AfroSAFE: Safe System for radical improvement of road safety in low- and middle-income African countries

HORIZON EUROPE—European Union's funding programme for research and innovation

Deliverable 7.1

Current training activities for road safety professionals – a comparison of European and African countries

Deliverable due date:	2023-11-30
Project start:	2022-09-01
Duration:	42 months

Lead contractor for this deliverable:

TØI, Norway

Version 2.0 (2024-03-05)

Dissemination Level

PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Document information

Author(s):   Aslak Fyhri (TØI, NO)

Vibeke Nenseth (TØI, NO)

Torkel Bjørnskau (TØI, NO)

Haneen Farah (TU Delft, NL)

Laxman Singh Bisht (TU Delft, NL)

Sonja Forward (VTI, SW)

Quality check: Reviewer One (Organization, Country)

Project Coordinator

Aliaksei Laureshyn

Department of Technology and Society

Faculty of Engineering, LTH

Lund University

Box 118

221 00 Lund, Sweden

Phone: +46 46 222 91 31

Email: aliaksei.laureshyn@tft.lth.se

www: www.afrosafe-eu.africa

Coordinator of WP7

Haneen Farah

Department of Transport & Planning

Stevinweg 1

 2628 CN Delft, The Netherlands

Phone: +31 (0)15 27 84301

Email: h.farah@tudelft.nl

Revision and History Chart

Version	Date	Comment
1	2016-09-30	First official version

The present document is a draft; the approval from the EU Commission is pending.

Table of Contents

Summary

This report is the first deliverable of WP7 in AfroSAFE which focuses on capacity building and the transfer of road safety knowledge. The main aim of this deliverable, D7.1, is to identify and report existing road safety training activities and identify the gaps in education and training in the African countries when benchmarked with the Safe System Approach. This deliverable achieves this in two ways, the first by compiling all the findings regarding existing training activities and gaps in training from the other WPs in the AfroSAFE project and from reviewing the findings in the SaferAfrica project. Second, additional data collection using interviews and desk research of existing document was conducted to complete the identification of gaps and recommendations for adjusting and developing the road safety education and training in the African countries. Furthermore, in this deliverable we review and elaborate on different learning theories and techniques suitable for educating professionals. The outcome of this deliverable is a set of recommendations to reduce the gaps in education and training in the African countries when benchmarked with the Safe System Approach. These recommendations can also be useful when developing a road safety course curriculum for professionals, and recommendations for establishing a centre of excellence.

Based on the SaferAfrica projects' course list review we summarized the pillar-wise courses that were accessible and still available. These courses were checked by AfroSAFE experts based on the open information available for each course. These courses are helpful to individual road safety professionals for learning at their own pace and for the African institutions as a knowledge resource to develop their own courses.

Identified training gaps

The training gaps for **road safety management pilla**r showed the lack of multidisciplinary approach and a notable absence of integrated training and diverse relevant disciplines such as public health, law, and social sciences in road safety management education. This gap highlights the need for a more holistic and inclusive educational framework to address the complex and multifaceted nature of road safety management effectively. Furthermore, introducing a systematic education and training in the elements of Safe System approach and its underlying principles are lacking.

The identified training gap for the **pillar safe infrastructure** indicated a lack of systematic education and training in the African countries regarding the elements of the Safe System approach. In the African countries there are no short courses in road infrastructure safety management (RISM). Therefore, supporting the African countries in developing their own RISM courses and a training centre which could stimulate the capacity building of trained road safety professionals. However, this should be as well accompanied with legislation for certifying road safety professionals such as auditors.

For the **safe vehicles pillar**, the identified training gap highlights the lack of consumer awareness about safe vehicles and inadequate vehicle inspection training. However, the identified gaps are primarily in the domain of policy adoption and implementation, and not likely to be influenced by training.

The **safe road user behaviour pillars'** identified training gap shows that the existing road safety driver training education programs focus on lower-order skills rather than on higher-order skills. This gap indicates the need for a more comprehensive driver education framework that includes both practical skills and cognitive aspects of driving. Other identified key gaps indicated the adoption of informal procedure of acquiring the driving license and traffic safety campaigns are not integrated with traffic enforcements.

The training gap for the **pillar post-crash care**, shows the sheer lack of staff, the specialized training, equipment for first responders, inadequate staff, and technical support. The gaps indicated a general shortage of resources, including ambulances and fire engines. These gaps underscore the need for dedicated investments and funding to fulfil the demand and supply gap of the resources and

manpower. There is a need to develop the comprehensive training programs and improved infrastructure to enhance the effectiveness of post-crash responses. To sum up, the pillar-wise identified gaps suggests that African countries may benefit from developing more structured and comprehensive training programs, aligned with the Safe System approach.

Recommendations

We recommend for **road safety management** introducing a systematic education and training in the elements of Safe System approach and its underlying principles. For **safe infrastructure** setting up national legislation that mandate the carrying out of systematic activities in Road Infrastructure Safety Management. Training local staff to be able to educate and train road safety professionals to carry out the various Road Infrastructure Safety Management activities is needed. For **safe vehicles** a consumer-oriented approach, with the goal to raise awareness among readers regarding the importance of NCAP (New Car Assessment Programme) is recommended. A training program should be directed towards the education of media and journalists. Another effective and tangible low-hanging fruit is the training of vehicle inspectors. Regarding **safe road user behaviour**, we recommend increasing the awareness of the driving instructors of the importance of training for the higher-level driving skills in line with the Goals for Driving Education (i.e., GDE matrix). For **post-crash care,** we recommend investment and funding to fulfil the shortage of staff, and equipment. It is important to realize that the training needs and requirements of the road safety professional will change over time.

We recommend developing an **educational curriculum for a road safety course for professionals** that includes the required core competencies for road safety professionals. The core-competencies should be providing a framework to design the course elements such as learning objectives, learning tasks and assessment on the principles of constructive alignment. The utilization of the core competencies establishes the foundation necessary for effective performance by road safety professionals, on which more developed skills and specialized knowledge can be built on. The road safety professionals should have the skills to understand and implement knowledge in many specialised fields. With respect to road safety professional training courses, the role of a teacher is to teach new road safety knowledge by building upon the existing knowledge, skills, and beliefs of the road safety professionals since these may affect their learning. Therefore, developing a road safety course curriculum development is a continuous process, rather than a one-time job.

We recommend establishing a **centre of excellence (CoE)** aimed to create a platform for academicians and road safety professionals for knowledge exchange and knowledge creation. The expertise of the CoE should be on the developing the scientific knowledge in the field of road safety and at an academic level. However, the scientific knowledge cannot flourish and have a societal impact if it is not translated to practical actions and best practices that can be implemented by practitioners and road safety professionals. Therefore, the CoE should put emphasis on the importance of connecting academics/researchers and professionals to promote the culture of knowledge exchange between these two worlds. This would guide academics and researchers to address relevant societal road safety challenges, and road safety professionals and practitioners to become more selective in applying evidence-based road safety measures, policies and best practices that are scientifically proven to improve road safety.

We also recommend developing a business plan to ensure sustainability and maintenance of the CoE. It is important to define roles and responsibilities, a short- and long-term plan for the activities to be arranged within the CoE. The sustainability and updating the course as new knowledge developed is an important aspect to keep the road safety professionals up to date with recent knowledge about road

safety management. In addition, the development of a mitigation plan for the CoE potential risks can minimize the possibility of its discontinuation.

1 Introduction

1.1 Aim of work-package 7 and Task 7.1

AfroSAFE includes seven different work-packages (WPs) and the main aim of WP7 is the transfer of road safety knowledge, training, and capacity building. To achieve this, we aim to expose local practitioners, professionals, and decision makers from the participating African countries to the state-of-the-art knowledge within road safety management based on Safe System principles, as well as supporting them by sharing necessary knowledge, tools, and methods for road safety improvements - adjusted to the African conditions and in tight cooperation with the local actors. In collaboration with universities and other educational bodies in the participating African countries an enhanced road safety training for safety practitioners, professionals and decision makers will be developed. This work-package will also propose tools and ways to maintain the sustainability of the developed training activities.

This deliverable reports the activities from Task 7.1 which has acted as an umbrella task and has compiled all the findings regarding existing training activities and gaps in training from the other WPs in the AfroSafe project. In addition to a review of findings from these WPs the task has involved additional data collection (interviews and collection of relevant documents). A predefined checklist has been established and used to structure and synthesize the information. This compilation will provide an integrated view of current training and capacity building activities, their level of depth and existing gaps. Further, the deliverable investigates efficient and effective ways to adjust the training activities towards the Safe System Approach and investigate what types of training are needed. Therefore, the deliverable also provides recommendations for future training activities in the African countries, particularly the setup of the Centre of Excellence (CoE) AfroSAFE Academy for road safety training.

1.2 Scoping of the task

According to the grant proposal, task 7.1 should to a large extent build upon information collected in the previous WPs, and only supplement this information with additional information when needed. However, it became clear that this would not be the most efficient approach. One reason for this is that the information that we requested was more specific and targeted than what was typically collected in the other WPs. A second reason is that the timing of subsequent activities in WP 7 did not allow for waiting to the end of the project to write this deliverable. We therefore decided to primarily rely on information collected as part of the task 7.1, and then to supplement this with information from other WPs.

It is important to note that the current deliverable does not cover *all* aspects of road safety education. Since the focus here is on "training the trainers", we will not go into details about curricula for *end users*, e.g., school children or novice drivers, but focus more on what is on offer for key actors within the various road safety pillars and how the trainers can teach the end users. The data collection in Task 7.1 will also try to understand where the training activities go on – e.g., although we do not directly interact with schoolteachers, it is still important to understand their role and responsibilities in promoting safety.

Broadly speaking we distinguish between two types of training 1) academic education at universities where people get education in the road safety domain and 2) short courses for practitioners in the road safety field. The formats of these two types of training activities will of course differ.

The report aims to end with recommendations related to gaps in the training activities. It is worth highlighting that we do not target to be comprehensive and cover all existing gaps but rather focus on the most important gaps that we have identified. By this we mean the most apparent gaps, the "lowest hanging fruit", and those that we believe have the largest impact on road safety.

2 Methods

2.1 Pillars and target groups based on Safe System approach

To structure the information about training activities we have used the five pillars[1] of road safety described in the Global Plan for the Decade of Action for Road Safety (WHO, 2011).

1. Road Safety Management
2. Safe Infrastructure
3. Safe Vehicles
4. Safe Road User Behaviour
5. Post-crash Care

In addition, we chose to identify what we have called key *target groups* within each pillar. These target groups can be defined as "the most important actors for instigating a Safe Systems approach for a given pillar".

We collected and synthesized data from each country of AfroSAFE project. We decided to follow a re-iterative process, where data collected as part of the task would be used as basis for discussions with local partners to spark some ideas and set the scene for the topics to be discussed. We spent the

---

[1] It should be noted that the Safe Systems approach as described by the ITF (2022) defines *six* pillars, but the AfroSafe project does not operate with safe speeds as an individual pillar.

first few months of 2023 collecting facts and figures for each country, and then presented these at a workshop involving local stakeholders in Ghana in June 2023.

2.2 Target Group Identification

A pivotal aspect of this task was to narrow down the list of target groups, ensuring that our subsequent steps would be focused and have an impact. Based on internet searches and interviews with local stakeholders we have therefore first identified a range of possible target groups (see Appendix 1). We then narrowed down this list to one *common* target group per pillar that we believed would be present in each of the involved countries; that would be possible to gain information about; and that would be specifically a relevant actor for applying the safe system approach within that given pillar.

These common target groups were National Road Safety Agency, National Public Road Administration, National Vehicle Inspection Agency, Traffic schools and Ambulance Services, see Table 2.1.

Table 2.1: Pre-selected and suggested target groups within each pillar

Target groups	Road-safety management	Safe infrastructure	Safe vehicles	Safe road-user behaviour	Post-crash care
Pre-selected	National Road Safety Agency	National Public Road Administration	National Vehicle Inspection Agency	Driving schools	Ambulance services
Suggested	NGOs Road administration, etc	Local road administration etc	Authorized car workshops Police, etc	Police, NGOs, etc	Fire brigades, Police, etc

In addition, the local partners were asked to identify one other *typical/relevant* target group considered to be the most relevant target group in their country. We tried to provide a generic name but discovered that this may be differently named in each country. For example, it can be either a ministry or a subordinate directorate that is the most relevant actor. At the onset of our work, we had a workshop with all partners in the project and brainstormed around the most relevant target groups in all countries, see Table 7.1: in Appendix 7.1.

2.3 Facts and figures template

We developed a template to be filled in by the identified target groups from each country. In total, 10 target groups from each country filled in this table. As presented in Table 2.2, the main aim was to collect information regarding the education formal requirements for each target group, institutes that provide this education, and the number of people with the required competence.

Table 2.2: Template for the form to be filled in (example, Road Safety Management)

Pillar	*Road Safety Management*
Target group	
Legislation	
Responsible admin unit	
Formal requirements? No/Yes –> content	
Educational objectives, curricula, syllabuses	
Educational institutions	
Foreign education? No/Yes -> where?	
No of people with required competence	

An example from Norway is presented in Table 7.3: in Appendix 7.1.

2.4 Instructions

Partners were given (partly) prefilled templates to complete, and the following instructions:

1. Look into what formal requirements that are needed to do the job, i.e. what certificates, requirements are needed in order to be qualified to work with safety issues in the particular pillars.

2. Identify the relevant educational institutions/training courses whereby the necessary qualifications can be achieved.

3. For the selected target groups, provide an overview of educational objectives, curricula, and syllabuses, in order to identify the degree to which a safe system approach is focused.

2.5 Input from the other WPs in AfroSAFE

To collect input from the other WPs in a structured fashion, we devised a short semi-structured questionnaire containing 7 questions describing in some detail findings from each WP regarding existing training activities. WP-leaders were instructed to write a brief outline, 1-2 pages in total supplemented with specific figures and illustrating excerpts from interviews of what they had learned about training for the specific pillar that was covered in their WP. The questionnaire to partners is enclosed in Appendix 7.2.

2.6 Methodology for recommending road safety courses

This section presents the methodology to develop with a list of active online, offline existing, and recommended road safety courses for academicians and professionals. The overall methodology is divided into three stages, which are outlined as follows, and illustrated in Figure 2.1:

Stage 1: We reviewed the list of online courses per pillar provided in Deliverable 6.1 report of the SaferAfrica an EU project (Gomes et al., 2017). The review aimed to determine which of these courses are still active and can be accessed online.

Stage 2: For the active online courses found in stage 1, the experts in the AfroSAFE project conducted a quality assessment check.

Stage 3: Following the quality assessment in stage 2, we developed a final list of recommended courses. The list consists of a subset of active online courses from the SaferAfrica project that were considered to have good quality and additional existing courses that the AfroSAFE experts proposed.
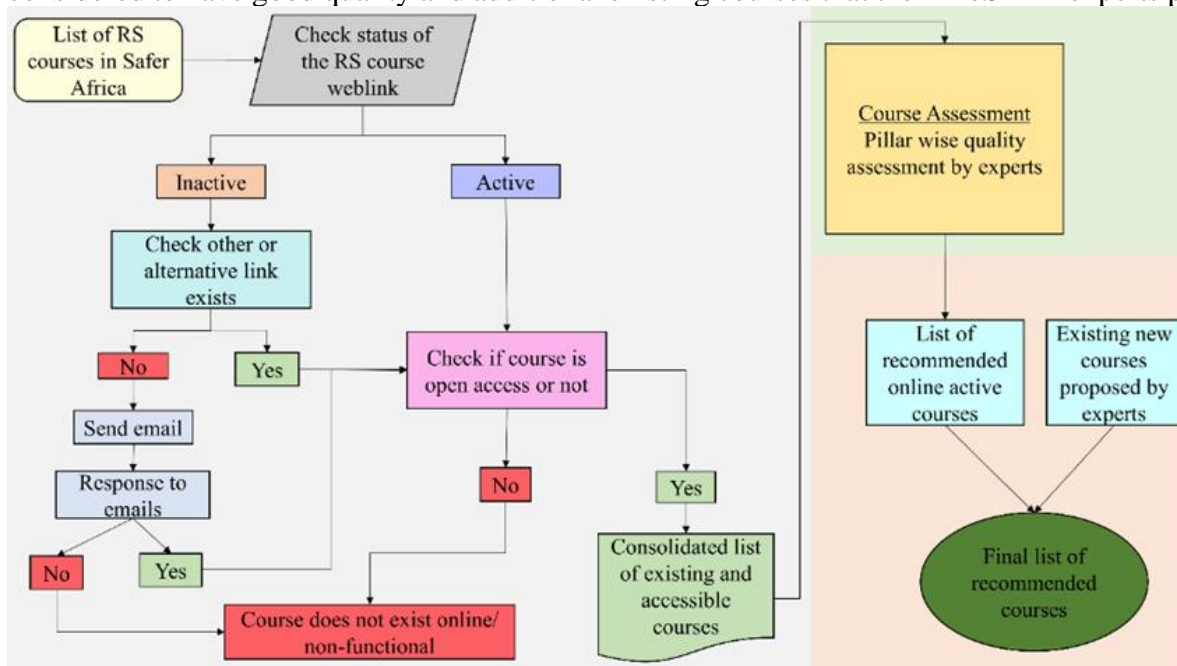
Figure 2.1: Overall methodology for developing a recommended list of road safety courses.

These three stages are further elaborated below.

2.6.1 Stage 1: Creating a consolidated list of online active courses

We followed three steps in developing a consolidated list of online courses.

2.6.1.1 Step 1: Developing a preliminary list of road safety courses

We first reviewed the list of online road safety courses and modules provided in Deliverable 6.1 report of the SaferAfrica EU project (Gomes et al., 2017). The SaferAfrica project aimed to establish a dialogue platform between Africa and Europe focused on road safety and traffic management issues (Usami et al., 2021). One of the project's objectives was to identify training needs and to develop capacity-building programs on road safety in African countries.

