



**Project number:** 2013-1-HR1-LEO05-03048

**Grant agreement number:** 2013-1-HR1-LEO05-03048

**Funding Programme:** Lifelong Learning Programme 2007 – 2013, Leonardo da Vinci, Transfer of Innovation project

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## D10: A Report on Methods and Methodologies

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*This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.*



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## Reviews History

Version	Date	Modifier	Remarks
V1	15-03-2014	Ugurcan Acar	1 <sup>st</sup> Draft/Layout
V2	09-05-2104	Himadri Lahiry	2 <sup>nd</sup> and main draft.
V3	22-05-2014	Ugurcan Acar	Final review
V4	30-05-2014	Himadri Lahiry	Approval by Steering Committee

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## Executive Summary

This report serves 3 main objectives:

- To identify, adapt and/or develop appropriate methods and methodologies for the development of training course content, delivery and assessment
- To identify the interactive pedagogical methods
- To apply multimedia learning techniques in the development and delivery of training courses

The report comprises methods and methodologies for preparation of the training material (WP 4) which include scenario creation (WP 5.2) and practice test modelling (5.3) as well as evaluation (WP 7) which also includes evaluation of the two planned training sessions.

The report also involves the review and analysis of the initial methods and methodologies particularly with regard to scenario generation. A format already developed in previous Leonardo projects is adopted / refined for scenario developments.

Each partner apart from the Slovenian partner (SPIN), supported the development and testing of the training module for a particular class and/or rank of seafarers. Each partner is also involved in decisions regarding the selection of methods of developing and delivering the training tasks, as well as methods of assessment. A review of state of art literature in competence based and vocational learning is debated as being the first step.

The decisions of Steering Committee supported by the project manager and coordinator on the final methods and methodologies for the entire training tasks are included in this report. Particular attention is given to the existing national standards and regulations regarding the training to make sure that they complement the existing structure.

The same procedures for the development of this Work are adapted for the development of methods and methodologies for the delivery of the training tasks. All partners' reports on their suggestion of learning and delivery tools and media for storing learning materials, as well as information on the use of e-learning/assessment is included in this report.

The Steering Committees' final decisions about methods/methodologies with due regards for the identified training needs and current tools for development and delivery of training modules is also included in this report. It should be noted that the Steering Committee agreed to the training needs and methods & methodologies on 30 May 2014.

This report also concerns the development of a methodological and pedagogical framework for the whole project. However, both qualitative and quantitative methods are used and the strength(s) of each method will be considered and its limitation(s) evaluated. The methods selected will be both primary (questionnaire) and secondary (review of good practice and sources of data, information and knowledge). For adaptation of M'aidier (2009-11), e-learning and e-assessment will include rapid prototyping techniques. Although different partners looked into the requirements of different types of officers/ratings, the course will take these requirements into consideration.

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## 1. Introduction

**Chapter 1** includes Introduction

**Chapter 2** includes Initial Methods and Methodologies

**Chapter 3** includes Refinements of the Methods and Methodologies

**Chapter 4** includes Selection of Methods for Developing and Training Task

**Chapter 5** includes Learning and Delivery Tools, Media for Storing Learning Materials, Use of E-learning/Assessment

**Chapter 6** includes Steering Committee Decisions on Methods and Methodologies

## 2. Initial Methods and Methodologies (Task 3.1)

The experience of TRAIN 4Cs programmes<sup>1</sup> which were developed to improve the effectiveness of sea training by preparing cadets for oral examination of major licencing body's CoC (Certificate of Competency) has triggered the project ACTs. During the implementation of TRAIN 4c programmes, one of the experiment included transferring Turkish Cadets (trained in Turkey) to UK to offer them an opportunity to get UK Licence through Maritime and Coastguard Exams (MCA)<sup>2</sup>. The reports received from the initial experiments during TRAIN 4Cs I and II programmes have highlighted the issue that Turkish Cadets had major difficulties in responding the Colregs questions (especially to respond to a given case) which cover the majority of the oral exam questions. This supports The Maritime Accident Investigation Branch (MAIB)<sup>3</sup> and Mariners' Alerting and Reporting Scheme (MARS)<sup>4</sup> reports as many collisions and near misses have contrary actions which are not complying with many of the basic principles of collision avoidance. An earlier study by Capt. R J Syms<sup>5</sup> have also pointed that in northern countries (such as the United Kingdom, Germany and France), the application and understanding of Colregs is of a higher standard than when compared to other countries. The reality is Colregs can only work in an environment where the responsible navigation officers have common understanding of it.

