Program Members, qualified course developers and course validators. The challenges depend on the role of respondents but "Limit budget", "Unavailability of human resources such as SMEs and course developers" and "Lengthy course development process" are indicated by all groups.

	Top Challenge	Second Challenge	Third Challenge
Program Members	limited budget	too long course development process	lack of qualified course developers
Qualified Course Developers	unavailability of Subject Matter Experts	too long course development process	insufficient management support
Course Validators	unavailability of Subject Matter Experts	limited budget	lack of qualified course developers

Table 4. Major Challenges of STP Development

With respect to the major challenges of course delivery, table 5 summarizes the comments received from the Program Members and ICAO instructors, and shows that respondents are facing challenges of getting sufficient trainees for classroom courses:

	Top Challenge	Second Challenge	Third Challenge
Program Members	too few trainees in a class	course cancellation	budget constraints
Instructors	course cancellation	too few trainees in a class	Ineffective communication

Table 5. Major Challenges of Course Delivery

Regarding the sharing mechanism which is one of the pillars of the TRAINAIR PLUS Program, table 6 shows that the Program Members and course validators share similar opinions on the reasons for low STP sharing. STPs are developed by training organizations using their regulations and procedures, consequently, use by other organizations requires sometimes major adaptation.

	Top Reason	Second Reason	Third Reason
Program Members	STPs do not meet local training needs	STPs require major adaptation	delivery requirements cannot be met
Course Validators	STPs require major adaptation	lack of sufficient STP information in TPEMS	STPs do not meet local training needs

Table 6. Reasons for Low STP Sharing

In terms of TRAINAIR PLUS Electronic Management System (TPEMS), Program Members, qualified course developers, course validators and instructors play different roles in the TRAINAIR PLUS Program, and they have different access to the TPEMS according to their specific tasks. Based on their experience with the Program, their recommendations for the further improvements of the Program and the TPEMS are outlined in table 7.

	First recommendation	Second recommendation	Third recommendation
Program Members	review the cost associated with the Program	update the competency-based training methodology and simply the course development process in the TPEMS	enhance the Program promotion and collaboration between Members
Qualified Course Developers	improve and reinforce the competency-based training methodology	automate the course development process in the TPEMS	enhance the communication between Members and the Program team
Course Validators	update and improve the competency-based training methodology	automate the course development process in the TPEMS using web-based application	enhance the applicability of course material to other organizations
Instructors	update and revise course material timely	enhance instructor selection and training	improve course promotion and marketing

Table 7. Recommendations for the further improvements of the Program

Chapter 5 – Discussion and Conclusion

Recommendations

As discussed in Chapter 2, since its inception in 2010, the ICAO TRAINAIR PLUS Program has established a cooperative network of 89 civil aviation training organizations and three industry partners working together to develop and deliver ICAO-recognized training courses. 141 competency-based training courses have been developed by the Program Members and placed in the TPEMS course library for sharing in the Program network.

The purpose of this formative evaluation is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TPEMS contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program and the TPEMS. The overall survey results indicate that 58% of the respondents perceived that the Program has achieved more than 80% of its objectives (favourable perception) but 42% of the respondents perceived that less than 80% of the Program objectives have been met. An ideal situation would show that at least 80% of respondents have a favourable perception with respect to the achievements. Same results apply to each group of respondents, including the Program Member, ICAO qualified course developers, ICAO course validators and ICAO instructors. As discussed in Chapter 3, if more than 20% of respondents comment that the Program meets less than 80% of its prescribed objectives (unfavourable perception), interventions should be considered to address Program issues.

Based on the survey results, the current status of the Program where only 58% of overall respondents have a favourable perception and no group reaching 80% of favourable perception, thoughtful attention should be brought into the Program processes to enhance the Program achievements with more focus on Program objectives. To improve the Program achievements and its further development, recommendations derived from the survey results are summarized in two categories in the sequence of importance.

1. From the Management Perspective

1) Review the efficiency of the Program and associated costs

Since the Program is meant to create a cooperative network for capacity-building through training on a worldwide basis and in a cost-effective manner, the Program Members are expected to obtain substantial benefits from their membership and better return on investment. The survey results show that Members indeed observed tangible benefits from the Program, such as more

course developers trained, more instructors trained, more training courses developed and more training sessions delivered. However, 74% of the Members did not observe more revenue generated since joining the Program. In relation to the investment that the Members have made in the Program, the top concern of the Members is about the costs and return on investment. Members are the program's customers and their common views determine the direction of the Program development. Obviously, retaining current Members is as important as attracting new Members. In this respect, for the sustainability of the Program, it is recommended to review the program process to make them more cost effective, reduce costs associated with the Program and enhance generation of revenue for members.

2) Enhance collaboration between the Program Members

Sharing in the network is one of the key functions of the Program. Although 92% of the Program Members indicate that they are interested in STP sharing, 62% of the Members did not benefit from STP sharing. The reasons include the following: current STPs do not meet local training needs, STPs required major adaptation in order to meet local training needs, course delivery requirements are too high to be met, etc. The applicability of STPs to meet national, regional or global training needs rather than an individual Member's needs is the fundamental problem that the Members are facing. Survey results also show that 44% of the Members have not observed annual increase of trainees after joining the Program, and the average of annual increase is below 20% to the Members who observed annual increase of trainees. In this regard, it is suggested that in addition to STP sharing, Members may consider collaborating in a variety of training activities, such as joint course development, mobility of training specialists (course developers, course validators and instructors), cooperative course delivery and so forth.