In particular, SaferAfrica's Deliverable 6.1 report, discusses the major challenges for developing a curriculum for African road safety experts and professionals. For each of the five road safety pillars, existing online road safety courses and modules in French, English, and Portuguese languages were listed in this deliverable. As a first step, we reviewed and checked whether the listed courses under each pillar are still active and available. We summarized the courses based on the course language (French, English, or Portuguese), and the accessibility criteria which we defined as follows:

- *Open access*: An open access course means that the content is freely available to users. Sometimes, the users just need to register using an email address to access the course content. These courses were highlighted in green in the Excel spreadsheet in Appendix 7.3.

- *Paid course*: A paid course means that the course is accessible only after paying a course registration fee. These courses were highlighted in orange in the Excel spreadsheet in Appendix 7.3.

- *Does not exist* anymore: We concluded that the course does not exist anymore when we could not find it even after web searching for an alternative link. These courses were highlighted in red in the Excel spreadsheet in Appendix 7.3.

Based on the above review, we developed a preliminary list of active online courses. Table 2.3, presents a summary of the number of courses categorized by language and accessibility criteria. A complete preliminary list of the courses is provided in Appendix 7.3.

Table 2.3: Summary of the number of courses categorized by course language and accessibility

Course's language	Accessibility			Total courses as per SaferAfrica project
	Open access	Paid course	Inactive web-link/ No online information	
English	6	10	9	25
French	0	5	1	6
Portuguese	0	6	13	19
Total courses	6	21	23	50

2.6.1.2 Step 2: Reaching out to host institutes/organizations for inactive courses

In step 2, we decided to proceed with further investigation of online courses in the English language only. The course retention criteria were decided based on the following factors:

1. Availability of the course content for assessment
2. Level of content accessibility of the course

Thus, in the preliminary list, twenty-five courses in the English language were retained. However, only 16 courses were either open access or paid courses, and 9 courses did not have an active web-link and no online information could be found. For the paid courses and the courses that we could not view via the web-link provided in the SaferAfrica deliverable 6.1 report, we contacted the host organization/institute and asked the following three questions regarding the course:

1. Is the course still active, or has it been updated/modified?

2. Is there an active/updated/modified course weblink?

3. Is the course open access?

Based on the responses received, we could only retain twelve courses for the quality assessment.

2.6.1.3 Step 3: Final list of consolidated active road safety courses for quality assessment

Based on the above two steps, we created a consolidated list of twelve active courses for the quality assessment by the AfroSAFE WP experts. Table 2.4 presents the pillar-wise summary of the courses. Under the pillars safe infrastructure and safe vehicles there were no active courses available.

Table 2.4: Summary of the pillar-wise number of online active courses

RS Pillar Description	Number of online active courses
Road Safety Management	6
Safe Infrastructure	3
Post-crash Care	3

2.6.2 Stage 2: Expert's assessment of the online active courses

The AfroSAFE WP experts assessed the consolidated list of twelve active courses. Table 2.5: presents the course assessment criteria used by the experts to assess the quality of the active courses. The list of active courses under each road safety pillar was sent to the respective experts within the AfroSAFE project. Since no courses were available under the pillars of safe infrastructure, and safe vehicles, the experts were asked to recommend courses related to these pillars. The quality assessment aimed to

identify the gaps in the courses from the perspective of developing core competencies of academics and professionals' education.

Table 2.5: Active road safety course assessment criteria

Criteria no.	Assessment criteria
1	Listing the content and syllabus (i.e., topics and themes covered) and gaps assessment
2	Year the course was established/started.
3	What are the learning objectives/outcomes (if available), and what is your input?
4	Target group and level of the course
5	Required pre-knowledge/prerequisite to be eligible to enrol in the course
6	Is there an entrance exam?
7	The teaching team and their qualifications
8	Which educational activities the course includes (e.g., projects, workshops, case studies, etc.)?
9	Duration (hours of teaching, student work, etc.)
10	Frequency in which the course runs (every six months/yearly/ biyearly)
11	Does the course have an evaluation criterion for the participants? Certification? Credits?
12	What are the clear benefits for the participants? Certification? Credits?
13	Final assessment of course quality in your opinion: Excellent, Good, or Average
14	Gaps identification (what is your opinion regarding the course assessment and the gaps in the course?)

The quality assessment aimed to identify the gaps in the courses from the perspective of developing core competencies of academics and professionals' education.

2.6.3 Stage 3: Final list of recommended courses

In this section, we present the final recommended active online road safety courses. We extend this list by recommending additional offline and one-time registration-based courses for academicians

and road safety professionals. Academicians and professionals can learn these courses individually and at their own pace.

2.6.3.1 Step 1: Final list of recommended road safety courses

The final and complete list of recommended courses is presented in Appendix 7.4. Based on the expert's assessment of these active courses, we suggest the following improvements to incorporate in the development of road safety courses for the road safety pillar:

- Updated and current research materials: It is essential to ensure that the course content remains up to date with the latest research and best practices in road safety.

- Incorporation of the road safety culture of the region: The course may consider different road safety cultures, with an in-depth exploration of cultural competency and its role in road safety.

- Target group-specific content: We suggest the course content is aimed towards a specific target group, for instance, professional drivers, veterans, refugees, or persons with disabilities.

- Case studies and practical application: We suggest including more real-life case studies and practical exercises that could help professionals apply the knowledge gained in the course to real-world scenarios in their jobs.

- Incorporation of interactive elements: Incorporating interactive elements like role-playing or simulations could enhance the learning and skill development of the professionals.

- Interdisciplinarity: road safety concerns different disciplines (e.g., engineering, psychology, social sciences, biomechanics) that interact and affect each other. Therefore, providing knowledge and insights to these relevant disciplines would be valuable.

- Advanced topics: The course could consider adding advanced topics in road safety such as safety issues due to the potential of Advanced Driving Assistant Systems in reducing accidents and protecting vulnerable road users.

- Road safety-driven organizational setup and change: We suggest course content should also provide examples of organizational setup or change for road safety. For example, how organizations can implement trauma-informed practices at an institutional level could be beneficial.

- We also recommend that while designing a road safety course, other aspects, such as a global perspective, emerging technologies, interdisciplinary collaboration, funding, and legal and ethical considerations to be discussed and considered.

2.6.3.2 *Step 2: Summary of existing courses in partner African countries*

We explored existing road safety pillar-wise courses in partner African countries. We asked African project partners to provide existing road safety courses in their respective country in a prespecified Excel format. Based on the provided data, we identified that there is total forty-two courses in Tanzania, three in Ghana, and thirteen in Zambia. Table 2.6 2presents a summary of the distribution of these courses per pillar. Some of these courses span more than one road safety pillar and therefore, the counts are 61 higher than 58. There was no course offered for the 'post-crash care' pillar. This

highlights the need for developing courses pertaining to this pillar. We could not conduct the quality assessment of the course due to lack of information.

Table 2.6: Summary of the number of course per pillar proposed by the participating African countries

Road Safety Pillar	Number of courses
Road Safety Management	18
Safe Infrastructure	12
Safe Vehicles	6
Safe Road User Behaviour	25

Most of the courses were offered to professionals. As shown in Table 2.7 approximately 84% of the courses were offered to professionalsTable 2.7Table 2.7. There were only two courses for bachelor students and eight for graduate students. The courses offered to students were university curriculum-based, taught in the classroom, and offered for at least a semester. In addition, the professionals were offered offline courses as a part of professionals' training programs.

Table 2.7: Courses in African Partners Countries by target group

Target group	Number of courses
Bachelor students	2
Graduate students	8
Professionals	54

Appendix 7.5 presents the AfroSAFE project partner African country's detailed course information.

2.6.3.3 Step 3: Additional recommended road safety courses

We have also conducted an additional search for available road safety courses provided internationally by different educational institutes and organizations and have summarized these for each road safety pillar in Appendix 7.6.

Furthermore, within the AfroSAFE project, we will develop a traffic safety course for academicians and professionals with particular attention to African road safety professionals' needs.

3 Status for current training activities

3.1 Road Safety Management

All countries have some kind of Road Safety Authority, some both at national and regional/district level. They are named somewhat differently: authority, council or committee; all apparently public. Ghana also has an NGO with a focus on road safety in this pillar, while in Zambia the accident investigation team is also considered as part of this pillar. Both in Ghana and Zambia Transport companies are also included in this pillar. While all the three African countries include both public and private agencies, neither of the European countries encompass other than public sector agencies. (See Table 7.1 in Appendix 7.1)

When it comes to **legislation,** all countries seem to have some kind of national road safety regulations, policies, and strategies. Some countries (Ghana, Sweden) have a specific road safety act or road infrastructure safety regulation (Netherlands), while for the other countries regulation of traffic safety seems to be embedded in the overarching transport policies and in a road traffic act.

The **responsible administrative unit** varies across the countries: It is a road safety authority within a Ministry of transport (in Ghana, Zambia and Denmark); within the Ministry of Home Affairs (in Tanzania), within the Directorate of Public Roads, under the Ministry of transport (in Norway) and in the larger Ministry of water and infrastructure (in Netherlands). In Sweden the responsible administrative units are the Swedish Road Administration (infrastructure) and the Swedish Transport Agency (mainly rules and regulations), both directorates under the Ministry of Rural Affairs and Infrastructure.

All countries state that there are **formal requirements** for a degree in Transport Planning/Management, Engineering, Business/Public Administration, Statistics, Economics, or other related programmes. Engineering seems to be the most common educational background; however, Tanzania also emphasises public health background and Norway puts forward a multidisciplinary (across technical and social science disciplines) composition of the employees in road safety management.

When it comes to specific **educational objectives, curricula or syllabuses** the data input is sparse. Ghana and Tanzania state that such educational objectives are not relevant; while Netherlands holds that it is required with a detailed analysis of specific educational programs. Norway mentions smaller courses of traffic safety (e-learning) or a one-week transport courses where traffic safety research is presented.

3.1.1 Most important safety-related activities in the African countries

Work package two in the AfroSAFE project concerns the Safe system pillar "road safety management" and is reported in deliverable 2.1. Here follows a summary of that deliverable.

Based on Varhely (2016), there are 12 elements which provide an ideal picture of effective national road safety management systems. These elements may be far from the reality in several countries, especially in low- and middle-income countries. The elements describe a range of key activities in national road safety management.

The most important safety-related activities that are done in this pillar in the African countries relates to the formal plans and strategies; most of the African countries have relatively promising road safety

plans and strategies, but they are only implemented to a very limited extent. In the European countries on the other hand, the road safety plans and strategies are implemented.

For the pillar of road safety management for the African countries, this means:

1) There are national overviews of road accidents, but there do not seem to be detailed overviews of accidents, with involved road users, types of accidents, risk factors etc. And no monetary valuation of the prevention of a fatality/injury accident.

2) There are generally no road safety strategies like e.g., Vision Zero or Sustainable safety.

4) There is not necessarily one responsible body for road safety on the national level. In Tanzania this was lacking.

5) The road Safety Problems are not described and analysed in the same detailed way as in the European countries, e.g., with detailed knowledge of status and development.

6) Road Safety Targets directed at road users, vehicles, and infrastructure, including complementary, non-accident-based indicators do exist in some countries. Ghana has good road safety targets.

7) Ghana has a good action plan for road safety, but it is not implemented as it should be.

8) Responsibility for Measures is not necessarily properly defined, and funding is often lacking.

9) Funding of measures is insufficient.

10) Measures with Known Effectiveness are not necessarily implemented.

11) Target indicators are not monitored if they exist. If any of them does not develop in the right direction, suitable countermeasures should be taken.

12) Due to low funding Research and Capacity Building are not stimulated.

3.1.2 Most important safety-related activities in the European countries

In the European countries, the road safety plans and strategies are implemented. For the pillar road safety management, this means:

1) The Burden and Nature of Road Casualties is defined. This involves mapping the number and types of fatal accidents, including defining monetary valuation of the prevention of a fatality/injury accident.

2) There is Commitment and Support to road safety from Decision Makers.

3) There is a Road Safety Policy or Vision. E.g., Vision Zero in Norway and Sweden and the "Sustainable safety" policy in the Netherlands.

4) Institutional Roles and Responsibilities are defined the existence of a responsible body for road safety on the national level, and definitions of institutional roles and responsibilities for important functions of road safety management. This involves responsibility for e.g., accident data registration, road maintenance, vehicle inspection, vehicle register, driver training, driver testing, driving license

register, enforcement of traffic rules, emergency assistance, traffic safety analyses, research and documentation services, training of professionals.

5) Road Safety Problems are identified as a basis for road safety actions and countermeasures, the road safety problems of the country should be identified in a systematic way.

6) Road Safety Targets are set, directed at road users, vehicles, and infrastructure, including complementary, non-accident-based indicators of road safety.

7) Strategies and Action Plans are formulated, e.g., with challenging, yet in principle achievable targets, priority to measures with known effectiveness, considerations of costs and expected benefits, a timetable.

8) Responsibility for Measures is allocated the responsibility for each of the indicators/actions, such as e.g., "Speed limit compliance", "Share of vehicles having 5 stars on NCAP scale", as well as monitoring of performance and outcome of all the above should be allocated to one respective responsible body.

9) Funding. The responsible bodies are not supplied with sufficient funding to implement all cost-effective road safety measures, but the situation is far better than in the African countries.

10) Measures with Known Effectiveness are to some extent implemented.

11) Performance is monitored. The status of the target indicators is monitored on a yearly basis, and feedback on their performance is given to the responsible bodies and to the national coordinating body; if any of them does not develop in the right direction, suitable countermeasures are taken.

12) Research and Capacity Building is stimulated. This involves developing research-based knowledge on RS problems and evaluate effectiveness of measures.

3.1.3 Knowledge requirements and ideals

To perform the 12 activities listed in accordance with the Safe System perspective, people working with road safety management should have knowledge of the Safe system approach in general, its underlying principles, the pillars, and the sub activities within the different pillars. Within the road safety management pillar, this involves all the key aspects of the continuous improvement process related to road safety management, e.g., proper collection, analysis and use of statistics about road accidents, including contributory factors, the use of safety performance indicators other than accidents, setting road safety targets, establishing road safety action plans, designating evidence based road safety measures systematically, allocating responsibility for the measures, and follow up etc. Thus, knowledge related to general principles and strategy is required as well as very specific knowledge about how to deal systematically with very concrete problems.

3.1.4 Most important gaps in training activities

The European countries have systematic training in the elements of Safe System, and many of them have based this on Vision Zero or Sustainable Safety for over 20 years. Thus, they are educated and trained on the importance of 1) Safe system approach in general; its underlying principles, the pillars, and the sub activities within the different pillars, and 2) all the key aspects of the continuous improvement process related to road safety management, e.g. proper collection, analysis, and use of statistics about road accidents, including contributory factors, the use of safety performance indicators other than accidents, setting road safety targets, establishing road safety action plans, designating evidence-based road safety measures systematically, allocating responsibility for the measures, and follow up etc. It is unclear if there are any systematic education and training in the African countries.

3.2 Safe Road Infrastructure

The **target groups** are the same as for road safety management, i.e., responsible administrative unit (departments, agency, directorates, administration) both at national and regional/local/urban level as road owners or otherwise responsible for the safety of roads. Also, NGOs, (private) road contractors or developers are listed – e.g., in Ghana, Zambia and Denmark. All countries directly focus only on road infrastructure, except in Netherlands where the responsibility for safe infrastructure is integrated in the larger ministry for infrastructure and water management.

The **legislation** for safe infrastructure varies across the countries – from the general roads act to certain highway codes or road geometric design (in Ghana).

The **responsible administrative unit** is mostly as the target group (and the same as for road safety management) the public road authorities, transport ministries and directorates. As mentioned earlier, Zambia has a different administrative organisation which means that this responsibility is embedded in the Ministry of Infrastructure, Housing and Urban Development and in the Ministry of Local Government and Rural Development. The Ministry of Transport and Logistics in Zambia is responsible for transport policy making.

All countries state that there are **formal requirements** for this responsibility – e.g., upper school (university admission certification) or degrees in building construction, transport engineering, road design or planning or related, often licenced by professional organisations or governments. Also mentioned are persons who carry out road safety audits (as in Netherlands) or particular job experience or on-job training (in Tanzania) or particular work practice/experience from road planning, traffic safety and traffic regulation (in Norway). Ghana holds specifically that such requirements must comply with the guidelines for the classification and licencing of contractors.

In line with these formal requirements, there are specific **educational objectives, curricula, or syllabuses** in the different countries, even if they may not be systematically established (like in Tanzania). Zambia has a certain civil engineering diploma for this, whereas the Netherlands and Norway have educational requirements for road safety auditors or certificated traffic safety revisors. In Denmark these educational objectives are listed together with the educational institutions where they belong.

All countries put forward their main **educational institutions** to educate these professionals responsible for safe infrastructure, i.e., the countries' technical universities that offer civil engineering programs. In Netherlands such training is managed by an independent organisation (KoVa) responsible for the road safety auditors (which, moreover, is outsourced to an engineering firm).

Whether **foreign education** is possible or not, also varies across the countries. Ghana says 'no', whereas Tanzania, Zambia says 'yes'. In the Netherlands road safety auditors from other EU countries can apply for the Dutch certificate, whereas Norway has traffic safety auditors educated in Denmark.

The number of people with the required training or education are listed in Appendix 7.7. Table 3.1 shows the number of employees in public roads authorities and the number of people with road safety auditor certificates per million inhabitants in each country.

Table 3.1: Employees in public roads authorities and number of people with road safety auditor certificates per million inhabitants in each country

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Employees at national road directorate/ million inhabitants	28	11	2	155	571	907	962
People with road safety audit education/ million inhabitants	0,2	0,4	0,3	34,5	0,8	46,3	1,4

There is a large difference in scale between the African countries and the European countries in how large their national road authorities are. Whereas Norway and Sweden have close to 1000 employees to a million inhabitants, this figure ranges from 2 to 28 in African countries. Some of this difference might be explained by organisational differences, with more responsibilities being delegated to local and national authorities in the African countries. Maybe more telling, and more directly relevant for road safety is then the difference in number of people with certification as road safety auditor. The scale difference between African and European countries ranges from 2 (between Tanzania and Netherlands) and 200! (between Ghana and Norway).