One of the methods experimented during the TRAIN 4Cs III programme implementation in 2010 was to teach the Colregs rules by giving priority to most-ignored to less-ignored. The experiments have shown positive results where students were more confident compared to previous groups (TRAIN 4Cs I and II).

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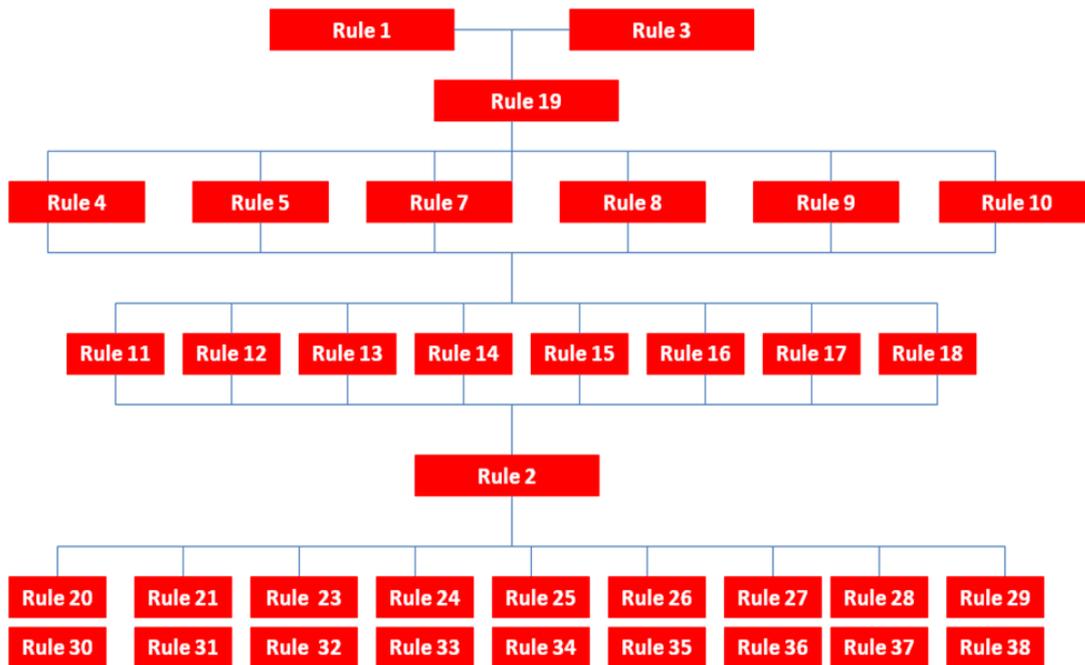
<sup>1</sup> TRAIN 4Cs Programmes – See [www.maredu.co.uk](http://www.maredu.co.uk)

<sup>2</sup> Maritime and Coastguard Agency – See – See [www.dft.gov.uk/mca/](http://www.dft.gov.uk/mca/)

<sup>3</sup> Maritime Accident Investigation Branch. See <http://www.maib.gov.uk/home/index.cfm>

<sup>4</sup> Mariners' Alerting and Reporting Scheme. See <http://www.nautinst.org/en/forums/mars/>

<sup>5</sup> Syms, R.J. Improving the application of the COLREGS – The Nautical Institute Colregs Study, Australia, 2002.



**Figure 1 - Colregs Teaching Methods Piloted at TRAIN 4Cs III experiment**

The above method compromises the teaching/learning rules from the most-ignored to less-ignored. For instance, the Rule 2 which gives flexibility to deviate from rules is taught at later stage when Cadets have reached to certain level in understanding and applying the rules. Another rule (Rule 19) which applies in restricted visibility is often ignored looking at the collision and near miss reports (MARS and MAIB).