3) Improve the Program promotion

The ICAO competency-based training methodology is the adaptation of the Instructional Systems Design (ISD) methodology in the aviation context. The methodology is not only for the development of ICAO-recognized training courses, Members are also encouraged to apply the methodology for the standardization of training courses in their organizations. In addition, the methodology is not only applicable to the Program Members, but also to the training of professionals in all aviation disciplines. As the survey results show, course cancellation is the top challenge of course delivery and ineffective course promotion is an impediment. In this respect, the Program promotion should not be limited to the Program network itself but should extend to

the general public through all kinds of social media, so that more participants can be enrolled in the competency-based training and consequently, work performance will be improved.

4) Improve the communication between all stakeholders

The Program is a cooperative network with all stakeholders' contributions and collaborations expected to achieve the Program objectives and yield to the Members financial returns. To support these achievements, it is important to share information effectively in the Program network. In particular, the Program has rapidly grown in recent years, and some of the Program policies and qualification requirements have evolved. Timely communication about the Program update will motivate the Members to strive for higher levels of involvement in the Program and to make more contributions to the network. This is beneficial to the Members themselves, and it will greatly contribute to the Program's achievements.

2. From the Training Perspective

1) Update the competency-based training methodology

The ICAO competency-based training methodology is detailed in the *Training Development Guide* (ICAO, 2011) which was published in 2011. Essentially, the methodology is a systematic and iterative process intended to ensure that a training program is more likely to address a meaningful goal, achieve objectives and serve the targeted audience. After six years of implementation, observations have been made that this is a traditional method and, in practice, greater emphasis should be placed on use of technology to enhance course development and delivery and reduce the time spent in documenting the course design and development processes. In fact, the more applicable, the more practical.

2) Automate the course development process using web-based application

Course development is the core activities of the Program and the course development process has been integrated within the TPEMS since 2013. The good point is the web-based process is accessible at any time in any place; however, the degree of automation needs to be further enhanced. For example, normally course material consists of dozens of files and its capacity is huge, and sometimes the same information has to been entered into the system many times. Automating the course development process in the TPEMS using a web-based application should greatly simplify the process and largely enhance its efficiency and use-friendliness.

3) Update course material in timely fashion

Training is an ongoing activity and a training course is not a book on a shelf but rather a live product with a life cycle aiming to produce competencies and enhance human performance at work. For ICAO courses, every instructor is required to complete a training e-report after each course delivery in order to archive the training records and collect the feedback. In this sense, there is sufficient information for the Program team to conduct analyses and consequently, decide whether course revision is required and when to make the necessary revisions. In addition, there is course content update with adoption of new ICAO provisions, amendment of some requirements, and introduction of new practices, processes and technology, etc. Timely updates of course material will keep pace with the real training needs and address the issues identified from the course delivery viewpoint. However, currently there is no specific requirements for major revisions of ICAO-recognized training courses (STP/CTP/ITP) taking into account the life cycle of courses and changes in regulations, procedures and technology.

4) Enhance instructors' training

Instructors are a core team for training, who should not only be the Subject Matter Experts in the subject area of the training course, but also master the use of instructional techniques. ICAO established the *Instructor Competency Framework* (ICAO, 2014) to standardize the instructional delivery, and the ICAO instructor qualification process covers the instructor candidate selection and initial training. However, instructors' initial training is only one step for their qualification and recurrent training is also important in view of the content update and technology advances. In addition, continuous monitoring of instructors' performance should be implemented within the TRAINAIR PLUS network to identify specific individual or group issues and solve them in a timely manner.

Limitations

Without a doubt, there are several limitations associated with this formative evaluation and future research might also be considered to this end.

First of all, the respondents participating in this study represent a relatively small group. This formative evaluation focused on one ICAO training program – TRAINAIR PLUS Program, therefore, the scope of the population is targeted towards those whom have working relationship with the Program and are able to provide feedback based on their real experience. Currently there are 89 training organizations in the Program network, but the population itself is not large compared to the number of training centres in the World. What's more, to some extent, the

sample of this study might not accurately represent the target population as a whole, since the total response rate to the survey questionnaires is about 54%. There are many factors affecting the response rate. The main reason is that all the surveys are not mandatory for participants to complete but up to an individual's decision. To maintain the survey as objective as possible, the researcher conducted the surveys by herself rather than on behalf of the Program team. In addition, the population is distributed all over the world; therefore the surveys were designed using Google Forms. However, the internet connectivity is not stable in Eastern Africa and the Google Forms are not accessible in some States in Asia Pacific, which further limits the sample of this study in terms of geographic coverage.

