

NEW STRATEGIES FOR RISK COMMUNICATION AND KNOWLEDGE: THE EXPERIENCE OF THE E-LEARNING TOOL OF THE EUROPEAN RESEARCH PROJECT ENSURE

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Abstract

The essay offers a synthesis of the activities developed into the ENSURE European project in order to build the planned e-learning tool.

The basic assumption of ENSURE is that our ability to better understand and evaluate different types of vulnerabilities and resilience to hazards constitutes a crucial tool to strengthen communities in the face of disasters due to extreme events and climate change. Improving the understanding of the factors that make a community more vulnerable from the one hand and more resilient from the other is therefore extremely important.

Into such a framework, the e-learning tool has been regarded as a new communication and knowledge strategy for achieving two main goals. The first one is the better dissemination of the project results, which enclose the proposal for a specific model to assess the vulnerability and resilience of a territorial area. The second one is more general and regards the improvement of knowledge and communication for what concerns the complex matters of vulnerability and resilience to natural and na-tech hazards and their assessment.

The tool has been organized as a course without external assistance, available in a website free on internet, and has been designed to reach and involve a variety of students, practitioners and other technicians as target users.

The e-learning path offers a sequence of themes, theories, methodologies, tools, and case studies the users can browse and experience. All learning materials come from the ENSURE project activities, which made it necessary to revise and “rework” the documents produced by the ENSURE partners during the research activities to adapt contents to the e-learning uses.

The essay offers a description of the activities and choices made by the working group to obtain the learning path and materials and to design the architecture of the website. This having in mind the need to develop a communication strategy able to introduce users to the importance of vulnerability and resilience matters and to capture them with interesting and appealing contents.

The following points will be discussed: main goals, main problems, the concept of the e-learning tool and the design of the website architecture.

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1. Introduction

In Ensure Project the research activity has been focused on the analysis of the vulnerability of territorial systems to the consequences of natural and na-tech disasters. Consequences like economic and social damages, loss of natural environments and cultural heritage, up to large death tolls. Losses which should be regarded as losses of territorial resources and of values for present and future development. It becomes therefore very important to better identify and measure in which way and to what extent a territory is exposed to certain types of hazards. Which means to better understand which elements, systems, subjects and areas are most likely to suffer from catastrophic events like earthquakes, floods, droughts, landslides. Improving the understanding of the factors that make a community vulnerable or resilient is therefore crucial.

Addressing the enhancement of knowledge and practice of vulnerability and resilience assessment as the main overall objective, the ENSURE Project set three working goals. The first one was the operational character of the tool to be developed. This is the reason why the project attempted to build on previous knowledge, taking advantage of what has already been accomplished in the field, trying to embed available results of risk and vulnerability assessment experiences as much as possible. The second general objective, responding to the need for operationalization, was to provide an interpretation of the relationship between vulnerability and related concepts (resilience, adaptation, coping capacity, etc.) within a framework strongly targeted towards prevention. The framework had to provide a sort of guideline to assess vulnerability before an event strikes, helping decision makers and even lay citizens take appropriate mitigation and anticipatory measures. The third, more specific, goal was to provide an updated picture of what is already available in literature, in previous studies, and in applications worldwide. We may count already a growing number of proposals concerning indicators, parameters, measures, related to physical, systemic and social aspects of vulnerability. These have been analyzed and a selection of the most advanced or appropriate ones were proposed as part of the tool for vulnerability assessment.

Into such a framework, the e-learning tool has been regarded as a communication and knowledge strategy to enhance the set of goals introduced above and to better exploit the project outcomes.

The website would like to invite users to make a journey into the vulnerability and resilience matters, offering a tool to directly experience the research results obtained during the Ensure Project work. Here it is therefore possible to find some theoretical and operational tools related to vulnerability and resilience assessment which could help in better understanding and evaluating different interpretations of the concepts and ways to operationalize them.