This method is taken as a discussion point and is reviewed during the first 6 months of the project during Questionnaire development/analysis and workshops.

### 2.1. Scenario Creation (WP 5.2)

The partners have been collating the collision and near miss reports in their country where applicable and looking into their neighbouring countries if there are not sufficient accident cases in their country. The collated cases will be summarised and be transformed into animated scenarios for the ease learning of the Colregs. The methods that will be used in scenario creation will consist of the work in creating a database of comprehensive collision and near miss reports. Second stage then will be to summarise these reports using the template given below so that they will converted into animated scenarios.

**Table 1 - Template for Scenario Creation**

<b>Type of the accident</b>	<input type="checkbox"/> Collision <input type="checkbox"/> Near Miss
<b>Location of the Accident</b>	Area/Latitude and Longitude
<b>Duration</b>	<input type="checkbox"/> Daylight <input type="checkbox"/> Night
<b>Visibility (nm)</b>	

<b>Consequences</b>	<input type="checkbox"/> Fatal injury <input type="checkbox"/> Non-fatal injury <input type="checkbox"/> Vessel damaged <input type="checkbox"/> Vessel lost or abandoned <input type="checkbox"/> No injury or damage <input type="checkbox"/> Pollution – if ticked please state quantity
<b>Length of the Vessels</b>	
<b>Voyage Details</b>	From .... / To .....
<b>Date and Time</b>	
<b>Rules Breached</b>	
<b>Please write the sequence of events leading to the accident (e.g details of collision or near-miss)</b>	
<b>Please also state why this collision/near-miss happened</b>	
<b>Supporting documents (pictures, visual presentation etc.)</b>	

## 2.2. Practice Test Modelling (WP 5.3)

This task is concerned with the preparation of training materials which will be hosted in the e-learning platform. The practice test modelling results will be used in making the final decision in developing e-learning and e-assessment platform (Internal). The practice model test will mainly be carried out by Slovenian partner with intention to create a draft template which will be based on the training needs report. E-learning and E-assessment framework will be tested on the following outcomes of the Training Needs:

1. **Can the ecolregs.com platform be based on a system/method to determine the relationships and hierarchy of the rules?** – SPIN will make a trial in response to this question on the selected ACTs e-learning and e-assessment platform trying to include possible interactive flowcharts to teach the rules. The results will be reviewed by all partners. Results and decisions will be reported by using the table below.

<b><u>Model Test Results/Decisions</u></b>
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2. **Can the developed scenarios be made in 3D model e.g. gamification, including day and night situations etc?** – This model was suggested by workshop attendees who are experts in the subject based on the outcomes of the questionnaire. SPIN will make a trial in response to this question on the selected platform trying to include 3D model applications to support the learning/teaching the rules. The results will be reviewed by all partners. Results and decisions will be reported by using the table below.

**Model Test Results/Decisions**

3. **Can an interactive radar screen with simple bridge be included in the course development?** – This model was suggested by workshop attendees who are experts in the subject. SPIN will look into this and draft a report on the feasibility to include radar screen with simple bridge to support the learning/teaching the rules. The results will be reviewed by all partners. Results and decisions will be reported by using the table below.

**Model Test Results/Decisions**

4. **Can a mobile app be developed? Can the animated scenarios be run in this app?** SPIN will look into feasibility of this on the selected platform to support the learning/teaching the rules. The results will be reviewed by all partners. Results and decisions will be reported by using the table below.

**Model Test Results/Decisions**

5. **Can e-assessment platform include multi language?** SPIN will look into feasibility of this on the selected platform to support the learning/teaching the rules. The results will be reviewed by all partners. Results and decisions will be reported by using the table below.

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### **Model Test Results/Decisions**

### **2.3. Evaluation and Quality Assurance (WP 7)**

This process will be led by PRU and Steering Committee member who will establish working parties with the representatives of these bodies to ensure more effective and efficient management of the intended validation processes.