3.2.1 Most important road infrastructure safety-related activities in African countries

Regarding Road Infrastructure Safety Management, Road Safety Audit and Road Safety Inspection are practiced nationwide in all three countries. In Ghana, Black Spot Management and Network Safety Management are practiced occasionally, and Road Assessment Programme is practiced locally. In Tanzania, Road Assessment Programme is practiced to some degree. In Zambia, Black Spot Management is practised occasionally.

3.2.2 Most important road infrastructure safety-related activities in European countries

In EU countries, systematic activities are carried out in Road Infrastructure Safety Management (RISM), such as:

- Black Spot Management (identification and treatment of hazardous road locations in the road infrastructure)

- Network Safety Management (identification and treatment of road sections with high accident concentration)

- Road Safety Impact Assessment (assessment of the safety effects of building new roads)

- Road Assessment Programme (assessing the safety level of existing roads)

- Road Safety Audit (a formal safety performance examination of planned roads by an audit team)

- Road Safety Inspection (a formal, systematic review of existing roads with the intention of identifying potential hazards).

3.2.3 Knowledge requirements

The mandatory utilisation of all RISM tools should be stipulated by national legislation. Also, national legislation should point out the supervisory authority with responsibility to supervise the process of carrying out these RISM activities, issue authorisation for certified experts who can carry out these RISM activities and keep an open database of certified experts. Legislation should also prescribe that the accident database owner regularly provides the road authority with accident data necessary for carrying out RISM activities.

A national regulatory framework should be established regarding procedures and responsibilities for initiating, carrying out, supervising, administrating and documenting RISM activities.

The procedures for carrying out the various RISM activities should be described in detail, pointing out the involved stakeholders, with their responsibilities, such as the project owner (road agency) with the responsibility to initiate the activity, procurement, the designer/planner organisation with the

responsibility to provide all necessary information, and the expert team carrying out the RISM activity and reporting their findings to the project owner.

For carrying out Road Safety Audit, Road Safety Inspection, and Road Assessment Programme, appropriate international guidelines are available. However, it is recommended that national Manuals/Guidelines are developed for:

- Black Spot Management in Tanzania and Zambia, and
- Network Safety Management and Road Safety Impact Assessment in all three countries.

A training centre with staff and curricula for training road safety professionals to carry out the various Road Infrastructure Safety Management activities should be established. The trainers might be brought in from outside when needed, but the permanent secretary of the training centre should continuously monitor the need for training and advertise training courses. After the training centre has issued a certificate for a completed course, the supervisory authority should authorise certified experts in various RISM methods.

3.2.4 Education levels

Both in Europe and Africa the typical education levels are Bachelor/Master of science in transportation/civil engineering, and besides 5 years of experience in road infrastructure safety engineering is needed to become a qualified road safety auditor.

3.2.5 Most important gaps

The most important gaps in training for African countries is that there are no short courses in RISM, so they are referred to courses overseas.

3.3 Safe Vehicles

The **target group** for the pillar 'safe vehicles' contains (accredited) private workshops/garages as the main contributor while there are also vehicle inspection authorities in Zambia and the European countries. In Ghana and Tanzania also private car dealers and vehicle importers are listed. In Denmark an NGO like the Danish Automotive Federation is said to have a responsibility for the safety of vehicles. However, for the other European countries this overall responsibility seems to be mainly public authorities. Zambia and Sweden also mention the police as being responsible for safe vehicles, while Tanzania is the only country who puts forward their Bureau of Standards.

When it comes to **legislation**, there are road traffic regulations in general and, in the European countries, EU directives and a framework regulation for whole vehicle type approval in particular. For instance, in Denmark the Danish Vehicle Act regulates the requirements for vehicle equipment, registration and inspection. In Sweden there are laws regarding qualifications required for vehicle inspection. For the target group 'vehicle importers' the custom excise and import registration standards are highly important. For the target group 'private garages/workshop' there are specific regulations for the work on vehicles (e.g., in Norway).

The **responsible administrative unit** is mostly the public road transport authorities, which is, however, specified to be the 'driver and vehicle licensing authority' in Ghana, Road Transport and Safety Agency in Zambia and Denmark, a Swedish accreditation board, the Bureau of Standard in Tanzania and the Netherlands' vehicle authority. In Denmark there is a private organisation, the Danish Automotive Federation, working in cooperation both with various authorities and the automotive industry.

Formal requirements for the safe vehicle pillar encompass relevant equipment, tools and standard as well as the necessity for the garages to be registered as a legal business. Educational requirements for the staff might be business administration, marketing, engineering or related, such as e.g., the

requirements for technical inspectors. In Norway vehicle workshops must have a technical manager approved by the NPRA.

When it comes to **educational objectives**, both Ghana and Tanzania confirm, while Netherlands states that there is a minimum requirement for a bachelor's degree in (automotive/mechanical) engineering (however, also with more recent opportunities of IT, mechatronics, etc.).

The **educational institutions** are again mainly the technical universities/colleges. In Norway, however, there is a specific upper school education to be a 'car mechanic'.

Foreign education does not seem be too relevant in the African countries, while Norway states that similar education in EU-countries will qualify for similar work with safe vehicles.

Statistics regarding car mechanics in the involved countries can be found in Appendix 7.7. Table 3.2 summarises these statistics, as number of mechanics and accredited garages per million inhabitants.

Table 3.2: Car mechanics and accredited garages per million inhabitants in each country.

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Mechanics/ million inhabitants	1220	-	256	759	394	2778	3399
Garages/ million inhabitants	1.1	-	0.3	708	1501	741	433
Vehicle inspectors/million inhabitants	3.7	1.3	1.0	76.9	6.2	37	-

There is not a large difference between African and European countries in the number of trained mechanics, at least not on paper. The largest difference seems to be that there are more accredited garages in Europe, typically in the hundreds per million inhabitants, whereas in African countries there are only a handful. Also, for vehicle inspectors (i.e., those responsible for type approvals and roadside testing of heavy vehicles) we can see large discrepancies.

3.3.1 Most important gaps for safe vehicles

At the fundamental level, the most important gap to be addressed for vehicle safety is awareness and adoption of the seven key UN agreements for vehicle safety. Of these, the 1958[1], 1997[2], and 1998[3] are the most important towards significantly advancing vehicle safety in Africa. While some African nations (South Africa, Nigeria, Egypt, and Tunisia) have adopted and ratified these three agreements, Ghana, Tanzania, and Zambia have not. The UN 1958 and UN 1998 agreements concern the adoption of harmonized technical regulations for wheeled vehicles (see AfroSAFE Deliverable 4.1 for more details). The adoption of these regulations is a global priority from the United Nations Economic Commission for Europe, the World Health Organization, and other international bodies (ITF, 2023;

---

[1] 1958 Agreement concerning the Adoption of Harmonised Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations. Full text available at: https://unece.org/trans/main/wp29/wp29regs

[2] 1997 Agreement concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles. Full text available at: https://unece.org/transportvehicle-regulations/text-1997-agreement

[3] 1998 Agreement concerning the Establishing of Global Technical Regulations for Wheeled Vehicles, Equipment and Parts. Full text available at: https://unece.org/text-1998-agreement

United Nations Economic Commission for Europe, 2021, 2022; World Health Organization, 2023). The following are the most important gaps for the 'safe vehicles' pillar.

1. Global harmonized vehicle standards and regulations

   The three African countries have not yet adopted the UN 1958, 1997, and 1998 Agreements, making it challenging to ensure that vehicles meet modern safety requirements. This also impacts the safety standards of both newly produced vehicles for these markets as well as used imported vehicles. The adoption of the 1997 agreement can support the nations with more stringent and modern roadworthiness and periodic technical inspections.

2. Safety systems in all phases of crashes

   Modern vehicles are equipped with several safety systems which work at different stages of the crash sequences to minimize and mitigate the risk of injury. These systems are active during normal driving (Anti-lock Braking System, Electronic Stability Control), during crash unavoidable phases (Automatic Emergency Braking), and during the crash phase (seatbelt pretensioner, seatbelts, airbags). The importance of the safe working of these systems cannot be understated. Road worthiness inspection upon import and annual inspections must ensure that these systems are present (not illegally removed or deactivated) and in good working condition.

3. Periodic Technical Inspections based on the UN 1997 Agreement concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles

   In addition to crash protection systems, there are several other aspects of the vehicle that must be inspected during PTIs. These are defined in the UN 1997 agreement and include brakes, lights, anchorages and fitments, door locks, emission control etc., including modifications that deviate from the type approval certificate for the vehicle. If a vehicle has undergone a type approval process and adheres to international or national standards, it is likely to have a design and construction that already meets many safety and environmental criteria.

4. Awareness of safe, imported vehicles including crashworthiness and roadworthiness according to global standards

   It is quite common for crashed but repaired vehicles from EU, USA, and Japan to be exported to other parts of the world. Under the UN 1958 Agreement, provisions related to the roadworthiness of repaired vehicles are outlined. The agreement includes technical prescriptions and standards that address the proper repair and maintenance of vehicles, especially those that have been damaged in crashes. These technical prescriptions cover aspects such as structural integrity, safety features, and other components that contribute to the overall roadworthiness of a repaired vehicle. The adoption of UN 1958 agreement can control the minimum safety standard of vehicles imported into the country, and in extension, guide local authorities, mechanics, and vehicle dealers with spreading awareness to the general public on the safety standard of the imported vehicles.

5. Awareness of consumer rating programs (NCAP)

   The New Car Assessment Program (NCAP) has played a crucial role in increasing awareness of vehicle safety among the general public in many parts of the world. NCAP programs are implemented by various organizations worldwide to evaluate and communicate the safety performance of vehicles to consumers. NCAP programs provide comprehensive safety information to consumers, including details on crash test results, safety features, and potential risks associated with specific vehicle models. The availability of detailed information empowers consumers to make informed decisions when purchasing a new (or used) vehicle,

helps promote safety as a critical factor. This can help significantly improve the safety standards of both new and used vehicles imported into the African continent.

6. End-of-life vehicles and importance of vehicle scrappage in modernizing fleets

The median age of used vehicles imported to Africa is 15 years (ITF, 2023). This means many of the vehicles entering African roads are lagging in modern crash safety standards of the exporting countries. Many of these vehicles continue to be used several years after import. Scrapping old vehicles is an important step towards speeding up of phasing-out these older, unsafe vehicles to modernize and increase the general safety of the nation's fleet. Scrappage typically refers to end-of-life vehicles or vehicles older than a certain age. End-of-life vehicles are those deemed no-longer road-worthy based on fitness and emission tests (in the EU, end-of-life vehicle is defined in Directive 2008/98/EC). Scrappage policies should encourage private individuals to voluntarily surrender older vehicles in return for payment, tax incentives, and discounts on new vehicles, such as the recent policy implemented in India (Ministry of Road Transport and Highways, n.d.; G.S.R. 221(E), 2022; G.S.R. 720(E), 2022).

3.3.2 Training gaps

Most of the challenges mentioned above are mostly in the domain of policy adoption and implementation. It can be questioned whether training as such can play a role in the process of adopting these policies. With all likelihood the barriers towards policy implementation exists at a political level and are not influenced by any training activities. Maybe a better understanding of the risks involved in allowing for end-of-life vehicles to be imported among policy makers should eventually lead to a stronger call for this policy to be adopted among politicians, but this would not be among the lowest hanging fruits, and not something to recommend with the framework of a project such as the AfroSafe. A more viable option, and a lower hanging fruit is to set up a program for education about the importance of the Global NCAP. An intriguing approach in that regard is to have a consumer-oriented approach, with the ultimate goal to raise awareness among readers. Therefore, such a program should be directed towards the education of media and journalists.

A second, quite tangible and effective measure would be to improve the vehicle inspector training. In all of the countries we have identified that such training exists, but that it is very basic. Therefore, the possibilities for setting up a brief training program in e.g. Sweden or Norway should be investigated.

3.4 Safe Road User Behaviour

The **target groups** for this pillar are public authorities, driving schools and the police. Most countries also include NGOs (i.e., associations for traffic safety; AMEND in Zambia and Tanzania), as a target group within this pillar. In some countries (Zambia and Sweden) public road administration is seen to have a role as a target group also for this safe road user behaviour pillar.

Legislation for this safe road user behaviour pillar is mainly embedded in the general road traffic regulations or in specific Motor Vehicle Driver Instructions Act (in Netherlands) or regulations on traffic education and driving tests (in Norway and Sweden). Denmark mentions specifically the Alcohol and Traffic Act that sets limits on the amount of alcohol for drivers and a Pedestrian and Cyclist Act that sets out rules for these road users.

The NGOs for the voluntary road safety work have more general goals and try to influence both the public and policy makers. In general, this is done by providing short courses and campaigns. For instance, the goal of the Swedish NGO (The National Traffic Safety Association, NTF) is to: "increase the ability and willingness of politicians, authorities, organisations, companies and

individual citizens to make demands on car dealers and themselves contribute to better road safety and public health''.

The **responsible administrative unit** is mostly the general road transport authorities. In Tanzania it would be the Police force department, in the Netherlands the Central Bureau of Drivers Licences and in Swedish Road Administration and the Swedish Transport Agency. For instance, a driving schools may only be allowed to operate after permission from the Swedish Transport Agency.

When it comes to **formal requirements** a driving instructor need to be at least 21 years old, hold a driving licence for about 3 years and have no motoring convictions. The training takes place at a college or a vocational school and last from 3 to 24 months, see Table 3.3. In addition to this they need to pass a vision test and a basic health screening. For NGOs there are no formal requirements.

The **educational objectives, curricula and syllabuses** for the driving school are formal exams and certifications, that might be both a practical and theoretical exam. In Norway there is curricula in handbooks prepared and approved by the NPRA and in Sweden particular course programmes, e.g., meeting the Goals for Driver Education (GDE), for further information about GDE see 3.4.2.

The **educational institutions** are both central, public driving schools (at universities/high school) but also private driving schools (in Sweden).

Most countries allow **foreign education**, if it is at a certain level (Ghana) or for the European countries, it is a traffic teacher approved in other European countries. In Sweden the theoretical test can even be carried out in 14 different languages.

3.4.1 The training of driving instructors in seven different countries.

An overview of training requirements and statistics over driving instructors in the countries who are involved in AfroSAFE is found in the Appendix 7.7. Table 3.3 shows the number of driving teachers and schools per million inhabitants in the different countries.

Table 3.3: Driving schools and teachers' qualifications.

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Driving teachers/ million inhabitants	27	311	-	345	925	537	307
Driving schools/ million inhabitants	9	269	8	293	509	204	88
Legislation year	1973	1973	2002	2008	1993	2004	2008
Months of training	36	3	3	12	6	12-24	12
Education level	College	College	College	College	College	College	College
Number of people with edu				3416		2900	
Number of schools	291		150	1700	8903	1100	911
Pop.	32.8	63.6	19.5	5.8	17.5	5.4	10.4

Table 3.3 shows that there is not much difference among the countries in terms of entry level requirements to become a driving instructor. Ghana has the longest training with 36 months, followed

by Norway, where the education can take up to 24 months. If we disregard the Ghana result, the African countries tend to have somewhat shorter training duration than the European.

The number of people with **required qualifications** is only known for Ghana and Zambia (estimation of number of schools) among the African countries. With this limitation in mind, there is still an apparent gap in available resources compared to European countries.

3.4.2 The GDE matrix as framework for understanding driver training

The objectives of driver training have shifted from an earlier focus on vehicle manoeuvring skills to focus on cognitive skills and risk awareness. This shift is based on research demonstrating that skill in manoeuvring and controlling the vehicle is not sufficient for a driver to drive in a safe manner. This has also been supported by Elvik et al. (2009) in a meta-analysis which concluded that too much focus on handling the vehicle can have a detrimental effect on road safety since it can lead to an overestimation of skills and greater risk-taking. Based on research findings a framework of educational goals has been developed; the so-called GDE matrix (Goals for Driver Education, Hatakka et al., 1999), see Table 3.4.

Table 3.4: The GDE matrix.

	Knowledge and skill	Risk increasing aspect	Self-assessment
Goals for life and skills for living	Lifestyle, age, sex, Personality, Group norms, Company culture	Sensation seeking Risk acceptance Safety ignorance Peer pressure	Introspective competence Own preconditions Impulse control
Goals and context of driving	Time planning Route planning Fitness to drive	Alcohol, Stress, Tiredness, Rush hour	Own motives influencing choices Self-critical thinking
Driving in traffic	Traffic rules Co-operation Hazard perception Automatization	Speeding Close following Low friction Vulnerable road users	Calibration of driving skills Own driving style
Vehicle control	Car functioning Protection systems Vehicle control Physical laws	No seatbelts Breakdown of vehicle systems Worn-out tyres	Calibration of car control skills

The matrix consists of four levels. *The highest level*, "Goals for life and skills for living" refers to personal circumstances and aspirations in life from a general perspective. This level is based on knowledge that social, psychological and demographic factors affect the behaviour and involvement in accidents. It emphasizes that the decisions we make and the motivation that governs our choices are largely a result of the personal circumstances we carry with us into the role as road users. The *second highest level*, "Goals and context of driving", focuses on the journey itself and the strategic choices that deal with the destination of the journey and the context in which it takes place. Here, the focus is on why it is necessary to embark on a journey, if that is the case, where to travel, with whom and under what circumstances. More precisely, it may be a choice between using the bike, car, or bus, to travel during the day or in the evening, during rush hour or not. It can also involve decisions to drive when tired, stressed or under the influence of alcohol.

The second lowest level, "Driving in traffic", is about mastering various concrete situations in traffic. A road user must be able to adapt his/her driving behaviour to the constant changes that take place in traffic, e.g., at intersections, at pedestrian crossings or when overtaking. The ability to identify potential hazards in traffic is also at this level. At *the lowest level*, "Vehicle control", emphasis is

placed on the operation of the vehicle itself. For example, being able to start and shift gears well enough belongs to this level, as well as techniques for more complicated evasive manoeuvres, braking effectively, avoiding skidding on slippery surfaces, and understanding how the laws of nature affect vehicle movements. The function and benefits of injury and accident prevention systems such as motorcycle, bicycle and moped helmets, lights and reflectors, seat belts, child seats and airbags, also belong here.