The rationale behind the architecture of contents and their organisation into the website meets two main purposes. The first one is the better dissemination of the project results. These enclose:

- the proposal for a specific integrated and multi-scale model to assess the vulnerability and resilience of a territorial area;
- a review of the investigations and reflections on vulnerability and resilience that led to the development of the evaluation framework;
- the consequent application of the assessment path into different case studies.

The second one is more general and addresses the improvement of knowledge and communication for what concerns the complex matters of vulnerability and resilience to natural and na-tech hazards and their assessment.

The e-learning tool, organized as a course without external assistance, aims at introducing users to the vulnerability assessment model proposed in the ENSURE project, specifying procedures, criteria and parameters to make it operable within a given territorial or cultural milieu. Case studies at local scales and within regional contexts complete the picture, proposing an approach for better understanding the articulated nature of the concept of vulnerability (i.e. physical, economic, cultural, social and systemic) at different spatial scales (regional and local), useful for exploring the integration and connections of different types of vulnerability and resilience and for developing assessment processes and future scenarios.

The learning path has been obtained from the project contents and results and offers a sequence of themes, theories, methodologies, tools, and case studies the users can browse and experience. The choice for the contents and the design of the learning sequence required a careful review of all the project documents produced and specific work to adapt them for use on a website. This adaptation was necessary because of the complexity itself of the subject matter – vulnerability and resilience to hazards – and because of the need to simplify such complexity into a clear and useful learning path.

The website has been developed to reach and involve a variety of students, practitioners and other technicians as target users. Generally speaking, each target group has different learning and knowledge needs or goals and the different categories of users are treated differently. However, in this case the e-learning tool has to be mostly regarded as an additional method for disseminating the project's results to a wide group of users, therefore documents and activities offered on the e-learning platform are generally aimed at all users. With this in mind, the website has been designed to be as attractive as possible, where the contents are interesting and appealing to many users, offering a variety of examples and case studies developed by a multimedia approach (texts, hypertexts, images, videos, links to other websites) and embracing interdisciplinary approaches, theories, methodologies and tools.

Conceived for both communication and knowledge enhancement, after the learning modules, users can find a module of activities, designed to self-test the achieved learning outcomes. Also these activities have been designed to be suitable for different target groups and mainly aim at making users aware of their capability to deal with the project issues and the use of the assessment methodology.

2. The concept of the tool

Great attention has been paid to the continuous connection between the e-learning site and the ENSURE project itself. Aiming to enhance the dissemination of the project results and products from the one side and to make users aware of the opening of the e-learning site from the other side, the e-learning tool has been linked into the ENSURE project website as one of the pieces of the starting puzzle in the home page (www.enssureproject.eu). Moving the opposite direction, in the opening page of the e-learning site (<http://ensure.metid.polimi.it>) a clear link to the main project site is available. The *continuum* between the two sites is also obtained by the use of graphic elements. The opening page of the e-learning tool maintains the same colours and some visual effects of the ENSURE Project website, while the graphic elements and the organization of the pages are of course different.

The contents of this e-learning tool, in a general perspective, is not so different from more traditional learning tools, the main requirements being:

- the identification of the “key learning goals”;
- the selection of the main learning contents, which will be offered on the e-learning platform in terms of “learning packages”;
- the project design of the learning path, which means the sequence of the themes, theories and methodologies, statements, tools, examples, best practices and case studies;
- the selection and/or building of reference documents;
- bibliography and literature references;
- selection and design of activities or exercises for the enhancement of the learning process and as a mean for a self-evaluation phase;

The choice for the contents and the design of the e-learning tool of the ENSURE Project required a careful review of all project documents and a specific work to adapt them for use on a website. This adaptation was necessary because of the complexity itself of the subject matter – vulnerability and resilience to hazards – and because of the need to simplify such complexity into a clear and useful learning path. Moreover it was not possible to just upload the deliverables as they have been developed. Deliverables had mainly been conceived to communicate with the European Commission and to disseminate both research results and the new methodology to the European experts, scholars and academics, even if with a great attention to the needs of practitioners. The learning goals require a different approach and a reworking, in order to obtain new materials for learning purposes.