#### **Internal Evaluation:**

Although each partner will be responsible for their own tasks, the responsibility for quality assurance would be taken by the partnership as whole. The intention is to use the expertise of the Steering Committee members and partner institutions / organisations extensively. Existing links with, and memberships of, external validation, accreditation, licensing bodies as well as IMO MSC (International Maritime Organisation Maritime Safety Committee) will be maintained.

C4FF will lead the internal Evaluation. The partnership has already developed a system for internal verification and external examination of education and training courses (based on Edexcel/BTEC, IMarEST and MCA systems). The assessment will be based on a given or a combination of scenarios and will be internally verified first by the Steering Committee and then by a qualified and certificated internal verifier. The verifier will verify the assessment scheme and criteria as well as the grading criteria and will sample, using the square root rule, the trainees' assessed work.

One of the silent partners, a well-known maritime college within the MarEdu, has agreed to internally verify the delivery and assessment of the training course for trainees. Another silent partner, an experience and qualified external verifier has agreed to support the validation of the proposed course and with the intention of externally verify these course.

#### **Accreditation:**

The professional body and a licensing authority have agreed to review the content and the arrangement for the delivery and assessment of the course with a view to support and possibly accredit the course and/or constituent parts of it. Again, a professional accreditor will support the consortium with the evaluation, validation and effectiveness of the training course.

An external evaluator (as an external adviser) who has experience of project evaluation and external examination with appropriate vocational and professional qualifications will be used. This evaluator will have an impartial view of the project and its results. In addition the partnership has agreed to approach an independent awarding body or accrediting institution to appoint another external evaluator (external examiner) for external evaluation activities. This external evaluator will also externally examine the arrangements for training the trainers and verification processes and programmes (SOS) which will be similar to those applied at PRU (TR partner) and developed through their Leonardo mobility programme with leading nautical colleges in the UK (TRAIN 4Cs – [www.maredu.co.uk](http://www.maredu.co.uk)).



Figure 2 - Evaluation and Quality Assurance Method

**a. Internal and External Evaluation Form (Task 7.1)**

Internal and Evaluation Forms will be produced by PRU explaining how it will be conducted (Task 7.1) prior to Evaluation process

**b. Piloting Plan with 3 Target Groups (Task 7.3)**

Piloting plan with 3 target groups will be developed by C4FF, NVNA and UoR) (Task 7.3)

**c. Piloting Plan with 5 Target Groups (Task 7.5)**

Piloting plan with 3 target groups will be developed by C4FF, NVNA and UoR)

**3. Refinement of the Methods and Methodologies (Task 3.2)**

This task involved an initial review and analysis of the methods and methodologies particularly with regard to scenario generation. The Methods and Methodologies were refined and updated, and a finalise version was produced for the course development and provision of course content. The same training course approach will be used for all seafarers, except Ratings. The ratings training approach will be different, a special disposition and specialised training approach will be applied for the Ratings and focus on the following rules: Rule 5 – Lookout, Rule 7 – Risk of Collision, Rule 21 – Definitions, Rule 22 – Visibility of Lights, Rule 32 – Definitions, Rule 36 - Signals to attract attention.

**3.1. Critical Review of the Initial Methods**

**A critical review of the Initial methods was provided and can be viewed below:**

- Preparation of the training material (WP 4) was discussed as to how the scenario will be created. The partners have been collating the collision and near miss reports in their country where applicable and looked into their neighbouring countries and produced data base tables for creating the scenarios from the information in animated form.
- Decided to apply multimedia learning techniques in the development and delivery of training courses

- Scenario creation consists of the work created from the database of comprehensive collision and near miss reports
- Refinement of the scenario are being developed considering & evaluating the strength(s) & limitation(s) of each method. e.g. adaptation of M'aider (2009-11), e-learning and e-assessment process for the production of training modules.
- It was decided to develop the ecolregs.com platform based on a system/method to determine the relationships and hierarchy of the rules.
- Delivery plan and reports on learning and delivery tools and media storing for learning are already incorporated in the files.
- Partners decided on the selection of methods of developing and delivering the training tasks, as well as methods of assessment. A review of state of art literature in competence based and vocational learning was considered
- It was decided that the project will be an online learning course, which will support self-learning. The course can be used to support blended learning, with additional classroom activities being added on.
- The Steering Committees' final decisions about methods/methodologies with due regards for the identified training needs and current tools for development and delivery of training modules have been decided. This was agreed by Steering Committee on 30th May.