However, a safe road user should not only be skilled, but also risk-aware, which means being aware of hazards as well as being aware of their own strengths and weaknesses. Thus, in addition to the four levels described, the matrix contains three different columns. *The first column*, "Knowledge and skills" describes what insights the road user needs to behave safely. At the bottom two levels of the hierarchy, this includes knowing how to manoeuvre the vehicle and what kind of protection should be used. I also include an understanding of rules and regulations. At the two higher levels, the column refers to how safe trips should be planned and understanding how personality, group norms etc. can affect behaviour.

In *the second column*, 'Risk-increasing aspects', the emphasis is on awareness of factors that may be related to greater risks. At the two lower levels, it may be a matter of understanding the risks of cycling at intersections, as a pedestrian demanding one's right at pedestrian crossings, overtaking when the visibility is poor, exceeding the speed limit in a residential area, having worn tyres or bad brakes, lacking the routine to perform simple manoeuvres, etc. Higher up in the hierarchy, the second column refers to the risks associated with driving when tired or intoxicated, to walk or drive in the dark, etc. The top level includes possible risk-enhancing aspects, such as, lifestyle, personality, and peer pressure.

The third column, "Self-assessment", covers the road user's ability to assess themselves. At the bottom two levels, it is a matter of understanding one's own ability to handle the vehicle and to behave safely in traffic. At the higher levels, "self-knowledge" is about becoming aware of one's own perception of risks and norms regarding risky behaviour in traffic. All four levels of the matrix should be considered significant in each context. They are part of a whole system of skills and insights. Such an approach means that all levels should be included in road safety education. It is important to clarify the hierarchical structure and that conditions at the highest level affect strategic choices and behaviours at the lower levels.

Based on this it can be concluded that teaching according to the GDE matrix requires a different form of training for driving instructors. It is not enough to be able to teach the students how to handle the car. The teacher also needs to interact with the student covering all levels of the matrix. This in turn also requires additional pedagogical methods which first and foremost starts with and understanding of the students' own motives.

3.4.3 Driver training in Europe and Africa

Deliverable 5.1 in the AfroSafe project (Forward, Mwamba, Sam & Masaki, 2023) is a comparative study assessing the quality of driver training and how it is conducted in Ghana, Tanzania and Zambia presented the following findings.

The mandatory elements are identical in the different countries. This means that they must be 18 years or above, have obtained a learner/provisional driving licence and are medically fit before they can start with their training. However, some drivers have acquired a valid driving license without going through the formal laid down procedures. It was also pointed out that corruption is undermining the (novice) driver training and certification. When it comes to formal driver training then all schools have to teach according to an approved curriculum. However, when it comes to the quality of the

training the conclusion was that it is not par with best practice standards. The problem is that the training focuses too much on something described as "lower-order skills", i.e., how to handle the vehicle rather than "higher-order skills". The latter means that risk-perception aspects and self-assessment are not included in the teaching (i.e., higher order skills as described in the GDE).

Driver training is mainly something the driver will be subject to once. This is usually the case even if they lose their licence and must renew it. However, this is not enough, and many road users need to be remined of rules and regulations but also remined of their own limitations. This is why public campaigns are so important but to become effective they need to be developed and implemented according to best practice (Delhomme et al., 2009).

3.4.4 Campaigns

A road safety campaign can be defined as follows:

> "Purposeful attempts to inform, persuade, and motivate a population (or sub-group of a population) to change its attitudes and/or behaviours to improve road safety, using organised communications involving specific media channels within a given time period, often supplemented by other safety-promoting activities (enforcement, education, legislation, enhancing personal commitment, rewards, etc.)." (see Delhomme et al., 2009).

The intervention can be targeted on an individual or societal level. Campaigns targeted on the individual level could be in the form of education, rehabilitation and/or punishment. It may be used to increase road users understanding of risk and includes both short- and long-term programmes. Intervention on a societal level use different forms of mass media campaigns and is targeted to a wider audience. It may be used to increase the public knowledge of the problem, change social norms and reduce the number of violations committed. It can also be used by public authorities to increase the acceptance of for instance new speed limits.

The results of meta-analysis including 437 individual campaigns showed that campaigns can be successful in reducing a number of outcome measures, including risk comprehension (16 per cent increase), yielding behaviours (37 per cent increase), speeding (16 per cent reduction), seatbelt use (25 per cent increase) and accident reduction (9 per cent decrease) (Phillips, Ulleberg., & Vaa, 2009). The evidence also suggests that the likelihood of success could be enhanced if the methods used are improved. That is based on a theoretical model, selecting a specific target audience, focusing on one theme and if possible, use in combination with enforcement. Results from another meta-analysis showed that 8.5% of crashes could be reduced if traffic safety campaigns were combined with traffic enforcements. If this was followed by yet another campaign then this figure increased to 15% (Delhomme et al., 1999). This would then agree with the deterrence theory which states that people will avoid an illegal act if they believe that it will result in sanctions (see Freeman et al., 2006).

However, to date very few campaigns are planned, designed, and implemented, according to best practice (see, Delhomme et al., 2009). The problem is also that only a few campaigns are based on a sound understanding of the target group. For instance, campaigns aimed at changing attitudes about crash risks and traffic safety may have little or no success, because most drivers believe that road crashes happen to others and that they are both safe and skilful. Another problem when trying to change maladaptive behaviour without an understanding of the target group is that the same behaviour might have been carried out over a length of time without encountering any negative consequences. This means that the behaviour has become habitual.

A campaign might also fail because it tries to appeal to reason rather than to emotions. Regarding seat belt usage, it has been found that most drivers know that seat belts protect the person, but this kind of information would not appear to change behaviour by itself. If they believe that:" Seatbelts make me to feel locked in" or that" It is difficult to put on" then it is this which determine behaviour rather than their knowledge.

Therefore, the understanding of a message depends, at least in part, on the receivers' own underlying beliefs. A message which runs counter to an individual's own beliefs may be re-interpreted to become

more consistent, partly ignored, repressed or compartmentalized. To be effective it is necessary to involve both the intellect and the emotions, it is these beliefs, so called salient beliefs, which need to be challenged.

3.5 Post-crash Care

In the pillar 'post-crash care' the **target group** of Emergency/Ambulance services and workers are listed in all countries, while fire brigades and rescue forces are included in Tanzania, Zambia (and Denmark and Norway). Ghana, Zambia, and Denmark put forward medical services, hospitals, and rehabilitation centres in general while Ghana points out physiotherapist support in particular. The police are seen as a target group also within this pillar – in Denmark and Norway.

Sweden has a somewhat different approach by also including the Civil Contingency Agency (i.e., the civil defence) as a target group for the post-crash care.

The aggregated results from our data collection regarding ambulance workers is presented in Table 3.5.

Table 3.5: Ambulance workers per million inhabitants

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Ambulance workers/ million inhabitants.	58	3	128	564	374	626	250

There are some holes in our data, so it is a bit hard to compare, but if we are to believe the data there does not seem to be any large discrepancies between the European and the African countries in training for ambulance workers. However, the number of workers differ a lot, with less than a hundred per million in African countries, and typically 250-600 per million inhabitants in Europe.

3.5.1 Most important post-crash safety-related activities in the African countries

Example of key elements of post-crash response according to the key stakeholders in Zambia:

Questions	Policy Level Responses	Law Enforcement Agencies	Health Institutions
What are the key elements of an effective post-crash response?	▪ Policy support for emergency handling ▪ Recruitment of qualified staff for emergency medicine ▪ Ensuring comfort for RTA victims ▪ Ensuring the availability of medicines	▪ Understanding of the Road Safety Act ▪ Effective communication ▪ Network response centre ▪ Adequate response vehicles ▪ Adequately trained personnel ▪ Save lives & secure property	▪ Saving lives ▪ Medical handling of victims of RTA ▪ Establishing RTA complications of the victim ▪ Treatment ▪ Comfort for victim

3.5.2 Most important post-crash safety-related activities in the European countries

- **Emergency Services:** Rapid deployment of emergency services, including police, fire, and medical personnel, to the accident scene is crucial. They play a key role in providing immediate medical assistance and ensuring the safety of the affected individuals.

- **Rescue and Extrication:** Trained responders work to safely remove individuals from damaged vehicles, particularly in cases of entrapment. Proper techniques and equipment are essential to minimize the risk of further injury during extraction.

- **Medical Care:** Post-crash response involves providing prompt and effective medical care to injured parties. This may include on-site triage, stabilization, and transportation to hospitals.

- **Traffic Management:** Ensuring traffic control and road safety around the crash scene is vital to prevent secondary accidents. This includes redirecting traffic, setting up roadblocks, and ensuring clear signage.

- **Investigation and Documentation**: Law enforcement agencies conduct thorough investigations to determine the causes of the crash. This information is crucial for both legal purposes and for improving road safety in the future.

- **Victim Support and Family Assistance:** Providing support to crash victims and their families is essential. This includes counselling, legal assistance, and assistance in dealing with insurance claims and other paperwork.

- **Public Awareness and Education:** Educating the public about safe driving practices, the importance of wearing seatbelts, and the dangers of drunk driving, distracted driving, and speeding is an ongoing activity to prevent future accidents.

- **Vehicle Safety Features:** Encouraging the use of vehicles equipped with advanced safety features, such as airbags, anti-lock brakes, electronic stability control, and collision avoidance systems.

- **Regulatory and Policy Measures:** Implementing and enforcing traffic laws and regulations to improve road safety. This includes measures like speed limits, alcohol limits, and seatbelt laws.

- **Infrastructure Improvements:** Continuously assessing and improving road infrastructure, including signage, lighting, and road design, to reduce the likelihood of accidents.

- **Data Collection and Analysis:** Gathering and analysing crash data is essential for identifying trends and areas of concern. This information is used to inform safety policy decisions.

- **International Collaboration**: European countries often collaborate on road safety initiatives, sharing best practices and research to collectively improve safety standards.

3.5.3 Key actors both in European countries and African countries

- **Government Authorities:** These include national and local government bodies responsible for road safety regulations, law enforcement, and emergency response coordination.

- **Law Enforcement Agencies:** Police departments and traffic enforcement agencies play a vital role in post-crash response, accident investigation, and enforcing road safety laws.

- **Emergency Services:** Ambulances, Medical personnel, fire departments, and rescue teams respond to accident scenes, provide immediate medical care, and extricate individuals from damaged vehicles.

- **Healthcare Providers:** Hospitals and medical facilities provide care to injured individuals, including emergency medical treatment, surgery, and rehabilitation.

- **The general public:** Since post-crash care is poor/lacking, in many cases bystanders and local people take on the role as first-aiders and ambulances

3.5.4 Knowledge requirement and ideals

For post-crash response, the Safe Systems approach focuses on minimizing the severity of injuries and fatalities resulting from road accidents:

- **Emergency Medical Expertise:** Healthcare professionals and emergency responders should have advanced knowledge in trauma care and medical procedures specific to road traffic accidents. This includes triage, wound management, and life-saving techniques.

- **Extrication Techniques:** Rescuers need specialized knowledge and training in vehicle extrication techniques to safely remove individuals from damaged vehicles without causing further harm.

- **Injury Assessment:** Understanding the types of injuries commonly associated with road accidents and how to assess and prioritize treatment based on injury severity is crucial.

- **Traffic Management and Scene Safety:** Responders should be knowledgeable about traffic management to ensure the safety of victims and emergency personnel on the scene. This includes setting up roadblocks, redirecting traffic, and creating a safe environment for medical care.

- **Communication and Coordination:** Effective communication and coordination among emergency services, law enforcement, and healthcare providers are essential for efficient post-crash response.

- **Psychological First Aid:** Responders should be trained to provide psychological support to victims and their families, as well as fellow responders, in the aftermath of a traumatic event.

- **Evidence Preservation:** Law enforcement personnel must be trained to preserve evidence at the accident scene for later investigation and legal purposes.

- **Advanced Life Support (ALS):** Emergency medical personnel should have advanced training in providing life support for seriously injured individuals, including airway management and advanced cardiac life support.

- **Understanding Safe Systems Principles:** While primarily focused on the immediate response, it is beneficial for responders to understand the broader Safe Systems principles to align their post-crash actions to minimize injury severity.

- **Data Collection and Reporting:** Responders should be trained in collecting and reporting data related to the crash, injuries, and emergency response, which can be used for future safety analysis.

3.5.5 Education levels in European countries

Healthcare professionals, such as doctors, nurses, and paramedics working in emergency medical services (EMS), generally have advanced degrees or certifications in medicine, nursing, or paramedicine.

Firefighters often undergo specific training and certifications in addition to a high school diploma.

Police officers involved in traffic law enforcement typically have completed a high school diploma or equivalent. Many may have additional training and specialized courses related to traffic

management and safety. Some officers may have higher education degrees, particularly if they are in supervisory or administrative roles.

3.5.6 Education in African countries (exemplified by Ghana)

3.5.6.1 Paramedics:

Paramedics represent the highest level of training in Ghana's ambulance services, capable of performing major medical interventions beyond the scope of basic or advanced technicians. Remarkably, there are only three paramedics in the entire country. Due to the complexity of their training, they are sent abroad to the United States for specialized education. A recent collaboration with a US institution has facilitated this training initiative, offering invaluable support in developing paramedic expertise.

3.5.6.2 Advanced Emergency Medical Technicians:

Advanced emergency medical technicians possess the expertise to conduct critical interventions that surpass the capabilities of basic technicians. Their responsibilities include administering IV lines, providing essential medications, and performing advanced procedures. E.g. Ghana boasts close to 400 advanced emergency medical technicians. Their training program spans one year.

3.5.6.3 Basic Emergency Medical Technicians:

Basic emergency medical technicians provide fundamental care and interventions within the ambulance. Their duties encompass assessing vital signs, stabilizing patients, and administering basic medical procedures such as oxygen therapy and CPR. They ensure safe patient transportation to appropriate healthcare facilities. Ghana employs over 1,500 basic emergency medical technicians, forming the majority of the workforce. The training for basic technicians consists of two years, with the first year focusing on foundational skills and the second year on advanced training.

The primary training institution for ambulance staff is located in Nkenkenso within the Offinso North District of Ghana. Prospective candidates seeking training with the Ghana Ambulance Service must possess a West Africa Senior Secondary Certificate Examination (WASSCE) or its equivalent for basic training. Advanced training requires candidates to hold a bachelor's degree. Applicants must also be Ghanaian citizens. The training institution is accredited by the Ghana Tertiary Education Commission, with no external organizations providing accreditation. The training received in Ghana is internationally recognized. The examinations conducted are accepted worldwide. Ambulance staff in Ghana must also undertake additional international exams when pursuing further education or training abroad. Trauma training is an integral component of the ambulance staff training programs, equipping personnel to handle traumatic incidents effectively.

Ambulance staff undergo regular refresher courses to update their knowledge and skills, keeping pace with evolving medical practices and technologies. Partnerships with external organizations, such as the North Dakota Department of Health and the University of Florida in the United States, contribute to ongoing training and skill enhancement. Recertification is mandatory every two years to ensure that staff maintain up-to-date knowledge and skills, preventing obsolescence and promoting high-quality service delivery.

3.5.7 Important gaps

To exemplify the major gaps in post-crash training we use the information gathered in Zambia as an example.

Among the pressing needs identified were issues related to administration, coordination, and legal operations. The list below highlights the most pressing needs:

    i. **Training for staff and community**. The community training would include bystanders, communities in accident-prone areas, and owners of toll vehicles that mostly rush for money

as they toll accident vehicles to police stations. Members of the community also tend to take pictures and videos of accident victims instead of rendering some approved help. In other instances, untrained assistants tend to worsen the victim's situation and the help may be fatal. Training would also support the hugely understaffed institutions.

ii. **Equipment** was another pressing need for improved post-crash response. Equipment like hydraulic cutting equipment, first aid kits, Portable oxygen, Pulse oximeter, stethoscopes, and jaws of life.

iii. **Transport (Ambulances) and fire engines** were discussed as being in short supply and a dire need for most districts in Zambia.

iv. **Technical support** was also listed as one of the urgent needs, to establish a robust, efficient post-crash response system that is well coordinated.

As can be seen, only the first of these needs is related to training. As we saw for Ghana, there were a shortage of staff in general, and particularly the most advanced paramedics (with only 3 for the entire country).

4 Framework for developing a road safety course for professionals

We present the framework for designing a road safety course for professionals. The framework is built on aspects such as professional learning, how professionals learn, teaching methods for professionals, experiential learning theory and its applications.

4.1 Professionals learning

The learning process is an active and evolving process. Learning is an increased capability to solve problems acquired through experience (Washburne, 1936). The Oxford Dictionary defines learning as acquiring knowledge or skills through experience, study, or teaching.

Adults learn differently than novice learners (Bransford et al., 2000). The theory of teaching adults is known as Andragogy (Knowles et al., 2015). It is based on adult individuals' learning characteristics (Knowles, 1980). Professionals have extensive knowledge and prior beliefs that may affect their learning. Professional knowledge can be viewed as hierarchical in which general principles occupy the highest level while concrete problem-solving the lowest (Schon, 1983, p.24). Professional knowledge has three components, as follows:

1. An underlying discipline or fundamental science
2. An applied science or engineering
3. A skill and attitudinal component

Therefore, to design a road safety course for professionals, it is essential to know the types of learning, learning theories, and minimum requirements to develop a road safety course. Teaching methods should target the core competencies of road safety professionals and provide them with the knowledge to develop the core competencies in the road safety subject.

4.2 How professionals learn

Different people learn the same thing using different learning strategies and brain processes. In the real world, learning new situations almost always involves multiple learning processes and is always influenced by the context and the learner's characteristics and preferences. Understanding the required core competencies is vital because it provides insights into the nature of thinking and problem-solving (Bransford et al., 2000). The core competencies are a set of minimum skills required by professionals. They represent the fundamental minimum knowledge, skills, and abilities needed to effectively function as a professional in road safety (Dixon et al., 2021).

Research shows that it is not simply general abilities, such as memory or intelligence, nor general strategies that differentiate professional experts from novices. Instead, the professional's extensive knowledge and epistemic beliefs affect what they notice and how they organize, represent, and interpret information in their environment. This, in turn, affects their abilities to remember, reason, and solve problems in their profession. Therefore, the teaching methods for professionals should consider the abovementioned aspects and the required core competencies for road safety professionals.