In the light of such elements, the concept of the ENSURE Project e-learning tool is the result of the reasoning around the following points:

- the learning path itself, that is the selection of learning contents and the sequence in which they are organized;
- the building of a friendly approach to main topics as well as to the learning path, in order to attract potential users and push them to enjoy the whole of the learning offer and site contents;
- the building of specific learning materials, different from the ENSURE Project final deliverables, needed to better support the users inside the learning environment;
- the offer of some activities to self-test the learning progress.

About the learning path, the following elements have proved to be particularly important in order to obtain the final scheme (see the next paragraph about the architecture of the site):

- to offer a clear and simplified framework of the concepts and main theories and methodologies concerning the assessment of vulnerability and resilience to hazards;
- to outline in a clear way the goals of a “vulnerability assessment” and of a “resilience assessment” (or of other typologies of assessments around hazard evaluation and management) in a certain territorial system;
- to draw attention to the passage from theory to practice, in particular in terms of information collection and processing for building assessment parameters. This also refers to the need for working on territorial complexity and “solve complexity” to both obtain clear and useful vulnerability and resilience assessments and better face hazard management and mitigation;
- to draw attention to the “scale approach” or spatial dimension in the analysis, that is the observation/analysis of territorial areas at the different territorial scales at which vulnerability and resilience assessments can be developed (from urban-local to regional). This also means to build working skills in order to better take into consideration the specificities of territories at different levels, with their institutional frameworks and organizational resources and bodies;
- to draw attention to “time”, defining phases or sequences of events, analysis, interventions which can be reflected in the “history” of an event and of all what follows (impact, emergency management, recovery, prevention and mitigation policies and interventions..);
- to make links between vulnerability assessment and other dynamic elements like impact, emergency and recovery management. This also with reference to resilience and mitigation of risk/damage matters;
- to identify what learning elements can be considered central for enhancing the capacity of territories to face the sequences of: hazards knowledge, potential damage impacts, emergency planning, events, post events, damage assessment and accountability, reconstruction;

- to draw attention to the importance of “learning from case studies”, which also means to outline questions that “should be asked to the case study” to extract the main elements and information from the experience.

Concerning the need for obtaining a friendly approach to the learning environment, the learning activities have been organized in a sequence of thematic chapters in which the user can find contents at three different deepening levels. This allows users to choose their main interests and/or work only on some issues but, at the same time, makes it easy to browse other, enlarged, contents. Strictly linked to this comes the point of the building of specific learning materials.

First the users can find a brief description of some main elements and concepts, just to be introduced by a first glance to the “great world” of the activities around the vulnerability and resilience matters and assessments.

Then they can deepen their knowledge selecting from a list of more specific contents and documents expressly produced for the e-learning tool. A part of these documents has been obtained from the deliverables, selecting contents and rebuilding the texts of the final products. Others are summaries of activities and documents produced from the ENSURE Project partners during the working period: slide presentations from the project’s meetings, schemes, maps, images, case studies and shorter versions of official documents, modified to be more suitable for the e-learning platform goals. The written texts in the opening pages of each module have been conceived as constituting the thread of the work.

All these will address to the ENSURE official final documents and publications by the project partners: the third learning level. As an example, if the user is reading about the central importance of time and territorial scale in vulnerability assessment, it is every time possible to trace the deliverable and the chapters in which the specific item can be found. Moreover references remain in the final deliverables, so that user will have at least to open them if they are interested in the literature, giving deliverables themselves a better visibility.

Of course basic elements like definitions, approaches, possible assessment methodologies and other elements alike have been specifically elaborated further in an e-learning perspective. For instance the users can find a list of basic keywords with a brief definition.