The second limitation is about the study instruments. Validity of instruments is vital for data collection in order to avoid over-reporting or under-reporting. Four different survey questionnaires were designed towards four groups of participants respectively, in order to gather feedback from different perspectives and make triangulation afterwards. However, some participants have multiple roles with the Program and different survey questionnaires may be answered by the same participants who are likely to mix their responses from different perspectives. As a result, some data may be distorted and may not accurately represent what is intended to measure. Although the role of each group of participants is highlighted in the instructions of each survey questionnaire, it is almost impossible to prevent merged responses from some participants. Since the population is comparatively small, to eliminate the participants with multiple roles with the Program may further decrease the sample size and the response rates. With respect to the reliability, it is important to maintain consistency in data collection procedure in order to make generalization over time. However, due to the unavailability to access Google Forms, editable survey questionnaires in word document were sent to some participants upon request, and subsequently answers were collected in order to have sufficient geographical representation.

Cultural differences also affect the credibility of data. The Program is typically located in multicultural environment and cultural characteristics of a particular participant may lead to different response to the survey questionnaire, although they may share similar experience with the Program. Looking into the individual responses, it is obvious that in general, the feedback from Asia and Pacific (APAC) region is overall higher than it from North American, Central

American and Caribbean (NACC) region. In this respect, the generalization might not equally reflect the feedback from participants with distinctive cultural background.

Last but not the least, trustworthiness of the data trend is questionable. Although recommendations are summarized from the data collected through the four surveys, they are largely limited to the sample who completed the survey questionnaires. The surveys are anonymous which provide respondents with the opportunity to respond freely. In addition, the responses to the qualitative open-ended questions are subject to an individual's opinion which may be biased because of their previous experience. Furthermore, since the sample is not guaranteed to be representative of the population, the data trend can only reflect the feedback from the sample and the generalization may or may not be applicable to the larger population.

To sum up, relevant recommendations from both management and training perspectives were presented based on the data collected through the four sets of online surveys. In response to the top concern of the Program Members, a special study is recommended to focus on the cost associated with the Program. Given the limitations aforementioned, future studies can be planned on a regular basis to ensure the Program achievements and improvements. Aligning with the Program triennium operating plan, a triennial study is suggested which is not so frequent but allows Members to accumulate certain experience with the Program. Also the study should encourage a higher ratio of sample participating in the study, and improve a representative sample who better represents for the larger population. As such, the credibility of data is enhanced and the generalization of data trend is more likely to be trustworthy.

Conclusions

As one of ICAO's leading training programs, the TRAINAIR PLUS Program achievements are remarkable with steady progress year by year since 2010. This formative evaluation was conducted after the Program has been implemented for seven years. The survey results confirm the Program acceptance (90% of the Program Members would recommend the Program to others) and the need for improvements since some serious concerns and challenges are shared by the Program Members, ICAO qualified course developers, ICAO course validators and ICAO instructors. Overall, 42% (more than 20%) of the respondents perceived that less than 80% of the Program objectives have been met. Therefore, interventions should be considered for the programme sustainability and development.

Recommendations resulting from the quantitative and qualitative data analysis can be summarized as follows:

1. From the Management Perspective:

1) Review the efficiency of the Program and associated costs;

2) Enhance collaboration between the Program Members;

3) Improve the Program promotion;

4) Improve the communication between all stakeholders;

2. From the Training Perspective:

1) Update the competency-based training methodology;

2) Automate the course development process using web-based application;

3) Update course material in timely fashion;

4) Enhance instructors' training.

The TRIANAIR PLUS Program needs some update based on the survey results and will be more successful through the joint efforts of all stakeholders.

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Appendix A – Invitation Message

Subject: Invitation to participate in an online survey of the ICAO TRAINAIR PLUS Program

Dear **TRAINAIR PLUS Member**,

This is Ms. Jie Huang (Annie) from the ICAO Global Aviation Training (GAT) office. I am currently working on my Master of Education thesis. The title of my study is *A Formative Evaluation of the ICAO TRAINAIR PLUS Program*, and I appreciate your assistance by responding to the online survey that will allow me gathering valuable information and opinion.

The purpose of this survey is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program.

The survey will take approximately **15 minutes** of your time to complete it.

Your answers will be completely anonymous and kept confidential. The results of the survey will be submitted to the TRAINAIR PLUS Program Manager and shared with the participants upon request.

To participate in this study, please click on this link and complete the online survey **by Monday, June 5th 2017:**
https://docs.google.com/forms/d/e/1FAIpQLSeXAQmHYP05EWcLO94G1GaYml-5bTRgnNC--YNE6i8uVGykFg/viewform

If you have any questions, or if you decide to discontinue your participation in this study at any point, please contact me at HuangJie@icao.int before June 15th 2017.

Thank you very much for your time!

Annie
Ms. Jie Huang
Master of Education (candidate)
Department of Education
Concordia University

Appendix A – Invitation Message

Subject: Invitation to participate in an online survey of the ICAO TRAINAIR PLUS Program

Dear **ICAO Qualified Course Developer**,

This is Ms. Jie Huang (Annie) from the ICAO Global Aviation Training (GAT) office. I am currently working on my Master of Education thesis. The title of my study is *A Formative Evaluation of the ICAO TRAINAIR PLUS Program*, and I appreciate your assistance by responding to the online survey that will allow me gathering valuable information and opinion.

The purpose of this survey is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program.

The survey will take approximately **10 minutes** of your time to complete it.

Your answers will be completely anonymous and kept confidential. The results of the survey will be submitted to the TRAINAIR PLUS Program Manager and shared with the participants upon request.