Professionals have prior knowledge, concepts, skills, and beliefs that significantly influence their understanding of the teaching course material or curriculum and how they learn and interpret it. Thus,

a logical strategy for the teacher is to teach the new road safety knowledge by building upon the existing knowledge of the road safety professionals.

4.3 Experiential learning theory

Many educational experts believe that the heart of all learning lies in how we process experience, particularly our critical reflection of experience. They suggest that learning is a cycle that begins with experience, continues with reflection, and later leads to action, which itself becomes a concrete experience for reflection (Kelly, 1997). Based on this idea, Kolb popularized the experiential learning theory (ELT), influenced by John Dewey's educational theories and models. The ELT is a dynamic view of learning based on a learning cycle driven by the resolution of the dual dialectics of action/reflection and experience/abstraction (Kolb & Kolb, 2009). It is a holistic theory that defines learning as the central process of human adaptation involving the whole person. It is applicable in almost everything in life we do.

The ELT proposes a constructivist theory of learning whereby social knowledge is created and recreated in the personal knowledge of the learner. It is one of the most applied theories in developing teaching methods and courses for adult education. Also, it is one of the most significant research areas of adult education (Fenwick, 2000)**.** It can help design educational curricula to embed learning within real-world contexts by applying problem-based and project-based learning techniques (Bates, 2016). In the following section, we explain the application of ELT in the active learning approach and learning-by-doing.

4.4 Learning techniques

In this section, we present the active learning approach as an effective learning technique that can be applied to teaching methods. We briefly explain the applications of active learning approaches such as learning-by-doing, project-based learning, and problem-based learning, which are widely applied methods for professional teaching.

4.4.1 Active learning approach

Active learning is a widely popular teaching strategy based on the ELT principles. It is a leaner-centric teaching method commonly used in higher education. Active learning is an instructional method of engaging learners in the learning process by designing meaningful learning activities (Prince, 2004). This evokes the learner's thinking about the learning activities they are performing. Therefore, learners learn actively.

Active learning includes the student's engagement at a new level of awareness of their learning and metacognition. This helps the learner to be aware of their learning. The elements of metacognition are somewhat like the six propositions of Andragogy (Flavell, 1979). The six propositions of andragogy are the need to know, self-concept, experience, readiness to learn, orientation to learning, and motivation to learn (Knowles et al., 2015). Therefore, the core of active learning is the active participation of the learners and self-regulation of their learning. Using problems as a basis for learning appears to be one of the more broadly applicable strategies to promote active learning (Misseyanni et al., 2018).

Prince (2004) suggests four widely used active learning strategies: collaborative, cooperative, problem-based learning (PBL), and project-based learning. Collaborative learning refers to instructional method where students work in small group to achieve a common goal. Cooperative learning refers to instructional method in which students work for a common goal however assessed individually. Research provides evidence of the effectiveness of active learning techniques, such as

learning-by-doing and PBL, in higher education (Prince, 2004). The following sections briefly discuss the learning-by-doing approach, the PBL and project-based learning.

4.4.1.1 Learning-by-doing approach

One of the best examples of the application of ELT can be seen in the Learning-by-doing educational methods. American philosopher and educationist John Dewey popularized the learning-by-doing idea (Bates, 2016). It is a teaching method based on the premise that learning capability increases if you do it. Reese (2011) opines that learning-by-doing means learning from experiences resulting directly from one's actions. A few examples of the learning-by-doing method's application in educational curriculum development are such as laboratory, workshop, or studio work, apprenticeship, problem-based learning (PBL), project-based learning, case-based learning, inquiry-based learning and cooperative (work- or community-based) learning (Bates, 2016).

4.4.1.2 Problem-based learning

In the 1960s, Howard Barrows and colleagues in the School of Medicine at McMaster University in Canada developed a problem-based learning (PBL) instructional approach. It is a student-centred approach to active learning in which students learn through the experience of resolving meaningful problems (Telang, 2014). It was developed to stimulate and motivate the learners to see the relevance of learning for future roles and maintain a high level of motivation toward learning. Thus, it is a learner-centred approach and involves self-directed learning. Students engage with the problem with whatever their current knowledge/experience affords.

This approach is based on the premise that the learner's motivation increases when responsibility for the solution to the problem and the process rests with the learner, and student ownership for learning increases (Walker et al., 2015). Walker & Leary (2009) argue that through the PBL approach, the learner acquires new knowledge only as a necessary step in solving authentic, ill-structured, and cross-disciplinary problems representative of professional practice. Therefore, it is an instructional learner-centred approach that empowers learners to apply knowledge and skills to develop a viable solution to a defined problem (Walker et al., 2015).

To sum up, the PBL is considered by many researchers to be the most innovative instructional method to date. It includes learning initiated by problems, self-directed learning, and collaborative learning in small groups (Hung et al., 2008).

4.4.1.3 Project-based learning

Kilpatrick developed the project-based learning approach in 1921 (Walker et al., 2015, p.25). It is like PBL in that the learning activities are organized around achieving a shared goal of the pre-defined project. This instructional approach is project-based, where learners usually have specifications for a desired outcome. For example, in the road safety context, designing a safe intersection where vulnerable road users interact with the motorized traffic. In this approach, the learning process is more oriented to following correct procedures. The learners likely expect the teacher's input while working on a project and solving a problem. The teaching is provided according to learner needs and within the project context.

According to Prince & Felder (2006), project-based learning is like PBL in several respects. For example, both usually involve teams of students in open-ended assignments that resemble challenges the students are likely to encounter as professionals, and both call for the students to formulate solution strategies and continually re-evaluate their approach in response to the outcomes of their efforts. However, there are differences between the two approaches in the way they have traditionally

been implemented in the teaching methods. The focus in project-based learning is on applying or integrating knowledge, while that in PBL is on acquiring it.

4.5 Designing a road safety course for professionals

The following section discusses the minimum requirements for developing a road safety course for professionals. The minimum requirements can be used as a guide by academicians and training institutes to develop a course for training road safety professionals.

4.5.1 Core competencies

The minimum requirement for designing a road safety course should be based on the core competencies of road safety professionals. The road safety domain requires knowledge of many specialised fields. There is an increasing demand for road safety professionals to address various road safety issues. Road safety professionals are defined as workers who spend all or most of their workday on matters pertaining directly to road safety, such as assessing safety performance and needs, planning, developing, and implementing safety initiatives, and taking specific actions related to safety (Transportation Research Board, 2008). Therefore, road safety professionals should have the skills to understand and implement knowledge in many specialised fields.

A road safety professional should have a minimum of the following core competencies (National Academies of Sciences, Engineering, and Medicine, 2010):

1. The nature of road safety
2. History and institutional settings of road safety management
3. Origins, characteristics, and uses of crash data
4. Contributing crash factors, countermeasure selection, and evaluation
5. Road safety program management

The core competencies represent the fundamental minimum knowledge, skills, and abilities needed to effectively function as a professional in road safety (Dixon et al., 2021). However, they do not represent all the knowledge and skills necessary for a safety professional to be successful. As such, they establish the foundation necessary for effective performance by road safety professionals. Moreover, they are also intended to provide a broad framework for educating new safety professionals and training the existing workforce. They guide designing a curriculum for imparting road safety education and training professionals. As the road transportation system keeps evolving, the need to update and impart road safety education and training to professionals is quite frequent.

4.5.2 Bloom's Taxonomy for defining the course learning objectives

In 1956, Benjamin S. Bloom and his colleagues developed Bloom's taxonomy, classifying cognitive behaviours into six levels (Orlich et al., 2009). These six levels are different cognitive processes with individual defining characteristics (Marzano & Kendall, 2007). Therefore, it is a hierarchical

taxonomy, with learning at higher levels depending on the prior attainment of prerequired site knowledge and skills at lower levels, as shown in Figure 4.1.
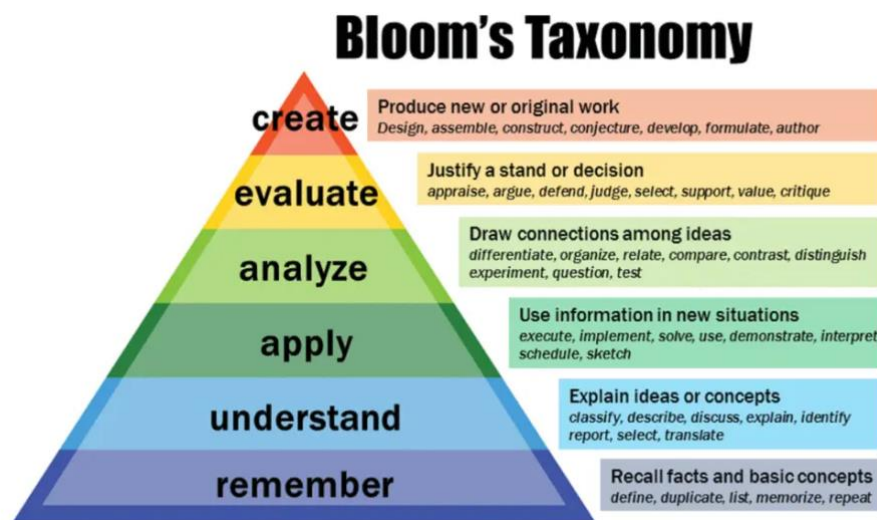
Figure 4.1: Bloom's taxonomy as a scaffold. Image Source: Armstrong (1956)

Teachers have extensively used taxonomies in designing their courses as a scaffold or an instructional guide (Wood et al., 1976). One of the best applications of Taxonomy for educators is formulating clear and measurable learning objectives. It also guides educators to focus on a range of cognitive skills and learners with different facets of learning and provides a starting point for effective learning. Thus, it could help educators to develop courses focused on the core competencies of road safety professionals. The taxonomies can be used as an instructional guide to begin designing the learning objectives and overall course for road safety professionals.

Bloom's taxonomy was revised by Anderson et al. (2001) to highlight the advances in cognitive psychology. Also, Marzano & Kendall (2007) modified the Bloom's taxonomy and called it the New taxonomy. They argue that the difficulty of a mental process is a function of at least two factors: the inherent complexity of the process in terms of the steps involved and the level of familiarity one has with the process.

4.5.3 Constructive alignment

Constructive alignment (CA) is an outcomes-based and learner-centric approach to teaching. The teaching and assessment methods are then designed to achieve those outcomes and to assess the

standard at which they have been achieved (Biggs, 2014). It is a way of interconnecting learning objectives, learning activities and assessment, as shown in Figure 4.2.
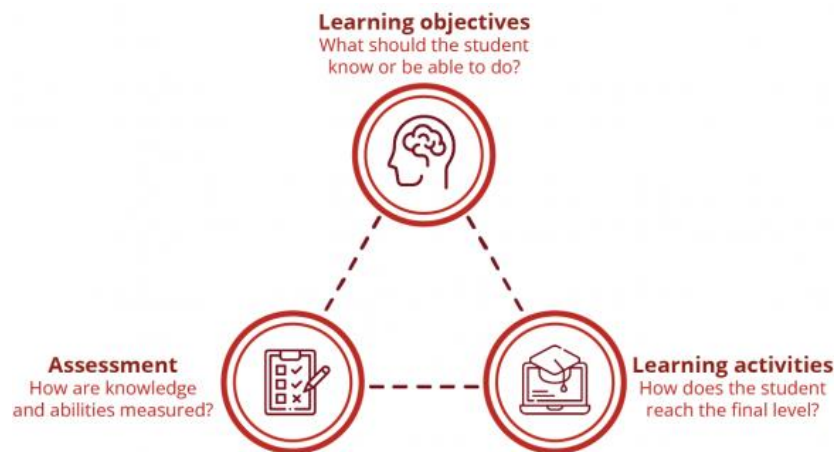
Figure 4.2: Illustration of constructive alignment. *Source:* **Using constructive alignment in your education | Radboud University**

It focuses on what and how the learner learns. The Bloom's taxonomies can be used in each activity (Orlich et al., 2009). Thus, the taxonomies can help in deciding what to teach, how to teach, and how to evaluate the effectiveness of the teaching (Marzano et al., 2001).

There are four design elements for developing a teaching course based on the CA approach:

1. Describe the intended learning outcomes (ILOs).
2. Create a learning environment using teaching/learning activities (TLAs).
3. Use assessment tasks (ATs) to evaluate students' actual learning outcomes to see how well they match what was intended.
4. Transform these evaluation scores into final grades.

Thus, the CA approach provides a framework for adjusting teaching and assessment to address the attainment of those ILOs. However, using CA to develop an effective teaching method requires an initial investment of time and effort. The effectiveness of the developed teaching course will, therefore, depend on effective teaching materials and assessment tools.

5 Discussion and conclusion

5.1 What are the most important training gaps?

The most important gap in training identified for pillar road safety management is the lack of a multidisciplinary approach in road safety management education. While engineering is a common educational requirement across different countries, there is a notable absence of integrated training that encompasses various relevant disciplines such as public health, law, and social sciences. This gap highlights the need for a more holistic and inclusive educational framework to address the complex and multifaceted nature of road safety management effectively. This will again lead to more proper collection, analysis and use of statistics about road accidents, including contributory factors, the use of safety performance indicators other than accidents, setting road safety targets, establishing road safety action plans, designating evidence-based road safety measures systematically.

For the pillar safe infrastructure, the most significant gap in training activities identified is the lack of systematic education and training in the African countries regarding the elements of the Safe System approach, particularly in road safety management. European countries, having implemented Vision Zero or Sustainable Safety for over 20 years, have established systematic training in these areas. This gap suggests that African countries may benefit from developing more structured and comprehensive training programs in road safety management, aligned with the Safe System approach. In the African countries there are no short courses in RISM, so they are referred to courses overseas. Therefore, supporting the African countries in developing their own RISM courses and a training centre which could stimulate the capacity building of trained road safety auditors. However, this should be as well accompanied with legislation for certifying road safety auditors.

For the pillar 'safe vehicles', we have identified a number of challenges. Most of these challenges mentioned above are mostly in the domain of policy adoption and implementation, and not likely to be influenced by training. However, two specific training gaps have been identified. The first is a lack of consumer awareness about safe vehicles. The second is that vehicle inspection training is of a very basic nature.

For the pillar of safe road user behaviour, the main issue highlighted for road safety education is the inadequate focus on higher-order skills like risk perception and self-assessment in driver training, especially in African countries. The training predominantly emphasizes lower-order skills, such as vehicle handling, which can lead to overestimation of driving abilities and increased risk-taking. This gap indicates the need for a more comprehensive driver education framework that includes both practical skills and cognitive aspects of driving. Other key gaps are that people can acquire a driving license without going through the formal laid down procedures and that traffic safety campaigns should be combined with traffic enforcements.

For the pillar post-crash care, an obvious gap is the sheer lack of staff and ambulances. Also, the lack of specialized training and equipment for first responders, inadequate staff and technical support, and a general shortage of resources, including ambulances and fire engines. These gaps underscore the need for comprehensive training programs and improved infrastructure to enhance the effectiveness of post-crash responses, which are crucial for reducing the consequences of road accidents.

5.2 How should successful training for professionals be done?

It is recommended to design educational curricula to embed learning within real-world contexts by applying problem-based and project-based learning techniques. Using these effective techniques an active and dynamic cycle of experience-reflection is activated which enhances the learners' learning process. These learning techniques are learner-centric and focus on engaging the learners in meaningful learning activities that support their awareness and self-regulation of their learning. Learners learn by doing which leads to increasing learners' capacity for solving meaningful problems.

This way of learning stimulates the learners' motivation to learn and seeing the relevance to their future roles. It also emphasizes that the responsibility for learning rests on the learner. This can practically be done for example by including real use-case problems where the learners work in groups in a cooperative way to solve that problem.

Finally, any educational course should follow a constructive alignment where the learning objectives, learning activities and the assessment are in-line and synced with each other. In other words, the learning activities should be able to support the student in achieving the defined learning objectives, and the assessment activities should test whether the student has acquired the knowledge and skills covered in the course. The learning objectives of the course should be SMART, i.e., specific, measurable, attainable, relevant and time bound. It is important for effective learning to adapt the learning activities to target covering cognitive skills building upon prior attainments.

5.3 Recommendation for developing a road safety course for professionals

The educational curricula for a road safety course for professionals should include the required core competencies for road safety professionals, where the teacher teaches the new road safety knowledge by building upon the existing knowledge, skills, and beliefs of the road safety professionals since these may affect their learning. The core competences include the following elements: the nature of road safety; history and institutional settings of road safety management; origins, characteristics, and uses of crash data; contributing crash factors, countermeasure selection, and evaluation; and road safety program management. These core elements establish the foundation necessary for effective performance by road safety professionals, on which more developed skills and specialized knowledge can be built on. The required road safety knowledge incorporates topics from many specialized fields, such as engineering, behavioral sciences, and psychology. Therefore, road safety professionals should have the skills to understand and implement knowledge in many specialised fields.

To determine whether the education and training provided by the centre of excellence should be research oriented, or practical oriented, depends upon where the largest gaps lay. Is it that decisions are made on faulty science, and poor understanding of accident mechanisms? Or is it that the knowledge exists among central stakeholders, but that it is not put into practical use among those responsible? Is it more a matter of finding an arena for sharing best practice? The choice of orientation research or practical will again have implications for how it is set up practically.

For **road safety management** introducing a systematic education and training in the elements of Safe System approach and its underlying principles are needed. This pertains for example to the sub-activities within the different pillars, road accident reporting and monitoring, use of safety indicators, implementation of evidence-based road safety measures, and the development of road safety action plans.

For **safe infrastructure** in addition to the lack of national legislation that mandate the carrying out of systematic activities in Road Infrastructure Safety Management, there is a lack of a training centre with staff and curricula for training road safety professionals to carry out the various Road Infrastructure Safety Management activities. Therefore, training local staff to be able to educate and train road safety professionals to carry out the various Road Infrastructure Safety Management activities is needed.