3. The architecture of the e-learning site

The learning menu is composed of four main modules. Two learning modules are devoted to theoretical and methodological issues related to *Vulnerability and Resilience Concepts* and *Vulnerability and Resilience Assessment*. The third module is devoted to the *Analysis of Case Studies* and the last one contains final self-evaluation activities referring to the whole proposed learning contents.

A fifth and last module contains the ENSURE Project final deliverables, the final booklet, the references of articles written by the research partners as an outcome of the project and some useful links to other websites.

In each module the user can find a brief introduction text and files containing the specific learning contents. Activities and examples useful to check the learning level obtained are all included in module four.

3.1 The home page of the e-learning tool

In the home page a presentation text introduces the ENSURE E-learning platform, explaining the main purposes of the tool and the main dissemination and learning goals (fig.1).

Figure 1 – The opening page of the ENSURE Project e-learning tool



This text is important as it must attract people to enter into the “operational part” of an e-learning tool concerning a particularly complex matter as vulnerability and resilience assessment can be. A video with a presentation completes the opening page, explaining the key contents and the meaning of the learning offer. These elements are very important as the e-learning content is offered to a huge public variously interested in the matter. Moreover some elements make the difference from other e-learning experiences and courses related to natural and na-tech hazards research, management and prevention:

1. the e-learning website has been conceived to be a tool to better diffuse the ENSURE Project integrated multi-scale vulnerability approach, together with all the documents and products available as the result of the overall project, which

makes this tool really different from all other experiences. For these reasons, just after the introductory text there is a link to the ENSURE project website;

2. The e-learning tool entails knowledge enhancement goals but in absence of direct interaction with a teaching team. This calls for solutions able to make users understand the meaning and the goals of the on-line course, what they can obtain from this particular sequence of learning contents and the meaning of the activities to self-evaluate knowledge enhancement results;
3. The access to all contents is free(similar to the tool NAHRIS, but here enriched by self-test activities), differently from other university or institutional e-learning courses (for instance the tools e-Scenario or GEOG105 Lab Programme). In the home page an “autologin” routine is available to users to simply and immediately register to the website. The registration will be used to identify users (number and some simple characteristics).

A second page contains a tutorial for the use of the e-learning tool. Here users find information on the learning object and goals, together with some instructions on how to use the platform and the contents. A menu allows to enter into the learning modules and in the module containing the ENSURE project deliverables and other products.

3.2 The organization of the learning modules

The three learning modules are introduced by a brief text summarizing the main learning elements and introducing to the use of the materials available. From the operational point of view, the contents are organized in folders and subfolders, in order to obtain both a clear learning sequence and a system of homogeneous learning units. In each folder users find the “learning files”, materials especially developed for the e-learning tool starting from the final deliverables of the ENSURE project and from other documents prepared by the partners during the research working period. These files are numbered to simplify their identification and use.

3.2.1 Learning module 1 – The Vulnerability and Resilience concept: “a journey into definitions, approaches, and tools”

In this module users find definitions, concepts and evaluation methodologies useful in vulnerability assessment and management. The module is meant to summarize the main theoretical and methodological elements in vulnerability assessment and management as elaborated and proposed by the ENSURE project working teams.

Here the ENSURE partners would also like to introduce both the importance of definitions themselves and the importance of the selection made during the working period. The huge variety of approaches, methodologies and assessment tools available in literature and practice requires a preliminary analysis to make it clear all the implications of such definitions in addressing assessment issues and activities: from the identification of hazards, the selection of indicators, the data collection and the elaboration of knowledge to the interpretation and evaluation process itself.

The following table 1 shows the organization of folders and subfolders.