#### **4. Selection of Methods for Developing and Training Tasks (Task 3.3)**

As in the project proposal, each partner, apart from the Slovenian partner (SPIN), will support the development and testing of the training module for a particular class and/or rank of seafarers. Each partner will be involved in decisions regarding the selection of methods of developing and methods of delivering the training tasks, as well as methods of assessment. A review of state of art literature in competence based and vocational learning was considered.

The partners developed a framework for developing the methods and methodologies for producing each rule.

##### **4.1. Review on of the state of art literature in competence based and vocational learning**

The model proposed after reviewing the state of the art literature in competence based and vocational learning in Competence Based Training (CBT) where the course will be learner centered<sup>6</sup>. One of the reasons choosing CBT is that it uses models and simulations extensively in competency-based training courses. The review of CBT system in the following research is based on feasibility adaptation of CTB to online platform.

In a CBT system, the unit of progression is mastery of specific knowledge and skills and is learner- or participant centered. Learning guides, checklists and coaching are one of the three paramount part of the CBT learning.

**Skill** - A task or group of tasks performed to a specific level of competency or proficiency

**Competency** - A skill performed to a specific standard under specific conditions.

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<sup>6</sup> Competence Based Training – See [http://www.rhrc.org/resources/general\\_fieldtools/toolkit/51b%20CBT.pdf](http://www.rhrc.org/resources/general_fieldtools/toolkit/51b%20CBT.pdf)

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### **a. Learning Methods**

There are number of methods that can be adapted in ACTs course. Participants in a competency-based training course can learn in an environment that duplicates or simulates the work place where assessment of skills is conducted using simulations (e.g., models and role plays). The best approach for training involved learner-centered instruction using print, instructional technology and simulations.

### **b. Evaluation and Assessment**

While knowledge - based assessments can certainly be used in CBT to measure mastery of information, the primary focus is on measuring mastery of skills. The assessment will be based on in competency-based programs which are criterion-referenced with the criterion being the competencies upon which the program is based. Simulation and work sample performance tests should include a checklist or some type of rating scale.

### **c. Transfer of Training**

A four step approach is suggested to be used to transfer specific skills and knowledge from ACTs platform to service providers/users. These steps are part of the process of developing a family planning training system within a country.

- Standardizing provision of Colregs course delivery at MET institutions/users and modifying and adapting ecolregs.com training materials as necessary
- ecolregs.com course providers to provide these services competently, according to the approved standards
- Identifying and preparing proficient ecolregs.com providers to function as Colregs trainers so they are able to train other ecolregs.com providers
- Identifying and preparing ecolregs.com trainers to function as advanced and eventually master trainers so that they are able to train other ecolregs.com trainers, evaluate training and develop or revise course materials

### **d. Design Activities**

The followings are the activities that will be considered when designing the course.

- Identification of the specific Colregs skills that will form the basis of a competency-based training course.
- Identification of the conditions (e.g., using models, role plays, clients) under which the skills must be demonstrated.
- Development of the criteria or standards to which the skills must be performed.
- Development of the competency-based learning guides and checklists which list each of the steps and sequence (if necessary) required to perform each skill or activity.
- Development of reference manuals which contain the essential, need-to-know information related to the skills to be developed.
- Development of models to be used during training.
- Development of training objectives which outline what the participant must do in order to master the Colregs skills.