For **safe vehicles** a consumer-oriented approach, with the ultimate goal to raise awareness among readers is recommended. Therefore, a training program should be directed towards the education of media and journalists. Related to this, a network of motor journalists where they can share ideas and safer relevant information could be tool for raising their interest in pursuing this topic.

Another measure is to improve the vehicle inspector training. In all the AfroSAFE countries we have identified that such training exists, but that it is very basic. Therefore, the possibilities for setting up

a brief training program in e.g. based on the existing training program in Sweden or Norway, should be investigated.

Regarding **safe road user behaviour**, driving instructors basically train for the lower-level driving skills, and there is not much attention on the higher-level driving skills. Therefore, increasing the awareness of the driving instructors of the importance of training for the higher-level driving skills and the GDE matrix. This in turn also requires additional pedagogical methods which starts with an understanding of the students' own motives.

For **post-crash care** when it comes to training there is a clear shortage of trained staff, for example, advanced trained paramedics.

The training needs and requirements of the road safety professional will change over time. Therefore, the course material should be updated regularly. In addition, road safety issues and societal safety perception evolve over time. Therefore, the training course material should incorporate such issue, at least to sensitize the road safety professional towards such issues. Therefore, developing a road safety course curriculum development is continuous process, rather than a one-time job.

5.4 Recommendations for Centre of Excellence

This section summarizes the recommendations for the centre of excellence in terms of the aim that it can fulfil and how it can function and sustain its activities.

The main aim of the centre of excellence should be to create a platform for academicians and road safety professionals for knowledge exchange and knowledge creation. Road safety can best be improved when the policies and measures developed and adopted are rooted in an evidence-based approach and best-practices. Therefore, the focus of the centre of excellence should be on the scientific knowledge in the field of road safety and at an academic level. However, the scientific knowledge cannot flourish and have a societal impact if it is not translated to practical actions and best practices that can be implemented by practitioners and road safety professionals. Therefore, the centre of excellence should emphasise the importance of connecting academics/ researchers and professionals to promote the culture of knowledge exchange between these two worlds. This would guide academics and researchers to address relevant societal road safety challenges and make road safety professionals and practitioners more selective in applying road safety measures, policies and best practices that are scientifically proven to improve road safety. In addition, the closer interaction between academicians and professionals can support them in understanding each other's language.

The means to guarantee the sustainability and update of the course as new knowledge developed is an important aspect to keep the road safety professionals up to date with recent knowledge about road safety management. Therefore, from the functional/management side it is recommended to develop a business plan which can guarantee the sustainability and maintenance of the centre of excellence. One of the lessons learned from the review of the lists of courses in SaferAfrica is that many courses were not available or accessible any longer. There could be different reasons for this, but the development of a business plan and a mitigation plan for potential risks happening can minimize the possibility of its discontinuation. In addition, it is important to define roles and responsibilities within the centre of excellence and a short- and long-term plan for the activities to be arranged within the centre of excellence.

6 Acknowledgements

A number of people have been involved in preparing material to this document. In particular, we would like to thank Tor Olav Nævestad at TØI, Liga Gutmane at NTU, Marjan Hagenzieker at TU Delft, Enoch F. Sam at University of Education, Winneba, Ghana, Jacqueline Masaki from University of Dar es Salaam Tanzania and Daniel Mwamba from Zambia Road Safety Trust, Zambia.

References

Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., Raths, J., & (Eds), M. C. W. (2001). A Taxonomy for Learning, Teaching, and Assessing: A revision of Bloom's Taxonomy of Educational Objectives (L. et al., D. R. Krathwohl, P. W. Airasian, K. A. Cruikshank, R. E. Mayer, P. R. Pintrich, J. Raths, & M. C. Wittrock (Eds.)). Addison Wesley Longman, Inc.

Armstrong, P. (2010). Bloom's Taxonomy. In Vanderbilt University, Center for teaching (p. 3). Vanderbilt University Center for Teaching. https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/.

Bates, T. (2016). Teaching in a digital age (Open Textbook). *URL: http://opentextbc. ca/teachinginadigitalage*.

Biggs, J. (2014). Constructive alignment in university teaching. HERDSA Review of Higher Education, 1, 5–22.

Bransford, J. D., Brown, A. L., Cocking, R. R., Editors, Donovan, M. S., Pellegrino, J. W., & Editors. (2000). How people learn: Brain, mind, experience, and school: Expanded edition. National Academies Press.

Delhomme, P., De Dobbeleer, W., Forward, S., & Simões, S. (Eds.). (2009). Manual for Designing, Implementing, and Evaluating Road Safety Communication Campaigns. In Campaigns and Awareness Raising Strategies in Traffic Safety (CAST project), Cast Project, 6e PCRD. Belgian Road Safety Institute (IBSR-BIVV), Brussels.

Delhomme, P., Vaa, T., Meyer, T., Harland, G., Goldenbeld, C., Järmark, S. et al. (1999). Evaluated road safety media campaigns: An overview of 265 evaluated campaigns and some meta-analysis on accidents. EC, Deliverable 4. Gadget project. Contract N°: RO-97-SC.2235. Arcueil, France: INRETS.

Directive 2008/98/EC, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (2008). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0098-20180705.

Dixon, K., Das, S., & Potts, I. (2021). Core Competencies for Key Safety Analysis. https://onlinepubs.trb.org/Onlinepubs/nchrp/docs/NchRPProject2007_368FinalReport.pdf

Fenwick, T. J. (2000). Expanding Conceptions of Experiential Learning: A Review of The Five Contemporary Perspectives on Cognition. ADULT EDUA TION QUAR TERLY, 50(4), 243–272.

Flavell, J. H. (1979). Metacognition and Cognitive Monitoring: A New Area of Cognitive—Developmental Inquiry JOHN. American Psychologist, 34(10), 906–911.

Freeman, J., Liossis, P., Schonfeld, C., Sheehan, M., Siskind, V., & Watson, B. (2006). The self-reported impact of legal and non-legal sanctions on a group of recidivist drink drivers. Transportation Research Part F: Traffic Psychology and Behaviour, 9, 53-64.

Forward, S. E. (2023). Current procedures and methodologies of national road safety work concerning road users in selected African countries. Deliverable D5.1. AfroSafe Horizon Europe.

G.S.R. 221(E), Central Motor Vehicles (Second Amendment) Rules, 2022 (2022). https://morth.nic.in/sites/default/files/circulars_document/Draft%20notification%20G.S.R.%20221(E)%20dated%2025th%20March,%202022.pdf.

G.S.R. 720(E), Central Motor Vehicles (Twenty fourth Amendment) Rules, 2021 (2022). https://morth.nic.in/sites/default/files/notifications_document/230189%20%281%29.pdf.

Gomes, S. V., Kluppels, L., & Schemers, G. (2017). Road Safety Curriculum for Africa D6.1 Road safety Curriculum for Africa.

Hatakka, M., Keskinen, E., Gregersen, N.P., Glad, A., Hernetkoski, K. (2002). From control of the vehicle to personal self-control: Broadening the perspectives to driver education. Transportation Research Part F 5, 201– 215.

Hung, W., Jonassen, D. H., & Liu, R. (2008). Problem-Based Learning. In Handbook of research on educational communications and technology 3, no. 1 (pp. 485–506).

ITF. (2023). New but Used: The Electric Vehicle Transition and the Global Second-hand Car Trade (International Transport Forum Policy Papers No. 125). OECD Publishing. https://www.itf-oecd.org/sites/default/files/docs/new-but-used-electric-vehicle-global-second-hand-car-trade.pdf.

Kelly, C. (1997). David Kolb, the theory of experiential learning and ESL. The Internet TESL Journal, 3(9), 1–5.

Knowles, M. S. (1980). From pedagogy to andragogy. In the beginning was pedagogy. Cambridge, 64–66.

Knowles, M. S., III, E. F. H., & Swanson, R. A. (2015). The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development (8th ed.). Routledge.

Kolb, A. Y., & Kolb, D. A. (2009). Experiential Learning Theory: A Dynamic, Holistic Approach to Management Learning, Education and Development. In The SAGE handbook of management learning, education and development, (pp. 42–68).

Marzano, R. J., & Kendall, J. S. (2007). The New Taxonomy of Educational Objectives. Corwin Press.

Ministry of Road Transport and Highways. (n.d.). Voluntary Vehicle Fleet Modernization Program Handbook. https://morth.nic.in/sites/default/files/VVMP-Investor-Handbook.pdf

Misseyanni, A., Lytras, M. D., Papadopoulou, P., & Marouli, C. E. (2018). Active Learning Strategies in Higher Education: Teaching for Leadership, Innovation, and Creativity for Leadership, Innovation, and Creativity (A. MISSEYANNI, M. D. LYTRAS, P. PAPADOPOULOU, & C. MAROULI (Eds.); 1st ed.). Emerald Publishing Limited.

National Academies of Sciences, Engineering, and Medicine. (2010). Model Curriculum for Highway Safety Core Competencies. Washington, DC: The National Academies Press. https://doi.org/10.17226/14459.

Orlich, D. C., Harder, R. J., Callahan, R. C., Trevisan, M. S., & Brown, A. H. (2009). Teaching Strategies: A Guide to Effective Instruction.

Phillips, R. O., Ulleberg., P., & Vaa, T. (2009). Do road safety campaigns work? A meta-analysis of road safety campaign effects. In Forward, S., & Kazemi, A. (Eds.) (2009). A theoretical approach to assess road safety campaigns: Evidence from seven European countries. Cast Project. Belgian Road Safety Institute (IBSR-BIVV), Brussels.

Prince, M. (2004). Does active learning work? A review of the research. Journal of Engineering Education, 93(3), 223–231.

Prince, M. J., & Felder, R. M. (2006). Inductive teaching and learning methods: Definitions, comparisons, and research bases. Journal of Engineering Education, 95(2), 123–138.

Reese, H. W. (2011). The learning-by-doing principle.*Behavioral Development Bulletin, 17*(1), 1–19. https://doi.org/10.1037/h0100597

Schon, D. A. (1983). The Reflective Practitioner: How Profesisonals Think in Action. Basic Books, Inc.

Systematics, C., Company, A. C., University, A. S., University, P. S., & Pittsburgh, U. of. (2010). Model Curriculum for Highway Safety Core Competencies. https://doi.org/10.17226/14459.

Telang, A. (2014). Problem-based learning in health professions education: An overview. Archives of Medicine and Health Sciences, 2(2), 243. DOI: 10.4103/2321-4848.144363.

Transportation Research Board. (2008). Building the Road Safety Profession in the Public Sector. (Transportation Research Board special report ; 289). https://onlinepubs.trb.org/onlinepubs/sr/sr289.pdf

United Nations Economic Commission for Europe. (2021). UN vehicle regulations for road safety cost-benefit methology: Part of the WP.29 'How it works - How to join it' series. United Nations.

United Nations Economic Commission for Europe. (2022). Safer and Cleaner Used Vehicles for Africa Part of the WP. 29 How It Works—How to Join It Series (ECE/TRANS/332). United Nations Research Institute for Social Development.

Usami, D. S., González-Hernández, B., Persia, L., Kunsoan, N. B., Meta, E., Saporito, M. R., ... & Vandemeulebroek, F. (2021). Defining suitable Safe System projects: The experience of the SaferAfrica project in five African countries. IATSS research, 45(4), 594-601.

Walker, A., & Leary, H. (2009). A Problem Based Learning Meta Analysis: Diff erences Across Problem Types , Implementation Types, Disciplines, and Assessment Levels. The Interdisciplinary Journal of Problem-Based Learning, 3(1), 12–43.

Walker, A., Leary, H., Hmelo-Silver, C. E., & Ertmer, P. A. (Eds. (2015). Essential Readings in Problem-Based Learning (A. Walker, H. Leary, C. E. Hmelo-Silver, & P. A. (Eds. Ertmer (Eds.)). P?rd?e Uni?ersi?y Press.

Washburne, J. N. (1936). The definition of learning. Journal of Educational Psychology, 27(8), 603–611.

World Health Organization. (2023). Global status report on road safety 2023. https://iris.who.int/bitstream/handle/10665/375016/9789240086517-eng.pdf?sequence=1.

Wood, D., Bruner, J. S., & Ross, G. (1976). The Role of Tutoring in Problem Solving. Journal of Child Psychology and Psychiatry, 17(2), 89–100.

7 Appendixes

7.1. Input from countries about training status.

7.2. Questionnaire to the other WP leaders.

7.3. List of preliminary courses.

7.4. Final recommended list of courses.

7.5. List of courses in AfroSAFE African partner countries.

7.6. Additional recommended courses for professionals.

7.7. Facts and figures.

7.1 Input from countries about training status

Table 7.1: Initial overview of target groups in each pillar, across countries

	Road safety management	Safe infrastructure	Safe vehicles	Safe road user behaviour	Post-crash care
Ghana	Regional/District National Road Safety Authorities (NRSAs) NGOs with a focus on road safety Transport Companies	Department of Urban Roads Department of Feeder Roads Road contractors /developers Road departments in the Metropolitan, Municipal and District Assemblies (MMDAs)	Motor Traffic and Transport Department Accredited private garages/workshops Vehicle importers Car dealers Ghana Ports and Harbours Transport departments in the MMDAs Transport companies	Driving schools The general public (pedestrians, cyclists, motorcyclists etc.) NGOs with a focus on road safety	Emergency services (ambulance) Hospitals Emergency wards Rehabilitation centres Physiotherapists/support staff
Tanzania	National Road Safety Council (NRSC) Regional Road Safety Committees (RRSC) District Road Safety Committees (DRSC)	Tanzania National Roads Agency (TANROADS) - Trunk and Regional Roads Tanzania Rural and Urban Roads Agency (TARURA) - District Roads	Vehicle Inspection Authority National Institute of Transport (NIT) Vehicle Inspection garage and school. Land Transport Regulatory Authority (LATRA) Mandatory insp. of commercial vehicles)	Driving schools Traffic Polic AMEND Tanzania (international NGO)	Ambulance services /workers Traffic Police Fire Brigades /Rescue Forces
Zambia	National Public Road Authority (NPRA) Regional/local authorities NPRA's accident investigation teams Safety investigation authority Transport companies	National and regional road administrations Road Supervisory Authority Safety investigation authority Road developers (Safety investments)	NPRA Vehicle inspection agency, Police Authorized car workshops Automobile federations NPRA's acc. invest. teams Safety investigation authority Bureau of standards	NPRA Police NGOs Traffic schools/ driver education Ordinary schools & kindergartens NPRA's acc. invest. Teams Safety investigation authority Transport companies	Emergency services/ward Ambulance Fire Brigade Hospitals Rehabilitation
Denmark	Road Safety Commission Danish Road Safety Council (NGO)	The Danish Road Directorate Road contractors/ developers	Danish Road Traffic Authority (Færdselsstyrelsen) Danish Automotive Federation	Driving schools (Driving instructors) Police	Danish Emergency Medical services Firefighters

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Table 7.2: Initial overview of target groups in each pillar, across countries (cont.)

	Road safety management	Safe infrastructure	Safe vehicles	Safe road user behaviour	Post-crash care
Netherlands	Rijkswaterstaat Provinces	Rijkswaterstaat Road Infrastructure Safety Management (RISM) Municipality of Amsterdam	Netherlands Vehicle Authority (RDW)	Driving schools Driving test examiners	Ambulance services Police
Norway	Road Safety Agency in the Norwegian Public Road Authority (NPRA)	NPRA and municipalities and county municipalities as road owners	National Vehicle Inspectors Authorities Car workshop staff (car mechanics)	Driving schools NGO: Norwegian council for traffic safety (Trygg trafikk)	Police Ambulance services/staff Fire brigade
Sweden	Swedish Transport Agency (Transportstyrelsen) Swedish Transport Adm. (Trafikverket)	Swedish Transport Adm. (Trafikverket) Swedish Association of Local Authorities and Regions (SKR)	Swedish Transport Agency (Transportstyrelsen) AB Svensk Bilprovning (vehicle inspection own by the state) Police	Driver education National Traffic Safety Association (NTF) Swedish Transport Administration	Ambulance services Civil Contingencies Agency (MSB) Safer

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Table 7.3: Fact sheet on Road Safety Management. Example from Norway

Pillar	Road Safety Management
Target group	"**Road Safety Agency**" (one of 12 departments) in the Division 'Transport and Society' in the Norwegian Public Roads Administration/Road directorate (NPRA)
Legislation / regulation	Traffic safety of one the main goals in National transport plan 2022-2033 (with its overriding objective: "*An efficient, environmental-friendly and safe transport system in 2050*") - also anchored in UN's Sustainable Development Goals, SDG3/6 and SGD11/2
Responsible administrative unit	Division Transport & Society, subdivision '**Traffic Safety**' **National accident analysis group** (for in-depth analyses of fatal traffic accidents/crashes)
Formal requirements? No/Yes –> content	None particular. Multidisciplinary educational background among the employees in the unit: engineers; architects, social scientists, geographers, e.g.
Educational objectives, curricula, syllabuses	**NPRA** organises E-learning for improved traffic safety (targeting 'lay car drivers'; emphasising Speed, Attention, Traffic Interaction, Passive safety in cars (safety materials); **TØI** (Institute of transport economics/National Centre for transport research) organises a one-week course for professionals in public or private transport sector - providing insight and research-based knowledge on transport sector, e.g. traffic safety
Educational institutions	Universities & High schools – (technical and social science disciplines)
Foreign education? **No/Yes -> where?**	Possible
No of people with req.	4500 employees in NPRA in total (approx. 2-300 working primarily with Road Safety Management)

Table 7.4: Target groups within each pillar. Example from Norway

	Road-safety management	Safe roads	Safe vehicles	Safe road-user behaviour	Post-crash care
Formal documents	National road safety plan 2022-2025 Max 50 killed/300 seriously injured by 2030 KPIs regularly monitored	The Road Traffic Act Mandatory and advisory guidelines in NPRA's handbooks	The Road Traffic Act: Motor Vehicle Regulation Directive 2014/45/EU on periodic roadworthines tests for motor vehicles	The Road Traffic Act Regulations on driving licences Directive 2006/126/EC on driving licences	Law Manuals Guidelines Handbooks
Responsible administrative unit/level	Ministry of Transport, National Road Administration (NPRA) Regional/local authorities	Ministry of Transport, NPRA Road Supervisory Authority Regional/local authorities	Ministry of Transport, NPRA	Ministry of Transport National Road Administration Ministry of Justice Ministry of Education	Ministry of Health The Directorate of Health Regional hospitals
Executive unit/agency (Target groups)	NPRA Regional/local authorities NPRA's accident investigation teams Safety investigation authority Transport companies	National and regional road administrations, Road Supervisory Authority Safety investigation authority Road developers	NPRA- Vehicle inspection agency, Police Authorized car workshops Automobile federations NPRA's acc. invest. teams Safety investigation authority	NPRA Police NGOs Traffic schools/driver education Ordinary schools & kindergardens NPRA's acc. invest. teams Safety investigation authority Transport companies	Emergency services (ambulance) Hospitals Emergency wards Rehabilitation centers
Formal requirements	Master or Bachelor? ISO-39001 RTSMS (not obligatory)	Master or Bachelor? ISO-39001 RTSMS (not obligatory)	Education/level? ISO-39001 Craft certificate	NPRA: Master degree Police: Bachelor (3 years) Traffic Teacher: Two-year college	
Educational institutions	**Norwegian University of Science and Technology (NTNU) University of Stavanger ++**	**Norwegian University of Science and Technology (NTNU)**	Norwegian University of Science and Technology (NTNU) + other Upper secondary school (car mechanic)	NTNU **NORD University Oslo Metropolitan University** The Norwegian Police University College	Universities (medicine) Universities (nursing) Upper secondary school (ambulance service)
Curriculum	Content, scope, safe system focus?	Content, scope, safe system focus?	Content, scope, safe system focus?	Content, scope, safe system focus?	Content, scope, safe system focus?