Table 1 - Folders organization and files in module 1

<p>📁 <i>Lm1.1 Vulnerability: concepts and definitions – what “do you need to know” to develop a vulnerability assessment?</i></p> <ul style="list-style-type: none">📄 <i>F02_An introduction to vulnerability definitions</i> <ul style="list-style-type: none"><i>Lm1.1.1 Vulnerability in time and space</i> <ul style="list-style-type: none">📄 <i>F03_Vulnerability in time and space</i>📄 <i>F04_Vulnerability in time</i>📄 <i>F05_Vulnerability in space</i>📄 <i>F06_Scale factors in vulnerability analysis: multi-scale and cross-scale analyses</i> <p>📁 <i>Lm1.2 Vulnerability and resilience – what is a resilience assessment and what do you need to know to develop one?</i></p> <ul style="list-style-type: none">📄 <i>F07_Vulnerability and resilience</i>📄 <i>F08_Resilience and vulnerability</i>📄 <i>F09_The resilience concept</i> <p>📁 <i>Lm1.3 The objects of a vulnerability and resilience assessment: structural, territorial, social and economic systems – what territorial elements should we take into consideration and in which way? Which indicators should we identify and measure to obtain a valid image of such territorial elements and their dynamics?</i></p> <ul style="list-style-type: none">📄 <i>F10_Vulnerability of socioeconomic systems</i>📄 <i>F11_Social and economic vulnerability_2 case studies</i>📄 <i>F12_Social vulnerability and resilience_the actors</i>📄 <i>F13_Territorial vulnerability and territorial capital</i>📄 <i>F14_Vulnerability of socio-economic systems. Concepts and definitions from a theoretical and research perspective</i>📄 <i>F15_Structuring social and economic vulnerabilities</i> <p>📁 <i>Lm1.4 Vulnerability, resilience and natural hazards – which fundamental relations are there between a vulnerability and resilience assessment and the type of hazard? What are the roles of time and territorial scale when working on different types of natural hazards?</i></p> <ul style="list-style-type: none">📄 <i>F16_Concept of risk in volcanology</i>📄 <i>F17_State-of-the-art on territorial vulnerability and natural hazards. Lessons learned</i>

Definitions are crucial for building the general framework of each issue and for answering questions like “how can we find the vulnerability profile of a certain territorial area?”, “which kind of vulnerability are we exploring?”, “which kind of territorial subjects and objects are exposed?”, “which are the main consequences in

terms of expected damages?”, “how can we find the resilience profile of a certain territorial area?”.

3.2.2 Learning module 2 – The Vulnerability and Resilience Assessment

The main purpose of this part is to make users experience the assessment process developed by the ENSURE research group. This is a particularly important and delicate issue as here the specific methodology developed by the ENSURE Project partners is introduced and explained from both a theoretical and operational point of view.

Users experience the sequence of elements and activities which drives from the territorial analysis to the vulnerability and resilience assessment. They can therefore find brief introductions to models, tools and techniques for the recognition of territorial elements and dynamics which explain different levels of vulnerability together with the operational definitions and applications of vulnerability and resilience assessment processes. Here it is moreover suggested to pay attention to some particular elements like: scale, time, indicators and data organization, knowledge building, territorial subjects and objects exposed to hazards.

After these, users find elements to identify the goals of a “vulnerability assessment” (or of other typologies of assessments around hazard evaluation and management) in a certain territorial system. The sequence of the learning contents will therefore drive the attention to the passage from theory to practice (in particular in terms of information collection and elaboration for parameters building): for instance the importance of “time”, defining phases/sequences of events/analysis/interventions which can be reflected in building a certain sequence of activities (analyzed through examples of applications and case studies in this and in the following module). Users will have to pay attention to differences concerning different tools coming from different approaches and follow the discussion which led to the specific ENSURE Project integrated multi-scale approach to vulnerability and resilience assessment.

The final section explores the use of vulnerability and resilience assessment results as an important basis for the design and implementation of possible policy tools for hazard management. Users therefore find elements to connect vulnerability and resilience assessments with impact, emergency and recovery management. This working at different institutional levels for a better governance and management of “the cycle of disaster” and for enhancing prevention and mitigation matters.

The following table 2 shows the organization of folders and subfolders.

Table 2 - Folders organization and files in module 2

📁 Lm2.1 Vulnerability and Resilience Assessment Tools – from theory to practice: the steps and the tools of a vulnerability or resilience assessment.