To participate in this study, please click on this link and complete the online survey **by Tuesday, June 6th 2017:**
https://docs.google.com/forms/d/e/1FAIpQLScq5CufRSrOIHOHlRKQ-45XHbQlKGKwU3F47ThGcwTiL2LMMw/viewform.

If you have any questions, or if you decide to discontinue your participation in this study at any point, please contact me at HuangJie@icao.int before June 15th 2017.

Thank you very much for your time!

Annie
Ms. Jie Huang
Master of Education (candidate)
Department of Education
Concordia University

Appendix A – Invitation Message

Subject: Invitation to participate in an online survey of the ICAO TRAINAIR PLUS Program

Dear **ICAO Course Validator**,

This is Ms. Jie Huang (Annie) from the ICAO Global Aviation Training (GAT) office. I am currently working on my Master of Education thesis. The title of my study is *A Formative Evaluation of the ICAO TRAINAIR PLUS Program*, and I appreciate your assistance by responding to the online survey that will allow me gathering valuable information and opinion.

The purpose of this survey is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program.

The survey will take approximately **10 minutes** of your time to complete it.

Your answers will be completely anonymous and kept confidential. The results of the survey will be submitted to the TRAINAIR PLUS Program Manager and shared with the participants upon request.

To participate in this study, please click on this link and complete the online survey **by Tuesday, June 6th 2017:**
https://docs.google.com/forms/d/e/1FAIpQLSc2Kws9ziX1jFqXfBWT9D5KHM13svWmOPMcxrmKg2ZqNbS3Fw/viewform.

If you have any questions, or if you decide to discontinue your participation in this study at any point, please contact me at HuangJie@icao.int before June 15th 2017.

Thank you very much for your time!

Annie
Ms. Jie Huang
Master of Education (candidate)
Department of Education
Concordia University

Appendix A – Invitation Message

Subject: Invitation to participate in an online survey of the ICAO TRAINAIR PLUS Program

Dear **ICAO Instructor**,

This is Ms. Jie Huang (Annie) from the ICAO Global Aviation Training (GAT) office. I am currently working on my Master of Education thesis. The title of my study is *A Formative Evaluation of the ICAO TRAINAIR PLUS Program*, and I appreciate your assistance by responding to the online survey that will allow me gathering valuable information and opinion.

The purpose of this survey is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program.

The survey will take approximately **10 minutes** of your time to complete it.

Your answers will be completely anonymous and kept confidential. The results of the survey will be submitted to the TRAINAIR PLUS Program Manager and shared with the participants upon request.

To participate in this study, please click on this link and complete the online survey **by Tuesday, June 6th 2017:**
https://docs.google.com/forms/d/e/1FAIpQLSf5hkA1uN4V4S9wbhMFaiGTGBUyPRQ-QOTV2b1naWIGslZ4kA/viewform

If you have any questions, or if you decide to discontinue your participation in this study at any point, please contact me at HuangJie@icao.int before June 15th 2017.

Thank you very much for your time!

Annie
Ms. Jie Huang
Master of Education (candidate)
Department of Education
Concordia University

Appendix B – Information and Consent to Participate in a Research Study

To: TRAINAIR PLUS Members

Study Title: A Formative Evaluation of the ICAO TRAINAIR PLUS Program

Researcher: Ms. Jie Huang (Annie)
Researcher's Contact Information:
HuangJie@icao.int | Tel: 514-954-8219, ext. 6483 | Global Aviation Training Office, ICAO
Faculty Supervisor: Dr. Steven Shaw
Faculty Supervisor's Contact Information:
steven.shaw@concordia.ca | Tel: 514-848-2424, ext.2044 | Department of Education, Concordia University

To participate in this study, please kindly read the following information:

Purpose:
The ICAO TRAINAIR PLUS Program is a global cooperative network of civil aviation training organizations and industry partners working together to develop and deliver competency-based training courses (Ref: ICAO Electronic Bulletin 2014/73).

The purpose of this survey is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program.

Procedure:
Your participation does not go beyond completing the online survey. The survey will be open until **Monday, June 5th 2017**, it will take approximately **15 minutes** of your time to complete it.

Risks and Benefits:
There are no risks associated with you participating in this study. The results of the survey will be submitted to the TRAINAIR PLUS Program Manager and shared with the participants upon request.

Confidentiality:
Your answers will be completely anonymous and kept confidential.

Conditions of Participation:
If you have any questions, or if you decide to discontinue your participation in this study at any point, please contact the researcher at HuangJie@icao.int before June 15th 2017.

Participant's Declaration (please check the box below to start):
☐ I agree to participate in this study entitled "A Formative Evaluation of the ICAO TRAINAIR PLUS Program".

Instructions:
When responding to the survey questionnaire, please select options that correspond best to your opinion, you also have the possibility to provide comments if any.

Thank you for your time!

Appendix B – Information and Consent to Participate in a Research Study

To: ICAO Qualified Course Developers

Study Title: A Formative Evaluation of the ICAO TRAINAIR PLUS Program

Researcher: Ms. Jie Huang (Annie)
Researcher's Contact Information:
HuangJie@icao.int | Tel: 514-954-8219, ext. 6483 | Global Aviation Training Office, ICAO
Faculty Supervisor: Dr. Steven Shaw
Faculty Supervisor's Contact Information:
steven.shaw@concordia.ca | Tel: 514-848-2424, ext.2044 | Department of Education, Concordia University

To participate in this study, please kindly read the following information:

Purpose:
The ICAO TRAINAIR PLUS Program is a global cooperative network of civil aviation training organizations and industry partners working together to develop and deliver competency-based training courses (Ref: ICAO Electronic Bulletin 2014/73).

