



Education and Culture

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**PROGETTO PILOTA- PILOT PROJECT
FORMA MENTIS**

La dignità culturale del sapere tecnico-scientifico
The cultural dignity of technical-scientific knowledge
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VALIDATION TOOLS KIT

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The goals of the Forma Mentis project

The “FORMA MENTIS” project aims at establishing models for the vocational guidance to the study of technical and scientific subjects. The initiative originates from the awareness that, beside the increasing development of new technologies, a progressive devaluation of technical and scientific subjects and their teaching methods is taking place, as far as school education, professional training and in-shop training are involved. It is necessary to abandon the logics of professional training and head towards a true vocational training that aims at restoring the cultural aspect of a business, its organisational model, its position within the market, as well as the cultural value of technology itself. The aim is to overcome conventional learning methods based on simple procedural knowledge, and bear in mind that a real technical culture implies the development of logic and linguistic competencies in order to understand and manage the cultural interaction with technological processes and with the set of systems that control the economical processes within the job market.

Forma Mentis stems from the realisation that the lack of logic and linguistic abilities, which is very common among students of technical and scientific subjects at school and university or students entering the job world after secondary school, irreversibly penalises the learning process itself on one hand, and affects the technological cultural update as well as the communication between the ‘players’ involved in the training activities on the other hand.

The above lack deeply impacts on the issue of hidden dispersiveness (not official, but especially clear when facing the increasingly selective job market), the qualification/re-training of one’s own professional skills and, therefore, the re-launching of the so-called technical culture.

The present project will mainly focus on:

- re-establishing the cultural dignity of technical and scientific subjects, in order to reevaluate the importance of knowledge, know-how, self-knowledge and mentoring, as well as their application to the education and training sector, so that all ‘players’ involved in this process are in charge of looking for the best strategies to enhance the educational power of technical and scientific subjects and to employ their contents as sources of didactic methods, with rigour as well as simplicity.
- re-launching technical culture by operating directly on the weaknesses of the technical-scientific learning process and focusing on the consolidation of the logic and linguistic skills of students and workers by constantly monitoring them throughout their training process.

Requisites of the model are:

- provide educators with guidelines for the definition of the processes that lead to the planning of a training program which meets the requirements and targets of the Forma Mentis project;
- provide a framework which combines teaching and student assessment methodologies with specific learning targets.

Validation of the training models

The validation of the training model is carried out on two separate levels:

1. the model:
 - assessment of the guidance capacity of the model in defining a specific training program¹ (the so-called instructions for use of the model).
2. the training programmes:
 - check that the training programmes comply with the processes and guidelines of the training model as well as the relations between the processes. The example programmes are aimed at contextualising their implementation so as to assess the maximum performance and the ability of the model to adjust to different contexts (School, University, Continuing Education, Companies...)

The identification of validators

Validators must be educators, decision-makers and other people involved in the educational processes, with direct experience in planning and implementing training activities in school and work settings.

The organisation of the validation process

The validation process is based on several tool kits designed for different categories of validators who freely decide how to carry out the validation on the basis of their experience.

- Tool kit no. 1 provides the document of the training model and an example of training program. It is aimed at the model validation and the creation of a database of training programs duly contextualised. The validation is based on questions made for a SWOT analysis² of the outcomes and the validator is required to provide a detailed account of the implementation test of a training program based on freely chosen technical-scientific contents. As mentioned above, attached to this tool kit the validator finds one or more examples of programs to support the activity.
- Tool kit no. 2 consists of the training model and one or more training programs adjusted to the contexts in which the validators operate. The whole procedure is made up of two stages (A and B). Stage A focuses on the assessment of the coherence of the program(s) with the model by means of questions designed for a 'quality assessment'

¹ The program can pertain to any type of technical-scientific content and must be extensive enough so as to contain topics referring to the methodological approaches which strengthen the logic-linguistic abilities of the student (units lasting at least 12 hours)

²

Strengths: What do you do well? What unique resources can you draw on? What do others see as your strengths?	Weaknesses: What could you improve? Where do you have fewer resources than others? What are others likely to see as weaknesses?
Opportunities: What good opportunities are open to you? What trends could you take advantage of? How can you turn your strengths into opportunities?	Threats: What trends could harm you? What is your competition doing? What threats do your weaknesses expose you to?

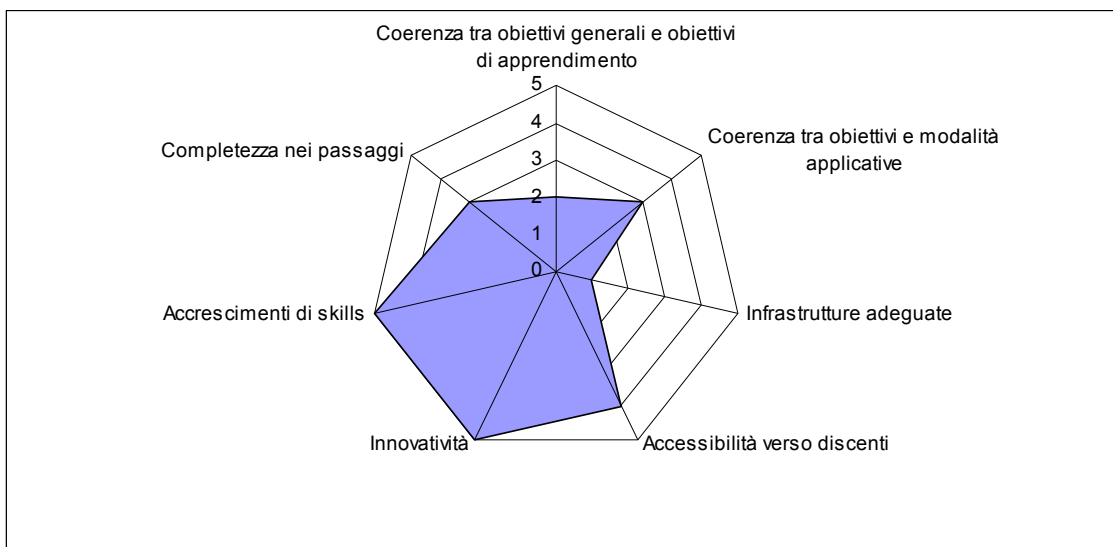
Basic scheme of the SWOT analysis (Strengths, Weaknesses, Opportunities, Threats)