📄 *F18_An overview of vulnerability assessment concept*

📄 *F19_Examples of methodologies assessing territorial vulnerability*

📄 *F20_Some key elements for vulnerabilities assessment with respect to complex hazardous events*

📄 *F21_Relationships among vulnerabilities and resilience: an assessment perspective*

📄 *F22_Tools for vulnerability analysis and representation*

📁 Lm2.2 Territorial elements and dynamics – the importance of the local territorial scale and of the knowledge of specific characteristics and dynamics territorial elements

📄 *F23_Structuring the relations between physical, social and economic vulnerabilities: an introduction*

📁 Lm2.3 Vulnerability and resilience assessment – How to build a vulnerability or resilience assessment procedure and which elements have to be taken into account to develop the assessment process

📄 *F24_Vulnerability operational concept and measurement*

📄 *F25_Transfer of vulnerability across time and space_a case study*

📄 *F26_Models and methodologies for socio-economic vulnerability assessment. A theoretic and research perspective*

📁 Lm2.3.1 Indicators

📄 *F27_Indicators for a vulnerability and resilience assessment: an introduction*

📄 *F28_Indicators/parameters of socio-economic vulnerability. A theoretic and research perspective*

📄 *F29_Data availability and indicators in vulnerability assessment*

📁 Lm2.3.2 Organizing knowledge

📄 *F30_Organizing knowledge for vulnerability and resilience assessment: the set of matrices developed within the Ensure project*

📁 Lm2.3.3 Interpretation: the vulnerability and resilience assessment

📄 *F31_Methodological framework for an Integrated multi-scale vulnerability and resilience assessment*

📄 *F32_A synthesis of the whole ENSURE method for assessing vulnerability and resilience*

📄 *F33_Vulnerability analysis and assessment of cultural heritage*

📁 Lm2.4 Facing and managing vulnerability – Which connection between vulnerability and resilience assessment and impact, recovery, prevention and reconstruction management? Once knowledge is available, which actions or tools could a territorial system explore and implement to better manage hazards?

📄 *F34_Does reducing vulnerability always lead to enhance resilience?*

📄 *F35_Strategies, approaches and practices to decrease socio-economic vulnerability and to increase resilience*

📄 *F36_Emergency planning in Vulcano*

3.2.3 Learning module 3 – Case studies

This section would like to introduce users to the reading, comprehension and building of case studies in vulnerability and resilience matters. Learning from case studies means also to outline questions that should be asked by the case study analysis. This, among others, means to apply “a certain level of abstraction” for a more effective description of reality and to extract the main elements and information from the experience.

A review of case studies is here proposed, in order to make users understand which are the most important knowledge elements which should appear in an assessment activity and how to build the sequence of working steps leading to an effective result. This can also be considered as a reading scheme to extract and learn from existing case studies as much as possible both of the experiences themselves (type of risk, country, vulnerable elements of the specific territorial system, selected tools to face and manage vulnerability..) and of the particular application of the tools for the building of the case study. “History” of an event and of all what follows (impact, emergency management, recovery, prevention and mitigation policies and interventions..).

The following table 3 shows the organization of files.