The purpose of this survey is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program.

Procedure:
Your participation does not go beyond completing the online survey. The survey will be open until **Tuesday, June 6th 2017**, it will take approximately **10 minutes** of your time to complete it.

Risks and Benefits:
There are no risks associated with you participating in this study. The results of the survey will be submitted to the TRAINAIR PLUS Program Manager and shared with the participants upon request.

Confidentiality:
Your answers will be completely anonymous and kept confidential.

Conditions of Participation:
If you have any questions, or if you decide to discontinue your participation in this study at any point, please contact the researcher at HuangJie@icao.int before June 15th 2017.

Participant's Declaration (please check the box below to start):
☐ I agree to participate in this study entitled "A Formative Evaluation of the ICAO TRAINAIR PLUS Program".

Instructions:
When responding to the survey questionnaire, please select options that correspond best to your opinion from your perspective as an ICAO qualified course developer, you also have the possibility to provide comments if any.

Thank you for your time!

Appendix B – Information and Consent to Participate in a Research Study

To: ICAO Course Validators

Study Title: A Formative Evaluation of the ICAO TRAINAIR PLUS Program

Researcher: Ms. Jie Huang (Annie)
Researcher's Contact Information:
HuangJie@icao.int | Tel: 514-954-8219, ext. 6483 | Global Aviation Training Office, ICAO
Faculty Supervisor: Dr. Steven Shaw
Faculty Supervisor's Contact Information:
steven.shaw@concordia.ca | Tel: 514-848-2424, ext.2044 | Department of Education, Concordia University

To participate in this study, please kindly read the following information:

Purpose:
The ICAO TRAINAIR PLUS Program is a global cooperative network of civil aviation training organizations and industry partners working together to develop and deliver competency-based training courses (Ref: ICAO Electronic Bulletin 2014/73).

The purpose of this survey is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program.

Procedure:
Your participation does not go beyond completing the online survey. The survey will be open until **Tuesday, June 6th 2017**, it will take approximately **10 minutes** of your time to complete it.

Risks and Benefits:
There are no risks associated with you participating in this study. The results of the survey will be submitted to the TRAINAIR PLUS Program Manager and shared with the participants upon request.

Confidentiality:
Your answers will be completely anonymous and kept confidential.

Conditions of Participation:
If you have any questions, or if you decide to discontinue your participation in this study at any point, please contact the researcher at HuangJie@icao.int before June 15th 2017.

Participant's Declaration (please check the box below to start):
☐ I agree to participate in this study entitled "A Formative Evaluation of the ICAO TRAINAIR PLUS Program".

Instructions:
When responding to the survey questionnaire, please select options that correspond best to your opinion from your perspective as an ICAO course validator, you also have the possibility to provide comments if any.

Thank you for your time!

Appendix B – Information and Consent to Participate in a Research Study

To: ICAO Course Instructors

Study Title: A Formative Evaluation of the ICAO TRAINAIR PLUS Program

Researcher: Ms. Jie Huang (Annie)
Researcher's Contact Information:
HuangJie@icao.int | Tel: 514-954-8219, ext. 6483 | Global Aviation Training Office, ICAO
Faculty Supervisor: Dr. Steven Shaw
Faculty Supervisor's Contact Information:
steven.shaw@concordia.ca | Tel: 514-848-2424, ext.2044 | Department of Education, Concordia University

To participate in this study, please kindly read the following information:

Purpose:
The ICAO TRAINAIR PLUS Program is a global cooperative network of civil aviation training organizations and industry partners working together to develop and deliver competency-based training courses (Ref: ICAO Electronic Bulletin 2014/73).

The purpose of this survey is to study how the TRAINAIR PLUS Program meets its prescribed objectives, how the TRAINAIR PLUS Electronic Management System (TPEMS) contributes to the achievements of the Program objectives, and consequently, determine potential improvements of the Program.

Procedure:
Your participation does not go beyond completing the online survey. The survey will be open until **Tuesday, June 6th 2017**, it will take approximately **10 minutes** of your time to complete it.

Risks and Benefits:
There are no risks associated with you participating in this study. The results of the survey will be submitted to the TRAINAIR PLUS Program Manager and shared with the participants upon request.

Confidentiality:
Your answers will be completely anonymous and kept confidential.

Conditions of Participation:
If you have any questions, or if you decide to discontinue your participation in this study at any point, please contact the researcher at HuangJie@icao.int before June 15th 2017.

Participant's Declaration (please check the box below to start):
☐ I agree to participate in this study entitled "A Formative Evaluation of the ICAO TRAINAIR PLUS Program".

Instructions:
When responding to the survey questionnaire, please select options that correspond best to your opinion from your perspective as an ICAO instructor, you also have the possibility to provide comments if any.

Thank you for your time!