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- Development of course outlines which match a variety of training methods and supporting media to course objectives.
  - Development of course syllabi and schedules which contain information about the course

#### **e. Delivery and Evaluation Activities**

- Administration of a pre-course questionnaire to assess the participants' knowledge and attitudes about course content.
- Administration of pre-course skill assessments using models to ensure participants possess the entry level skills (e.g. able to respond a give case using Sailing and Steering Rules) to complete the course successfully and role plays to determine the level of their knowledge, understanding and attitude
- Delivery of the course by a trainer/facilitator using an interactive and participatory approach.
- Transfer of skills from the trainer to the participants through Colregs skill demonstrations using slide sets, videotapes, models, role plays and finally, clients.
- Development of the participants' skills using a humanistic approach, which means participants acquire the skill and then practice until competent using anatomic models and role plays.
- Practice of the skills following the steps in the learning guide until the participant becomes competent at performing the skill.
- During this time the trainer functions as a coach providing continuous feedback and reinforcement to participants. Only when participants are assessed and determined to be competent on a model do they work with clients.
- Presentation of supporting information and theory through interactive and participatory classroom sessions using a variety of methods and audiovisuals.
- Administration of a midcourse questionnaire to determine if the participants have mastered the new knowledge associated with the clinical skills.
- Guided practice in providing all components of the clinical service.
- Evaluation of each participant's performance (i.e., knowledge, skills and attitudes) in a given case. The evaluation by the trainer is performed using competency-based checklists. The participant is either qualified or not qualified as a result of the knowledge, attitude and skills assessments.
- Presentation of a statement of qualification which identifies the specific clinical service the individual is qualified to provide.

#### **4.2. Development and Testing of Training Module**

The same training course approach will be used for all seafarers, except Ratings. The ratings training approach will be different, a special disposition and specialised training approach will be applied for the Ratings.

The ratings are required to have limited level of knowledge of Colregs which is based on their duties on the job, for instance, they steer the ship and assist the deck officer in other navigational duties<sup>7</sup>.

Relevant Rules for Ratings to be aware of (Based on our research) are:

Rule 5 – Lookout

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<sup>7</sup> RATINGS – See <http://www.careersatsea.org/roles/ratings.php>

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Rule 7 – Risk of Collision  
Rule 21 – Definitions  
Rule 22 – Visibility of Lights  
Rule 32 – Definitions  
Rule 36 - Signals to attract attention

## **5. Learning and Delivery Tools, Media for Storing Learning Materials, Use of E-learning/Assessment (Task 3.6)**

This work will involve all other partners to draft a report on learning and delivery tools and media for storing learning materials, as well as information on the use of e-learning/assessment.

### **5.1. Learning and Delivery Tools**

SPIN have provided clear details on how the online course will function, and C4FF and SPIN have demonstrated how the online platform will work.

### **5.2. Media for Storing Learning Materials**

The project is storing learning materials in a relational database and will be available on the online platform, as the learning materials are being finalised.

### **5.3. Use of E-learning/Assessment**

SPIN are providing the design and development of the online platform to support both e-learning and e-assessment.

## **6. Steering Committee Decisions on Methods and Methodologies (Task 3.4 and 3.7)**

This task included the decisions on the final methods and methodologies for each, for a group or for the entire training tasks (modules). The Steering Committee supported by the project manager (UoR) and coordinator (C4FF). Particular attention is given to the existing national standards and regulations on the training to make sure that it complements the existing structure.

The Steering Committee made the final decisions about methods/methodologies with due regards for the identified training needs and current tools for development and delivery of training modules. This was agreed on 30th May by the Steering Committee.

Updated extended knowledge base from accidents and near misses has been provided.

An excel table is produced and a data base is created based on real life accident reports. Data collected from partner countries, as well as globally.

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### **6.1. Review of National Standards**

Research on National standards and requirements have been provided by each partners. The **partners'** local language of Colregs was also provided by partners.

C4FF supported by UoR to draft the report which is based on Steering Committee Decisions.

### **6.2. Training Needs**

UoR with support from partners in completing the final report, and was agreed by Steering Committee.

Training needs have been identified based on the research evidence of accident reports.

### **6.3. Current Tools for development and delivery of training modules**

Current tool for the delivery of the training modules have been decided and tested by experts and writing of the module is in progress.

NVNA, UoR, SPIN with support from other partners to draft plan for development and delivery of training modules.