Table 3 – File organization in module 3

<p>📁 Lm3 Vulnerability and Resilience Assessment Tools – from theory to practice: the steps and the tools of a vulnerability or resilience assessment.</p> <ul style="list-style-type: none">📄 <i>F37_Hazard-specific case studies of inter-relationships between social vulnerability and economic vulnerability</i>📄 <i>F38_Structuring the relations between physical, social and economic vulnerabilities: applications to different natural hazards</i>📄 <i>F39_Applying the concept of vulnerability: the case of Negev</i>📄 <i>F40_Vulnerability in time: case studies</i>📄 <i>F41_Vulnerability in space: case studies</i>📄 <i>F42_Applying the ENSURE methodology for vulnerability assessment: the case of Ilia forest fires</i>📄 <i>ENSURE Del5.3.1 - Development of the Integrated Approach on the Ilia case study</i>📄 <i>ENSURE Del5.3.2 - Development of the Integrated Approach on the Negev case study</i>📄 <i>ENSURE Del5.3.3 - Development of the Integrated Approach on the Vulcano case study</i>📄 <i>ENSURE Del5.3.4 - Development of the Integrated Approach on the Ethiopian, Istanbul and Corvara case studies</i>
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The selection of case studies tries to call attention to differences of approach, media, territorial analysis process and knowledge building tools like, for instance: type of document – written, images, video –, type of assessment tool, indicators selection and processing methodologies, knowledge building according to real needs, territorial features, scale and time, type of target communities of the document, subject asking for the assessment. Moreover, some elements already discussed in the previews modules are underlined, to make it clearer the transition from theory to practice: territorial scale of the analysis, time, sequences of events/analysis/interventions and time related matters, selection and processing of different kinds of indicators, building procedure for the vulnerability and resilience assessment (emphasis on the sequence of the activities).

To make users better understand the process, in this section both elaborated files and the four ENSURE Project final deliverables on case studies are available.

3.3 The activities to self-test the knowledge achieved

This section is meant to be a place where to test the acquired knowledge and as a mean for a self-evaluation of knowledge level about the specific subject of vulnerability to hazards.

The external intervention not being previewed, the exercises are organized with answers and the indication of theoretical and methodological knowledge references into the e-learning site.

The activities have been developed according to the main knowledge goals of the ENSURE Project and try to retrace the contents from an operational perspective. The user is then asked to try to develop actions like:

- “to identify and find essential elements in order to obtain a first knowledge picture of the specific territorial system”
- “to recognize usable information/knowledge from images, maps and other visual documents describing natural and na-tech hazards”
- “to select key territorial subjects in order to organize the vulnerability assessment activity”
- “to assess the quality of data”
- “to organize indicators and build up assessment tables”
- “to develop a vulnerability and/or resilience assessment”
- “to put in evidence the main results of the assessment process”
- “to suggest some possible vulnerability management suggestions to local subjects”

The architecture of these activities also aims at introducing users to the knowledge building needs and to the sequence of actions required to autonomously develop an assessment process.

Table 4 – Example of an activity in module 4

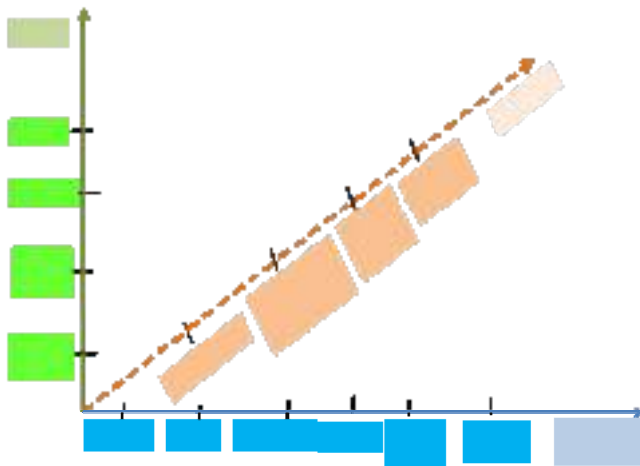
Working with indicators

This activity aims to help you achieve a better understanding of this important matter.

The use of indicators is one of the core activities in any assessment process, regardless of the specific field of application. As well introduced by file F28 in module 2, “Indicators are qualitative or quantitative parameters that describe features of a certain, often complex and ill-defined, phenomenon and communicate an assessment of the phenomenon involved (Dopheide and Martinez, 2000). The latter implies that, although indicators can be either descriptive or normative, they always have implicitly or explicitly a reference to a norm. This makes indicators clearly different from simple measurements”.

This means that the selection and quality of indicators define the quality itself of information. Quality which means completeness, usability and clarity of information describing a certain matter or phenomena or territorial area: information needed to develop any vulnerability and resilience assessment.