Appendix C – Online Survey to TRAINAIR PLUS Members

Section A: Demographic Information

1. Please select the ICAO region where you are:
   - ☐ Asia and Pacific (APAC)
   - ☐ Eastern and Southern African (ESAF)
   - ☐ European and North Atlantic (EUR/NAT)
   - ☐ Middle East (MID)
   - ☐ North American, Central American and Caribbean (NACC)
   - ☐ South American (SAM)
   - ☐ Western and Central African (WACAF)

2. Please select your membership status with the TRAINAIR PLUS Program:
   - ☐ Regional Training Centre of Excellence (RTCE)
   - ☐ Full Member
   - ☐ Associate Member

3. Please select the training scope of your organization (select all that apply):
   - ☐ Safety
   - ☐ Air Navigation Services
   - ☐ Aerodromes
   - ☐ Air Transport
   - ☐ Aviation Security and Facilitation
   - ☐ Environment
   - ☐ Aviation Management
   - ☐ Others, please specify _____.

4. How many years has your organization been a TRAINAIR PLUS Program Member?
   - ☐ Less than one year
   - ☐ 1 – 2 years
   - ☐ 3 – 5 years
   - ☐ More than 5 years

5. How many trainees does your organization train per year (over the last three years)?
   - ☐ Less than 100
   - ☐ 101 – 250
   - ☐ 251 – 500
   - ☐ 501 – 1000
   - ☐ More than 1000

Section B: TRAINAIR PLUS Program

6. How many ICAO-recognized training courses (STP, CTP, ITP) has your organization developed?

STP	CTP	ITP
☐ 0	☐ 0	☐ 0
☐ 1	☐ 1	☐ 1
☐ 2	☐ 2	☐ 2
☐ 3	☐ 3	☐ 3
☐ 4 – 5	☐ 4 – 5	☐ 4 – 5
☐ 6 – 10	☐ 6 – 10	☐ 6 – 10
☐ More than 10	☐ More than 10	☐ More than 10

7. Have you observed the ICAO competency-based training methodology standardized training course development in your organization?

- ☐ Yes, we have applied the methodology to standardize all training course development in my organization
- ☐ Yes, we have applied the methodology to the development of some of the training courses in my organization
- ☐ Yes, we apply the methodology to the development of ICAO-recognized courses (STP, CTP, ITP) only
- ☐ No, we have not applied the methodology to training course development in my organization

8. Have you observed the ICAO competency-based training methodology enhanced the quality of training courses in your organization?

- ☐ Yes, it enhanced the quality of all training courses in my organization
- ☐ Yes, it enhanced the quality of some of the training courses in my organization
- ☐ Yes, it enhanced the quality of ICAO-recognized courses (STP, CTP, ITP) only
- ☐ No, it did not enhance the quality of training courses in my organization

9. Have you observed the ICAO Instructor Competency Framework standardized instructional delivery in your organization?

- ☐ Yes, we have applied the framework to all instructors in my organization
- ☐ Yes, we have applied the framework to some of the instructors in my organization
- ☐ Yes, we apply the framework to the delivery of ICAO-recognized courses (STP, CTP, ITP) only
- ☐ No, we have not applied the framework in my organization

10. In your training organization, what are the major challenges of STP development ? (select all that apply)

- ☐ Lack of qualified course developers
- ☐ Unavailability of Subject Matter Experts (SMEs)
- ☐ Insufficient management support
- ☐ Too long course development and validation process
- ☐ Limited budget
- ☐ Others, please specify _____.

11. Is your training organization interested in the STP sharing through the TRAINAIR PLUS Electronic Management System (TPEMS)?

- ☐ Yes
- ☐ No

12. Has your training organization benefited from the STP sharing through the TPEMS?
- ☐ Yes, the STP/s purchased met our training needs with no or minor adaptation
- ☐ Yes, but the STP/s purchased required major adaptation in order to meet our training needs
- ☐ No, current STP/s don't meet training needs of our potential trainees
- ☐ No, the course delivery requirements (instructor qualification, special equipment, facilities, etc.) for identified STP/s cannot be met by my organization
- ☐ Others, please specify _____.

13. In your training organization, what are the major challenges of organizing ICAO course delivery? (select all that apply)
- ☐ Course cancellation (e.g. insufficient registration)
- ☐ Too few students in a class
- ☐ Too many students in a class
- ☐ Poor quality of the course material (e.g. insufficient instructor guidance)
- ☐ Ineffective communication between training organization, instructors and the TRAINAIR PLUS team
- ☐ Others, please specify _____.

14. In your opinion, has your organization trained more trainees since joining the TRAINAIR PLUS Program?
- ☐ Yes, if possible indicate the estimated percentage of annual increase _____% .
- ☐ No.

15. Please select the areas where your training organization has enhanced capacity since joining the TRAINAIR PLUS Program (select all that apply):
- ☐ More course developers trained
- ☐ More instructors trained
- ☐ More training courses developed
- ☐ More training sessions delivered
- ☐ More revenue generated annually
- ☐ Others, please specify _____.

16. Please select the benefits of the TRAINAIR PLUS Program to your organization (select all that apply):
- ☐ Technical assistance for the development of competency-based training courses
- ☐ Capacity-building of training organization through training professionals (e.g. course developers, instructors, training managers etc.)
- ☐ Standardization of training courses
- ☐ Delivery of ICAO training course
- ☐ Continuous access to the TPEMS
- ☐ Communication with other training organizations in the TRAINAIR PLUS network
- ☐ Others, please specify _____.