7.2 Questionnaire to the other WP leaders

1. Give a brief outline of the most important safety-related activities that are done in the pillar in the African countries.

2. Give a brief outline of the most important safety-related activities that are done in the pillar in the European countries.

3. Who are performing these activities? Who are the key actors? (In the African countries and the European countries).

4. What kind of knowledge is required to perform these activities in a manner that is in line with the thinking of the Safe Systems approach? What is the ideal?

5. What is the typical education level for a given actor in the European countries?

6. What is the typical education level for a given actor in the African countries?

7. What do you identify as the most important gaps in training activities when comparing the African and the European situation?

7.3 List of preliminary courses

Name	Country	Additional content	Web address	Type of course	Alternative link	Access type
ENGLISH LANGUAGE COURSES						
PILLAR 1 - ROAD SAFETY MANAGEMENT						
Online Diploma in Road Safety and Traffic Management	India	Road safety management Road safety data collection	http://www.fireandsafetyforum.com/online_course/diploma/Road_Safety_Management.html	Online		Course does not exist
Global Road Safety Online Training – Pilot	USA	Road safety data collection Road safety policy Road safety management	https://www.public-health.uiowa.edu/iprc/grs/	Online training		Register and pay
Introductory Course on Road Safety Fundamentals	USA	Road safety data collection Road safety risk factors: helmets, alcohol, seat belts,speed	http://www.hsrc.unc.edu/apply-now-road-safety-fundamentals/	Online	Road Safety academy provides Road safety 101 course. Road safety academy	Course does not exist
ISO 39001 Course – Road Traffic Safety	Pakistan	Road safety Road safety data collection	http://www.omni-academy.com/course/iso-39001-road-traffic- safety/	Online		Register and pay
How to Develop a Pedestrian Safety Action Plan	USA	Road safety Road safety management	http://www.pedbikeinfo.org/training/gettraining_dpsap.cfm	Report	https://www.pedbikeinfo.org/pdf/Webinar_PSAP_060111_4.pdf	Open access
Pedestrian Safety Workshop: A Focus on Older Adults	USA	Road safety management	http://www.rsa.unc.edu/psw/	Webinar/Workshop	https://www.nhtsa.gov/sites/nhtsa.gov/files/pedsafetyworkshop-02.pdf	Open access
Road Safety Legislation Course	USA	Road safety Post trauma care	http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-international-injury-research-unit/training/road-safety-legislation.html	Online	https://courseplus.jhu.edu/core/index.cfm/go/course.home/coid/14431/	Open access
Global Road Safety Leadership Course	USA	Road safety management Road safety policy Safer vehicles Post trauma care	https://www.jhsph.edu/research/centers-and-institutes/johns- hopkins-international-injury-research-unit/training/global-road- safety-leadership-course.html	Online	https://grslc-courses.jhsph.edu/	Register and pay
PILLAR 2 – SAFE INFRASTRUCTURE						
Road Safety Audits	USA	-	http://www.citeconsortium.org/courses/RSA.html			course does not exist

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Name	Country	Additional content	Web address	Type of course	Alternative link	Access type
CIVITAS Integrated Planning Thematic Group - Tools for better urban mobility planning	Germany	Road safety policy	http://capsut.org/events/tools-for-better-urban-mobility-planning/	Webinar	https://civitas.eu/sites/default/files/webinar_tools_better_mobility_planning_introduction.pdf	Open access
Urban Transport Roadmaps	Germany	Road safety policy	http://capsut.org/events/urban-transport-roadmaps-webinar/	Web based online interactive tool	http://urban-transport-roadmaps.eu/ Urban-Transport-Roadmaps-Webinar-FN.pdf	Course does not exist
TRB Webinar: Applications of Adaptive Lighting in Roadways	USA	-	http://capsut.org/events/trb-webinar-applications-of-adaptive-lighting-in-roadways/	Webinar/Workshop	https://www.trb.org/Energy/Blurbs/173200.aspx	Open access
Utilities and Roadside Safety	USA	Road safety management Accident prevention	http://www.pdhonline.com/courses/c273/c273_new.htm	Report	https://nap.nationalacademies.org/catalog/23378/utilities-and-roadside-safety https://nap.nationalacademies.org/catalog/23378/utilities-and-roadside-safety	Course does not exist
PILLAR 4 - SAFE ROAD USER BEHAVIOUR						
Driving instructor training	UK	-	https://www.theaa.com/driving-school/driving-instructor-training	Online		Register and pay
Drunk Driving course	USA	Road safety risk factors: alcohol	https://www.policeoneacademy.com/wp-content/uploads/2017/05/PoliceOne-Academy-Course-Catalog-May2017.pdf	Offline		Register and pay
Traffic Stops & Safety	USA	-	https://www.policeoneacademy.com/wp-content/uploads/2017/05/PoliceOne-Academy-Course-Catalog-May2017.pdf	Offline		Register and pay
PILLAR 5 - POST-CRASH CARE						
Emergency Vehicle Operations Course	USA	-	https://www.v-academy.com/product/le_1310-	Unknown		Course does not exist

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Name	Country	Additional content	Web address	Type of course	Alternative link	Access type
			emergency-vehicle- operations-course/#.WYMrxoQrKUk			
Safe Transport of Children in EMS Vehicles	Mexico	-	https://hscssl.unm.edu/EM/PED/emsc/training/SafeTransport/Part1/Intro.html	Unknown		Course does not exist
Certificate of trauma informed care	Australia	-	https://www.australianonlinecourses.com.au/product/certificate-of-trauma-informed-care/	Online		Register and pay
Trauma Sciences	UK	-	http://www.qmul.ac.uk/postgraduate/taught/coursefinder/courses/121561.html	Online MSC course	https://www.qmul.ac.uk/postgraduate/taught/coursefinder/courses/trauma-sciences-online-msc/	Register and pay
Crash Investigation (1 & 2)	USA	Road safety data collection Training in Enforcement Road safety data collection	http://sps.northwestern.edu/program-areas/public-safety/programs/crash-investigation.asp#	On-Ground or Online	https://sps.northwestern.edu/center-for-public-safety/crash/crashsequence.asp#Crash%20Investigation%201 https://sps.northwestern.edu/center-for-public-safety/docs/2022-23nucpscoursecatalog22-09.pdf https://sps.northwestern.edu/center-for-public-safety/docs/traffic-collision-investigation-and-reconstruction-program-overview.pdf	Register and pay
Collision Investigation	Canada	Training in Enforcement	https://www.cpkn.ca/fr/course_collision_investigation	Unknown		Course does not exist
Road Traffic Injury Prevention and Control in Low- and Middle-Income Countries	USA	Road safety Road safety strategies, plans or targets Road safety policy	http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-international-injury-research-unit/training/courses-in-injury-prevention/free-online-training/index.html	Online	https://courseplus.jhu.edu/core/index.cfm/go/course.home/coid/8140/	Open access

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Name	Country	Additional content	Web address	Type of course	Alternative link	Access type
Strategies to Prevent, Reduce, and Mitigate Bus Collisions	USA	Road safety strategies, plans or targets	http://capsut.org/events/strategies-to-prevent-reduce-and-mitigate-bus-collisions/	Report		Course does not exist
Master of rehabilitation counselling	Australia		https://www.sydney.edu.au/medicine-health/schools/sydney-school-of-health-sciences/discipline-of-rehabilitation-counselling.html	Classroom course*		Register and pay
FRENCH LANGUAGE COURSES						
PILLAR 1 - ROAD SAFETY MANAGEMENT						
Test your road safety knowledge Testez voz connaissances en securité routiére	Canada	-	https://testdeconnaissances.saaq.gouv.qc.ca/	Unknown	course does not exist	Access type
Challenges and mobility issues Challenges et enjeux de la mobilité	France	Road safety data collection	https://www.fun-mooc.fr/courses/MinesTelecom/04015S02/session02/about	Unknown	https://www.fun-mooc.fr/fr/cours/mobilite-30/	Access type
PILLAR 4 - SAFE ROAD USER BEHAVIOUR						
Online Road Safety Training Platform Plateforme de formation sécurité routière en ligne	France	Road safety	http://formation.education-securite-routiere.fr/	Unknown	https://formation-securite-routiere.fr/formation-en-ligne-securite-routiere/	Access type
PILLAR 5 - POST-CRASH CARE						
Investigation and reporting procedures for accidents *Procédures d'investigation et de déclaration en cas d'accident*	France	--	https://eazysafe.fr/project/procedures-de-declaration-en-cas-daccident/	Unknown	https://www.eazysafe.com/courses/online-accident-investigation-training/	Access type
Police and road accidents: prevention measures Policiers et accidents de la route: mesures de prévention	Canada	--	https://www.cpkn.ca/fr/course_officer_collision	Unknown	https://www.cpkn.ca/en/course/preventing-officer-involved-collisions-for-police/	Access type

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Name	Country	Additional content	Web address	Type of course	Alternative link	Access type
Roadworks signalizer *Signaleur de chantiers routiers*	Canada	-	https://aqtr.com/formations/nos-formations/signalisation-chantiers-routiers/signaleur-chantiers-routiers-attestation	Unknown	https://aqtr.com/formations/nos-formations	Access type
PORTUGESE LANGUAGE COURSES						
PILLAR 1 - ROAD SAFETY MANAGEMENT						
High Course in Traffic Safety Technology Curso Superior de Tecnologia em Segurança no Trânsito	Brazil	--	http://www.unisul.br/wps/portal/home/ensino/graduacao/seguranca-no-transito#?unidade=23	Unknown	NA	Course does not exist
Road management Gestão em estradas e rodovias	Brazil	Road safety	https://www.certificando.com.br/cursos/gestao-em-estradas-e-rodovias.html	Online		Register and pay
Traffic management Gestão de Trânsito	Brazil	-	http://fenasdetran.com/cursos-ead/curso-de-gestao-de-transito-ead	Unknown		Course does not exist
PILLAR 2 – SAFE INFRSTRUCTURE						
Urban planning for engineers Noções de planejamento urbano para engenheiros incorporadores	Brazil	-	https://unieducar.org.br/catalogo/curso/nocoes-de-planejamento-urbano-para-engenheiros-incorporadores	Online	https://unieducar.org.br/cursos/arquitetura-e-urbanismo	Register and pay
Urban Planning and Environment Planejamento Urbano e Meio Ambiente	Brazil	-	http://cursos.r7.com/Curso.aspx?id=13075	Unknown		Course does not exist
PILLAR 3 - SAFE VEHICLES						
Expertise in inspection and evaluation of automobiles Perícia, vistoria e avaliação de automóveis	Brazil	-	http://inscrim.org/institucional/vistoria-e-avaliacao-de-automoveis/	Unknown		Course does not exist
Expertise in vehicle identification Perícias em	Brazil	-	https://www.buzzero.com/legislacao-e-juridico-337/curso-online-pericias-em-identificacao-de-veiculos-com-certificado-26382	Unknown	https://www.buzzero.com/legislacao-e-juridico-337/curso-online-pericias-de-identificacao-veicular-	Register and pay

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Name	Country	Additional content	Web address	Type of course	Alternative link	Access type
Identificação de Veículos					com-certificado-60607#vantagens	
Vehicle inspection and identification of chassis and engine adulteration *Vistoria em veículos e identificação de adulteração de chassis e motores*	Brazil	-	http://www.wsnpericia.com.br/cursos/curso-de-vistoria-de-automoveis-a-distAncia-ead	Unknown		Course does not exist
PILLAR 4 - SAFE ROAD USER BEHAVIOUR						
Traffic education Educação para o Trânsito	Brazil	-	https://www.educamundo.com.br/cursos-online/educacao-para-o-transito	Unknown		Course does not exist
Training of drivers' instructors and directors of driving schools Instrutor / Diretor de Centros de Formação de Condutores (CFC)	Brazil	-	https://ead.autoescolaonline.net/cursos/instrutor-diretor-cfc/	Unknown		Course does not exist
PILLAR 5 - POST-CRASH CARE						
Urgency and emergency Urgência e Emergência	Brazil	Prehospital care systems	https://www.cursosabeline.com.br/curso-urgencia-e-emergencia	Unknown		Course does not exist
Urgency and emergency Urgência e Emergência	Brazil	-	https://www.cursosgratisonline.com.br/saude/urgencia-emergencia	Unknown		Course does not exist
Post-graduation in urgency, emergency and ICU Pós-graduação em Urgência, Emergência e UTI	Brazil	-	https://www.uninter.com/pos-graduacao-ead/curso-urgencia-e-emergencia/	Unknown		Course does not exist
Nursing care in urgency and emergency Assistência de	Brazil	Prehospital care systems	http://www.ibacbrasil.com/cursos/cursos-de-enfermagem/emergencia-e-cuidados-intensivos-na-pratica-da-enfermagem https://www.educaedu-	Unknown		Course does not exist

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Name	Country	Additional content	Web address	Type of course	Alternative link	Access type
enfermagem em urgência e emergência			brasil.com/curso-de-primeiros-socorros-em- emergencias-traumaticas-cursos-57603.html			
First Aid in Traumatic Emergencies Primeiros Socorros em Emergências Traumáticas	Brazil	Prehospital care systems	https://www.educaedu-brasil.com/curso-de-primeiros-socorros-em-emergencias-traumaticas-cursos-57603.html	Online		Register and pay
Prehospital care Atendimento pré-hospitalar	Brazil	Post-crash emergencies	https://www.buzzero.com/medicina-e-saude-352/enfermagem-361/curso-online-atendimento-pre-hospitalar-com-certificado-7394	Online		Register and pay
Prehospital care Atendimento pré-hospitalar	Brazil	-	https://www.portaldecursosrapidos.com.br/cursos/atendimento-pre-hospitalar--aph-.html	Online		Register and pay
Expertise in road traffic accidents analysis Perícias em Acidentes de Trânsito	Brazil	-	https://www.buzzero.com/legislacao-e-juridico-337/curso-online-pericias-em-acidentes-de-transito-com-certificado-54382	Unknown		Course does not exist
Investigation and analysis of road traffic accidents Investigação e análise de acidentes de trânsito	Brazil	-	https://www.buzzero.com/outros-cursos-369/curso-online-investigacao-e-analise-de-acidentes-de-transito-com-certificado-61001	Unknown		Course does not exist

7.4 Final recommended list of courses

Name/Organizing country	Topics covered	Course type	Access type	Web address
Road safety management pillar				
Global Road Safety Online Training – Pilot/USA	Road safety data collection Road safety policy Road safety management	Online	Register and pay	https://www.public-health.uiowa.edu/iprc/grs/
ISO 39001 Course – Road Traffic Safety/Pakistan	Road safety Road safety data collection	Online	Register and pay	http://www.omni-academy.com/course/iso-39001-road-traffic- Safety/
Road Safety Legislation Course/USA	Road safety Post trauma care	Online	Open access and register to access the course content	http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins- international-injury-research-unit/training/road-safety- legislation.html Alternative link: https://courseplus.jhu.edu/core/index.cfm/go/course.home/coid/14431/
Global Road Safety Leadership Course/USA	Road safety management Road safety policy Safer vehicles Post trauma care	Online	Register and pay	https://www.jhsph.edu/research/centers-and-institutes/johns- hopkins-international-injury-research-unit/training/global-road- safety-leadership-course.html Alternative link: https://grslc-courses.jhsph.edu/
Crash Investigation (1 & 2)/USA	Road safety data collection Training in Enforcement Road safety data collection	Both (Online and Offline)	Register and pay	http://sps.northwestern.edu/program-areas/public- safety/programs/crash-investigation.asp# Alternative links: https://registration.nucps.northwestern.edu/categorySearch.cfm?category=1&prgID=5 http://sps.northwestern.edu/program-areas/public-safety/programs/crash-investigation.asphttps://sps.northwestern.edu/center-for-public-safety/crash/crashsequence.asp#Crash%20Investigation%201
Road Traffic Injury Prevention and Control in Low- and Middle-Income Countries/USA	Road safety Road safety strategies, plans or targets Road safety policy	Online	Open access and register to access the course content	http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-international-injury-research-unit/training/courses-in-injury-prevention/free-online-training/index.html http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-international-injury-research-unit/training/courses-in-injury-prevention/free-online-training/index.htmlAlternative link:Alternative link: https://courseplus.jhu.edu/core/index.cfm/go/course.home/coid/8140/
Safe road user behaviour pillar				