1. The following figure can be found in module 2 and shows “Criteria to identify and select vulnerability indicators”. Are you able to fill the coloured areas with the right contents?



To help you remember that criteria are grouped along three main axes:

- On the x axis, the inherent characteristics of indicators are addressed;
- On the y axis, the characteristics of the data to be used to assess the indicators value in a given place are shown;
- On the z axis, the usefulness of indicators is appraised.

2. To develop a vulnerability assessment you need some categories of data/indicators: which ones?

To understand which sources are needed we have to make reference to the definition of vulnerability. You can find useful elements in files F02, chapter 3, and, mainly, in file F29.

3. Once data have been processed into a vulnerability assessment, it is important to organise them into tools for vulnerability analysis and representation. Tools must be able to transmit information and communicate about the vulnerability profile of a territorial area, becoming supports for decision making processes. Which instruments for the data visualisation can be found in the ENSURE documents?

Exercises are of course based on the materials available on the website and try to use a variety of elements and media to make activities more attractive and diversified. Finally, as the e-learning site should function as a tool for the dissemination of the results and documents produced by the ENSURE Project, activities have been designed to invite users to browse all the knowledge contents and to make reference to the complete work developed into the ENSURE Project. Table 4 shows an example of activity.

3.4 Module 5 – The final ENSURE Projects products

The final module in the e-learning site offers a collection of documents and publications produced by the project partners.

Here it is possible to find the whole set of deliverables of the ENSURE Project from which the specific learning files have been obtained. There are constant cross-references between files and deliverables, in order to invite users to deepen their knowledge beyond the educational contents which have been expressly composed for learning purposes. For the same reasons this module offer is enriched by the final booklet *Enhancing Resilience of Communities and Territories Facing Natural and Na-tech Hazards*, a list of the references of the publications prepared by the project partners and a list of links to interesting websites.

4. Conclusions

The e-learning tool of the ENSURE Project may be seen as an attempt to widely diffuse both a research project results and a methodological/operational practice contributing to the offer of instruments to be used in the field of natural and na-tech hazards vulnerability and resilience assessment.

The concept and the architecture try to respond to a double challenge. From the one hand there is the need to offer contents directly coming from a recent and innovative research work. The selection and elaboration of the e-learning contents should therefore be able to adequately explain and diffuse the products of a very rich analysis and discussion regarding the existing approaches and practices in vulnerability and resilience assessment and the new operational integrated multi-scale ENSURE methodology. From the other hand this can be regarded as a new offer of an easy-to-use course on a very complex matter like vulnerability and resilience assessment to a wide audience of students, professionals and practitioners.

To draw concrete conclusions on the performance itself of the tool we will of course have to wait some more time, as a real evaluation of the results will be possible only after at least a year from the finalization of the website and the diffusion of information about its availability. The work of conceptualization and the production and organization of the learning contents has anyway highlighted some important elements for future developments.

A first issue is the use of English as the working language (see Lienert et al. 2009). This of course opens the tool to a really wide audience but, on the other hand, could represent a constraint to the diffusion towards practitioners and technicians in public and private local bodies. In future it will therefore be important to understand whether and in which cases it could be useful an effort of translation, taking into account the emerging of costs which may be high.

A second point is the capability to offer approaches and methodologies from both a theoretical and operational point of view. Operational tools are of course very important but in time they can change. A course like this one have to make users aware of the importance of theory and methodology beside practice. What changes only a little is the capability to build the knowledge needed to develop a certain sequence of actions to obtain an effective and useful vulnerability and resilience assessment, apart from the use of one specific model.

The final point is the need for contents able to offer a wide variety of operational experiences in many different regions and in presence of different hazard typologies. This is way the ENSURE Project tool put so much emphasis on case studies, a result achieved by involving many scientists from different countries working with different disciplinary approaches. An great effort during the research period but a great richness in terms of knowledge production.

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