17. Please select the functions of the TPEMS that, in your opinion, contribute to the achievements of the Program objectives (select all that apply):

- ☐ Membership application
- ☐ Assessment processes
- ☐ Development of ICAO-recognized courses (STP, CTP, ITP)
- ☐ Ordering of courses through the TRAINAIR PLUS library
- ☐ Hosting of TRAINAIR PLUS courses
- ☐ Production of certificates
- ☐ Submission of training evaluation forms
- ☐ Communication with each other through Member News
- ☐ Qualification process of instructors
- ☐ Others, please specify _____.

18. From your perspective, to what extent, does the TRAINAIR PLUS Program meet its prescribed objectives?

- ☐ More than 90 per cent
- ☐ 80 – 89 per cent
- ☐ 70 – 79 per cent
- ☐ 60 – 69 per cent
- ☐ Less than 60 per cent

19. What could be further improvement of the TRAINAIR PLUS Program? (please be specific and brief)

_____.
_____.
_____.

20. Would you recommend the TRAINAIR PLUS Program to others? Why/Why not? (please be specific and brief)

_____.
_____.
_____.

Thank you for your cooperation!

Appendix D – Online Survey to ICAO Qualified Course Developers

Section A: Demographic Information

1. Please select the ICAO region where you are:
   - ☐ Asia and Pacific (APAC)
   - ☐ Eastern and Southern African (ESAF)
   - ☐ European and North Atlantic (EUR/NAT)
   - ☐ Middle East (MID)
   - ☐ North American, Central American and Caribbean (NACC)
   - ☐ South American (SAM)
   - ☐ Western and Central African (WACAF)

2. Are you a full time employee of a TRAINAIR PLUS Member?
   - ☐ Yes
   - ☐ No

3. What is the percentage of your work time dedicated to course development in your organization?
   - ☐ More than 75 per cent
   - ☐ 50 – 75 per cent
   - ☐ 25 – 50 per cent
   - ☐ Less than 25 per cent
   - ☐ Not involved in course development any more

4. How many years have you been an ICAO qualified course developer?
   - ☐ Less than one year
   - ☐ 1 – 2 years
   - ☐ 3 – 5 years
   - ☐ More than 5 years

5. How many ICAO-recognized training courses (STP, CTP, ITP) have you participated in the development?

STP	CTP	ITP
☐ 0	☐ 0	☐ 0
☐ 1	☐ 1	☐ 1
☐ 2	☐ 2	☐ 2
☐ 3	☐ 3	☐ 3
☐ 4 – 5	☐ 4 – 5	☐ 4 – 5
☐ 6 – 10	☐ 6 – 10	☐ 6 – 10
☐ More than 10	☐ More than 10	☐ More than 10

Section B: TRAINAIR PLUS Program

6. Have you observed the ICAO competency-based training methodology standardized training course development in your organization?

- ☐ Yes, we have applied the methodology to standardize all training course development in my organization
- ☐ Yes, we have applied the methodology to the development of some of the training courses in my organization
- ☐ Yes, we apply the methodology to the development of ICAO-recognized courses (STP, CTP, ITP) only
- ☐ No, we have not applied the methodology to training course development in my organization

7. Have you observed the ICAO competency-based training methodology enhanced the quality of training courses in your organization?

- ☐ Yes, it enhanced the quality of all training courses in my organization
- ☐ Yes, it enhanced the quality of some of the training courses in my organization
- ☐ Yes, it enhanced the quality of ICAO-recognized courses (STP, CTP, ITP) only
- ☐ No, it did not enhance the quality of training courses in my organization

8. In your experience, what are the major challenges of competency-based training development in your training organization? (select all that apply)

- ☐ Lack of qualified course developers
- ☐ Unavailability of Subject Matter Experts (SMEs)
- ☐ Insufficient management support
- ☐ Too long course development and validation process
- ☐ Limited budget
- ☐ Others, please specify _____.

9. What are your recommendations to ensure the quality of competency-based training courses? (please be specific and brief)

_____.
_____.
_____.

10. What could be further improvements of the course development process through the TRAINAIR PLUS Electronic Management System (TPEMS)? (please be specific and brief)

_____.
_____.
_____.

11. Would you recommend the competency-based training courses that you developed to other training organizations? Why/Why not? (please be specific and brief)

_____.
_____.
_____.

12. From your perspective, to what extent, does the TRAINAIR PLUS Program meet its prescribed objectives?

- ☐ More than 90 per cent

- ☐ 80 – 89 per cent
- ☐ 70 – 79 per cent
- ☐ 60 – 69 per cent
- ☐ Less than 60 per cent

Thank you for your cooperation!