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Name/Organizing country	Topics covered	Course type	Access type	Web address
Driving instructor training/UK	-	Online	Register and pay	https://www.theaa.com/driving-school/driving-instructor-training
Drunk Driving course/USA	Road safety risk factors: alcohol	Offline	Register and pay	https://www.policeoneacademy.com/wp-content/uploads/2017/05/PoliceOne-Academy-Course-Catalog-May2017.pdf
Traffic Stops & Safety/USA	-	Offline	Register and pay	https://www.policeoneacademy.com/wp-content/uploads/2017/05/PoliceOne-Academy-Course-Catalog-May2017.pdf
Post-crash care pillar				
Certificate of trauma informed care/Australia	-	Online	Register and pay	https://www.australianonlinecourses.com.au/product/certificate-of-trauma-informed-care/ Contact link: Contact Us - Australian Online Courses
Trauma Sciences/UK	-	Online (MSC course)	Register and pay	http://www.qmul.ac.uk/postgraduate/taught/coursefinder/courses/121561.html Alternative link: https://www.qmul.ac.uk/postgraduate/taught/coursefinder/courses/trauma-sciences-online-msc/
Master of rehabilitation counselling/Australia	-	Offline (classroom course)	Register and pay	https://www.sydney.edu.au/medicine-health/schools/sydney-school-of-health-sciences/discipline-of-rehabilitation-counselling.html

7.5 Summary of the of courses in AfroSAFE African partner countries

Course name	University Name	Faculty/Department name	Target group	Type of course	Access type	Web address	Remarks
Road safety management							
PhD in Transportation Engineering by thesis	University of Dar es Salaam (UDSM)	Transportation and Geotechnical Engineering	Graduate students'	Offline	Paid	https://www.udsm.ac.tz/web/index.php/colleges/coet/department-of-transportation-and-geotechnical-engineering-(tge)-degree-program	Student can receive PhD with specialization on road safety by thesis
Road Safety in the South	Ardhi University (ARU)	School of Spatial Planning and Social Sciences (SSPSS)	Graduate students'	Offline	Paid	https://www.aru.ac.tz/uploads/documents/en-1678177810-ARDHI%20UNIVERSITY%20Prospectus%202022-2023.pdf	Elective course for Master of Transportation Sciences. It is offer for a semester (15 weeks).
Map 5 - traffic safety analysis	Dar es Salaam Institute of Technology (DIT)	Institute Consultancy Bureau (ICB)/Civil Engineering	Professionals'	Offline	Paid	https://dit.ac.tz/documents/dit_prospectus.pdf	A short course of 4 weeks.
Postgraduate Diploma in Road Transport Safety Management	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Bachelor students'	Offline	Paid	https://www.nit.ac.tz/index.php/postgraduate/	A long course for a year.
Road Safety and Traffic Engineering	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Long program
Road Safety Management	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Long program
Mobility Management and Traffic Camming	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
Road Crash Investigation and Analysis	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
Traffic survey techniques	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Transport analysis and demand forecasting	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
Road Safety Engineering and Audits	NGO-Tanzania Roads Association (TARA)	--	Professionals'	Offline	Paid	https://www.tara.or.tz/sites/default/files/Final%20Advert%20-%20Regional%20Seminar%20and%20International%20Course%20on%20Road%20Safety%20Audits%20-%2024th%20April%202019.pdf	Short course of 4 days based on the demand and needed basis.
iRAP - Introduction to iRAP in Tanzania and the safe system	iRAP/TARA	--	For all	Online	Paid	https://www.training.irap.org	Short course offered by iRAP for the Ten Step Project sponsored by iRF from 2021-2023, course is still available on iRAP website.
Safe infrastructure							
PhD in Transportation Engineering by thesis	University of Dar es Salaam (UDSM)	Transportation and Geotechnical Engineering	Graduate students'	Offline	Paid	https://www.udsm.ac.tz/web/index.php/colleges/coet/department-of-transportation-and-geotechnical-engineering-(tge)-degree-program	Student can receive PhD with specialization on road safety by thesis.
Road Safety in the South	Ardhi University (ARU)	School of Spatial Planning and Social Sciences (SSPSS)	Graduate students'	Offline	Paid	https://www.aru.ac.tz/uploads/documents/en-1678177810-ARDHI%20UNIVERSITY%20Prospectus%202022-2023.pdf	Elective course for Master of Transportation Sciences offered for a semester of 15 weeks.
Road Safety Audit (Traffic Safety)	Ardhi University (ARU)	School of Spatial Planning and Social Sciences (SSPSS)	Graduate students'	Offline	Paid	https://www.aru.ac.tz/uploads/documents/en-1678177810-ARDHI%20UNIVERSITY%20Prospectus%202022-2023.pdf	Core course for Master of Transportation Sciences offered for a semester of 15 weeks.
Safety on highway work zones	Dar es Salaam Institute of Technology (DIT)	Institute Consultancy Bureau (ICB)/Civil Engineering	Professionals'	Offline	Paid	https://dit.ac.tz/documents/dit_prospectus.pdf	A short course of 2 weeks.
Road Traffic Accidents Handling and analysis	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	A short course of 1 week.

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Environmental Engineering and Transport Planning	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Long program

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Course name	University Name	Faculty/Department name	Target group	Type of course	Access type	Web address	Remarks
Road Safety Audits	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
Road Safety and Black Spot Identification (GIS Application)	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
Road Network planning and evaluation	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
VIP Driving	Mbeya University of Science and Technology (MUST)	--	Professionals'	Offline	Paid	https://must.ac.tz/portal/frontend/web/uploads/documents/118105172206731412199168041513_8.pdf	Short course based on the demand and needed basis.
Road Safety Engineering	iRAP/TARA	--	For all	Online	Paid	https://www.training.irap.org	Short course offered by iRAP for the Ten Step Project sponsored by iRF from 2021-2023, course is still available in iRAP website
Road Safety Audit	iRAP/TARA	--	For all	Online	Paid	https://www.training.irap.org	Short course offered by iRAP for the Ten Step Project sponsored by iRF from 2021-2023, course is still available in iRAP website
Safe vehicles							
VIP Driving	Mbeya University of Science and Technology (MUST)		Professionals'	Offline	Paid	https://must.ac.tz/portal/frontend/web/uploads/documents/118105172206731412199168041513_8.pdf	Short course based on the demand and needed basis
Vehicle inspection and appraisal	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	It is offered for 15 weeks.

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Course name	University Name	Faculty/Department name	Target group	Type of course	Access type	Web address	Remarks
Vehicle inspection and Driver Examiner	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	It is offered for 24 weeks.
Training of Driver's Instructors	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
Road Safety Training of trainers	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
Professional Drivers (Heavy Goods and Public Transport)	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	Short program
Safe road user behaviour							
PhD in Transportation Engineering by thesis	University of Dar es Salaam (UDSM)	Transportation and Geotechnical Engineering	Graduate students'	Offline	Paid	https://www.udsm.ac.tz/web/index.php/colleges/coet/department-of-transportation-and-geotechnical-engineering-(tge)-degree-program	Student can receive PhD with specialization on road safety by thesis
Road Safety in the South	Ardhi University (ARU)	School of Spatial Planning and Social Sciences (SSPSS)	Graduate students'	Offline	Paid	https://www.aru.ac.tz/uploads/documents/en-1678177810-ARDHI%20UNIVERSITY%20Prospectus%202022-2023.pdf	Elective course for Master of Transportation Sciences offered for a semester of 15 weeks.
VIP Driving	Mbeya University of Science and Technology (MUST)	--	Professionals'	Offline	Paid	https://must.ac.tz/portal/frontend/web/uploads/documents/118105172206731412199168041513_8.pdf	Short course based on the demand and needed basis
Crowdsourcing Community Road Safety Education, Sensitization and Information: Needs and Strategies	Ardhi University (ARU)	School of Spatial Planning and Social Sciences (SSPSS)	Professionals'	Offline	Paid	https://www.aru.ac.tz/uploads/documents/en-1696507472-CCE-SHORT-COURSES-2023.pdf	A short course of 1 week.
Advanced Driver's Grade Two (INDUSTRIAL)	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	A short course of 4 weeks.

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Advanced Driver's Grade Two (VIP)	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	A short course of 4 week.
Course name	**University Name**	**Faculty/Department name**	**Target group**	**Type of course**	**Access type**	**Web address**	**Remarks**
Advanced Driver's Grade One	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	A short course for 4 weeks.
Public Service Vehicle (Passenger) Driving Course (PSV)	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	A short course of 10 days.
Senior Driver's Course	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	It is offered for 6 weeks.
Driver Instructors Course	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	It is offered for 10 weeks.
Road Safety awareness	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	A short course of 1 week.
Defensive Driving	National Institute of Transport (NIT)	Transport Safety and Environmental Studies (TSES)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/short-courses-programmes/	A short course of 2 weeks.
Road User Behaviour and attitudes	National Institute of Transport (NIT)	Regional center for excellence in Road safety (RCoE)	Professionals'	Offline	Paid	https://www.nit.ac.tz/index.php/center-of-excellence-and-road-safety/	It is a short program.
Advanced Defensive Driving Grade One	Mbeya University of Science and Technology (MUST)	--	Professionals'	Offline	Paid	https://must.ac.tz/portal/frontend/web/uploads/documents/21143614105981301516181719171712_8.pdf	Short course per needed basis
PROFFESSIONAL DRIVING CLASS B, C AND EC (20 DAYS	Industrial Training Centre (ICT)	TRANSPORT AND LOGISTICS	Unknown	Unknown	Paid	https://itczambia.co.zm/	

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Defensive Driving (20 Days)	Industrial Training Centre (ICT)	TRANSPORT AND LOGISTICS	Unknown	Unknown	Paid	https://itczambia.co.zm/	
Driver Recruitment (5days	Industrial Training Centre (ICT)	TRANSPORT AND LOGISTICS	Unknown	Unknown	Paid	https://itczambia.co.zm/	
Course name	**University Name**	**Faculty/Department name**	**Target group**	**Type of course**	**Access type**	**Web address**	**Remarks**
Driver Refresher (Course 5days)	Industrial Training Centre (ICT)	TRANSPORT AND LOGISTICS	Unknown	Unknown	Paid	https://itczambia.co.zm/	
Motor Bike Riding (5days)	Industrial Training Centre (ICT)	TRANSPORT AND LOGISTICS	Unknown	Unknown	Paid	https://itczambia.co.zm/	
Driver Suitability (Assessment Test) (5days)	Industrial Training Centre (ICT)	TRANSPORT AND LOGISTICS	Unknown	Unknown	Paid		
Defensive Driving	Belsam driving school	Consultancy	Unknown	Unknown	Paid		
Dangerous Goods Course	Belsam driving school	Consultancy	Unknown	Unknown	Paid		
Vehicle Accident Investigations	Belsam driving school	Consultancy	Unknown	Unknown	Paid		
Fleet Management	Belsam driving school	Consultancy	Unknown	Unknown	Paid		
Driver Training	Several Driving Schools	Consultancy	Unknown	Unknown	Paid		
Road safety management							
Diploma In Transport and Road Safety Management	University Of Cape Coast	Department Of Geography and Regional Planning	For all	Offline	Paid		
Courses for all pillars							

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Road Safety Engineering in Ghana	University of Dar es Salaam (UDSM), Tanzania	Transportation and Geotechnical Engineering	Graduate students'	Offline	Paid	https://www.udsm.ac.tz/web/index.php/colleges/coet/department-of-transportation-and-geotechnical-engineering-(tge)-degree-program	Core course for upcoming MSc. Highway Engineering and Managent & Msc. Transport Planning and Engineering
Delft Road Safety Course	Delft University of Technology (TU Delft)	Faculty of Civil Engineering and Geosciences, TU Delft	Professionals'	Offline	Paid	course@delftroadsafetycourses.org	The NRSA partnered with the TU Delft to undertake the maiden course for west Africa sub-region in Ghana. It was held in 2017 and 2018 but suspended since covid19.
Short course on road safety and traffic management	Kwame Nkrumah University of Science and Technology, Kumasi, Ghana	Africa Centre of Excellence (ACE) for Regional Transport Research & Education Centre, Kumasi	For Bachelor and Graduate students	Offline	Paid		

7.6 Additional recommended course for professionals

Course name	University/ Organization Name	Faculty/Department name	Target group	Type of course	Access type	Web address	Duration
Road safety management						
Road safety course	Delft University of Technology	Transport and Planning Department of the Faculty of Civil Engineering and Geosciences at	Professionals	Online	Register and pay	Road Safety | TU Delft Online (self-paced)	6 weeks
Delft Road Safety Course	TU Delft. SWOV, roadsafety for all, CARSS	--	Professionals	Online and in-person	Register and pay	Annual Delft Road Safety Course - Delft Road Safety Courses	7 weeks (6 weeks online, 7th week in-person)
Vision Zero International Course	The Swedish Transport Administration	Vision Zero Academy	Professionals	Offline	Register and pay	Vision Zero International Course - Bransch (trafikverket.se)	1 week
Traffic Safety Researcher's Course	ICTCT	--	Professionals	Offline	Register and pay	Traffic Safety Researcher's Course - ICTCT	2 days
The Global Road Safety Leadership Course (GRSLC)	GRSP and JHU-IIRU, USA	--	Professionals	Offline	Register and pay	Global Road Safety Leadership Courses - Global Road Safety Partnership (grsproadsafety.org)	2 weeks
ROAD SAFETY AUDIT AND INSPECTION	Lund University, Sweden	The Department of Technology and Society	Professionals	Offline	Register and pay	https://luvit.education.lu.se/luce/activities/activitydetails_ext.aspx?id=311	1 week
Road Safety Legislation	JHU-IIRU, USA	International Injury Research Unit (IIRU)	Professionals	Online	Free	Road Safety Legislation | Johns Hopkins International Injury ...	N/A
Safe infrastructure						
Road Safety Engineering	RoSPA CPD, UK	--	Professionals	Offline	Register and pay	Road Safety Engineering - Assured by RoSPA (10 days) - TMS Consultancy	10 days
The Private Degree of Expert in Road Safety Management and Administration	Spain	At CIFAL Madrid	Post graduate course	Online	Register and pay	Road safety training courses: e-learning | CIFAL Madrid	10 hours
Road Safety Engineering E-learning Course	European Bank for Reconstruction and Development (EBRD)	--	Professionals	Online	Free	Road Safety Engineering E-learning Course | EBRD Academy (ebrdelearning.com)	1.5 to 2 weeks
Think Road Safety	WB	Open Learning Campus	Professionals	Online	Free	Think Road Safety - Road Safety Training for External PARTNERS (self-paced) (worldbank.org)	N/A
Safe vehicles						

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Training courses for Professionals		Safer vehicles	ZF [pro]Academy			Training_catalogue_2023_UK.pdf (zf.com)	N/A
Safe road user behaviour							
Professional Driver Improvement Courses (PDIC)	IAPD, USA/Canada	-	Professionals	Online		Courses - IAPD | International Academy for Professional Driving (iapdworld.com)	N/A
Certificate of Professional Competence for drivers	IRU	-	Professionals	Online		Certificate of Professional Competence: Driver | IRU | World Road Transport Organisation	N/A
Driver Safety Training: Professional Truck and Van Driver	NSC, USA	-	Professionals	Online		Professional Truck and Van Driver - National Safety Council (nsc.org)	from 45 minutes to 4 hours.
The National Safety Council Defensive Driving Online Courses	NSC, USA	-	Professionals	Online		leading-way-to-safer-roads.pdf (azureedge.net)	N/A
Driver Training - Complete packages for professional drivers	DEKRA, Germany	-	Professionals	Online		Driver Training worldwide | DEKRA	N/A

7.7 Facts and figures

Road authorities

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Employees national road directorate, N	929	685	30	900	10,000	4,900	10,000
People with road safety audit education, N	7	28	5	200	14	250	15
Population, mill	*32,8*	*63,6*	*19,5*	*5,8*	*17,5*	*5,4*	*10,4*

Accredited mechanics and garages

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Legislation year	1999		non	1986		2020	
Months of training		6	6-24	24 to 48	1 to 4 years (based on MBO Level)	36-48	24-48
Education level	Tech. colleges	Tech. colleges	Tech. colleges	College	Diploma (MBO Level 1 to 4)	Upper secondary	Tech. colleges
Number of trained professionals	40,000 (?)	Unestablished	5000	4400	6900	15000	32350
Number of accredited garages	36 (?)	Unestablished	5	4106	26264	4000	4500
Population	*32.8*	*63.6*	*19.5*	*5.8*	*17.5*	*5.4*	*10.4*

Deliverable D7.1 Current training activities for road safety professionals in the participating African countries

Vehicle inspectors

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Legislation year	1999	1973	2002	1986	1985 (1981 for heavy vehicles)		
Months of training	48	6	6	25-49	36	60-80	
Education level	Tech. Coll/ univ.	Tech. coll/ univ.	Upper sec. coll/univ.	Upper sec. coll/univ.	Upper sec. coll/univ.		
Number of inspectors	120 (?)	80	20	446	108	200	
Pop.	*32.8*	*63.6*	*19.5*	*5.8*	*17.5*	*5.4*	*10.4*

Driving schools

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Legislation year	1973	1973	2002	2023	1993	2004	2008
Months of training	36	3	3	8	6	12-24	12
Education level	Upper sec.	Upper sec.	Upper sec.	College	Upper sec.	Upper sec.	Upper sec.
Number of driving teachers	873		?	2000	16183	2900	3195
Number of schools	291		150	1700	8903	1100	911
Pop.	*32.8*	*63.6*	*19.5*	*5.8*	*17.5*	*5.4*	*10.4*

Post-crash care

	Ghana	Tanzania	Zambia	Denmark	Netherlands	Norway	Sweden
Legislation year	2003	1973	1960	2005		2005	
Months of training	12/36	12/36	0	48+	12/36	36/60	24/50
Education level	Upper sec.	Upper sec.	Upper sec.	?	Upper sec./ univ.	Upper sec./ univ.	Upper sec./ univ
Number of ambulance workers	**1903**	**162**	**128**	**2629 + 642**	**6,541**	**3380**	**2600**
per mill inhabitants	58,0			453,3/641,4	375	625,9	
Pop.	*32.8*	*63.6*	*19.5*	*5.8*	*17.5*	*5.4*	*10.4*