Appendix E – Online Survey to ICAO Course Validators

Section A: Demographic Information

1. Please select the ICAO region where you are:
   - ☐ Asia and Pacific (APAC)
   - ☐ Eastern and Southern African (ESAF)
   - ☐ European and North Atlantic (EUR/NAT)
   - ☐ Middle East (MID)
   - ☐ North American, Central American and Caribbean (NACC)
   - ☐ South American (SAM)
   - ☐ Western and Central African (WACAF)

2. Are you a full time employee of a TRAINAIR PLUS Member?
   - ☐ Yes
   - ☐ No

3. How many years have you been a TRAINAIR PLUS course validator?
   - ☐ Less than one year
   - ☐ 1 – 2 years
   - ☐ 3 – 5 years
   - ☐ More than 5 years

4. How many Standardized Training Packages (STPs) have you validated?
   - ☐ 0
   - ☐ 1
   - ☐ 2 – 5
   - ☐ 6 – 10
   - ☐ More than 10

5. How many ICAO Qualified Course Developers (IQCDs) have you trained?
   - ☐ 4 or less
   - ☐ 5 – 10
   - ☐ 11 – 15
   - ☐ 16 – 20
   - ☐ More than 20

Section B: TRAINAIR PLUS Program

6. In your experience, what are the major challenges of competency-based training development in a training organization? (select all that apply)

- ☐ Lack of qualified course developers
- ☐ Unavailability of Subject Matter Experts (SMEs)
- ☐ Insufficient management support
- ☐ Too long course development and validation process
- ☐ Limited budget
- ☐ Others, please specify _____.

7. What are your recommendations to ensure the quality of competency-based training courses? (please be specific and brief)

_____.
_____.
_____.

8. What could be further improvements of the STP development process through the TRAINAIR PLUS Electronic Management System (TPEMS)? (please be specific and brief)

_____.
_____.
_____.

9. Are the training organizations you worked with interested in the STP sharing?

- ☐ Yes, all training organizations I worked with are interested
- ☐ Yes, some of the training organizations I worked with are interested
- ☐ No, no training organizations I worked with are interested

10. Would you recommend the competency-based training courses that you validated to other training organizations? Why/Why not? (please be specific and brief)

_____.
_____.
_____.

11. In your opinion, what are the main reasons for low STP sharing among the TRAINAIR PLUS Members? (select all that apply)

- ☐ STPs in the library do not meet local training needs
- ☐ STPs require major adaptation in order to meet local training needs
- ☐ No local instructors for the STP delivery
- ☐ STP delivery requirements (special equipment, facilities etc.) are too high to be met
- ☐ Lack of sufficient STP information in the TPEMS
- ☐ Others, please specify _____.

12. From your perspective, to what extent, does the TRAINAIR PLUS Program meet its prescribed objectives?

- ☐ More than 90 per cent
- ☐ 80 – 89 per cent
- ☐ 70 – 79 per cent

☐ 60 – 69 per cent
☐ Less than 60 per cent

Thank you for your cooperation!

Appendix F – Online Survey to ICAO Instructors

Section A: Demographic Information

1. Please select the ICAO region where you are:
   - ☐ Asia and Pacific (APAC)
   - ☐ Eastern and Southern African (ESAF)
   - ☐ European and North Atlantic (EUR/NAT)
   - ☐ Middle East (MID)
   - ☐ North American, Central American and Caribbean (NACC)
   - ☐ South American (SAM)
   - ☐ Western and Central African (WACAF)

2. Are you a full time employee of a TRAINAIR PLUS Member?
   - ☐ Yes
   - ☐ No

3. How many years have you been an ICAO qualified instructor?
   - ☐ Less than one year
   - ☐ 1 – 2 years
   - ☐ 3 – 5 years
   - ☐ More than 5 years

4. Please select the ICAO Training Packages (ITPs) that you are qualified to teach from the list below (select all that apply):
   - ☐ Training Developers Course (TDC)
   - ☐ Training Instructors Course (TIC)
   - ☐ Training Managers Course (TMC)

5. How many training sessions have you conducted for these ITPs?
   - ☐ 1 – 5 sessions
   - ☐ 6 – 10 sessions
   - ☐ 11 – 20 sessions
   - ☐ More than 20 sessions

Section B: TRAINAIR PLUS Program

6. In your experience, what are the major challenges of ICAO course delivery in a training organization? (select all that apply)

- ☐ Course cancellation (e.g. insufficient registration)
- ☐ Too few trainees in a class
- ☐ Too many trainees in a class
- ☐ Poor quality of the course material (e.g. insufficient instructor guidance)
- ☐ Ineffective communication between training organization, instructors and the TRAINAIR PLUS team
- ☐ Others, please specify _____.

7. What are your recommendations to ensure the quality of ICAO course delivery? (please be specific and brief)

_____.
_____.
_____.

8. Does the instructor access to the TRAINAIR PLUS Electronic Management System (TPEMS) provide you with sufficient information for course delivery?

- ☐ Yes.
- ☐ No, please specify the improvements needed _____.

9. In your opinion, does the training e-report include all the necessary information for training records and future course improvement?

- ☐ Yes.
- ☐ No, please specify the improvements needed _____.

10. Would you recommend the ICAO courses that you are qualified to teach to other training organizations? Why/Why not? (please be specific and brief)

_____.
_____.
_____.

11. In your opinion, how to increase the ICAO course delivery on a worldwide basis? (please be specific and brief)

_____.
_____.
_____.

12. From your perspective, to what extent, does the TRAINAIR PLUS Program meet its prescribed objectives?

- ☐ More than 90 per cent
- ☐ 80 – 89 per cent
- ☐ 70 – 79 per cent
- ☐ 60 – 69 per cent
- ☐ Less than 60 per cent

Thank you for your cooperation!