analysis, whereby the outcomes are synthesised by a few indicators which are graphically represented on the radar chart³. The latter provides an immediate overall view of the assessment. Stage B is the real validation process of the training model and, as tool kit no. 1, is based on questions made for a SWOT analysis of the outcomes.

- Tool kit no. 3 consists of the training model and one or more training programs adjusted to the contexts in which the validators operate. The whole procedure is made up of two stages (A and B). Stage A focuses on the assessment of the coherence/consistency of the programme(s) to the model by means of questions designed for a 'quality assessment' analysis, whereby the outcomes are synthesised by a few indicators which are graphically represented on the radar chart. The latter provides an immediate overall view of the assessment. Stage B is the real validation process of the training model and implies that the validators autonomously carries out a SWOT analysis. In order to compare the outcome with tool kit no. 1 and tool kit no. 2, the features to be analysed are indicated.

From an operational point of view, the validation can be carried out through focus groups, interviews and individual questionnaires.

³ Radar chart built on 7 indicators



Coherence between general goals and learning goals
 Coherence between goals and applications
 Suitable infrastructures
 Accessibility for students
 Innovation
 Skills enhancement
 Completeness
 Comprehensive transfers

Stage 0

The validator or validation team must be identified..

Educators category:

- institutions
- education
- vocational training
- companies
- other

The validator or validation team must decide on how to validate the model:

- Carry out the model validation operationally (testing oneself as schemer by following the proposed project routine) (Tool kit no. 1); in this case, it is at discretion of the validator to note down personal details, home institution or organization (address, telephone no., WEB site, e-mail), which will be loaded on the database and linked to the training program developed.
- Carry out the model validation in two different stages with the support of the training program(s): stage A consists of answering questions (set A) on the training program by following a scheme designed for 'quality assessment' aimed at providing a comprehensive evaluation of the coherence of the training program with the model, then answer set B of questions which follow the same pattern as tool kit no. 1, i.e. designed for a SWOT analysis (Tool kit no. 2);
- Carry out the model validation in two different stages with the support of the training program(s): stage A consists of answering questions (set A) on the training program by following a scheme designed for 'quality assessment' aimed at providing a comprehensive evaluation of the coherence of the training programme with the model, then directly carry out the SWOT analysis (Tool kit no. 3)

Tool Kit no. 1

On the basis of the proposed training model, the validator or validation team simulates the planning of an example program as a response to particular training requirements. Complying with these training needs and the general and learning goals of the Forma Mentis project, the validator provides a detailed account on the outcome of the test based on technical-scientific contents which have been freely chosen and in line with the validator's experience

The validator or validation team must answer in detail to the following free-form questions that then undergo a SWOT analysis of the outcomes (one or more letters referring to the 4 factors of the SWOT analysis are placed next to each question).

Questions:

1. [S] What elements of the model would you deem as innovative with respect to your current working field?
.....
2. [S] Do you think that the role kept for educational methodologies inside the model can bring advantages to the students? What are they?
.....
3. [S/W] Do you think that the model was successful in its aim of making you aware of teaching and/or learning methods?
.....
4. [W] Do you think that the role reserved for educational methodologies can absorb time and effort that are subtracted from the contents or from the acquirement of know-how ability? If so, which ones and why?
.....
5. [W] In your opinion, are there areas that the training model doesn't take into consideration or are there areas that are insignificant and/or obsolete? If so, please specify.
.....
6. [W] Do you think that there are worthless steps in the model? If so, which ones and why?
.....
7. [W] Do you think that the general objectives of the model can penalise the quick learning required by the job market? In what way and for what reasons?
.....
8. [T] As far as you know, are there other educational methodologies that are efficient in training technical-scientific personnel? Please, indicate them and the learning evaluation parameters used.
.....
9. [O] Do you think that the creation of a database for educational methodologies and a network of teachers – researchers for sharing methods and material is important? Do you have any suggestions for the creation of such network?
.....
10. [T] As far as you are aware, are there any other more effective and efficient training models that share the same general objectives? If so, please specify.
.....
11. [O] Would you be willing to adopt the model as a guideline for your own future training program?
.....

12. [O] What are the best contexts for obtaining the maximum output from the proposed model?

.....

Training program developed

.....

Tool Kit no. 2

The validator or validation team must answer to set (A) of questions aimed at evaluating, through a “quality assessment” analysis, the coherence of one or more training programs with the training models (a “quality assessment” for every program analysed must be carried out). Therefore the validator or validation team, with the support of the training model and training program(s), must answer in detail to set B of free-form questions that then undergo a SWOT analysis of the outcomes (one or more letters referring to the 4 factors of the SWOT analysis are placed next to each question).

Set A (one or more indicators, found in square brackets, are associated to each question/answer)

Does the training program comply with the coherence between training requirements, general objectives and learning objectives? (5 = excellent, 1 = poor) [requirements-objectives coherence]

1 2 3 4 5

Do the proposed educational methodologies adhere to the guidelines of the training model? (5 = excellent, 1 = poor) [coherence of educational methodologies]

1 2 3 4 5

Are the subjects organised according to the guidelines of the model? (5 = excellent, 1 = poor) [coherence in the organisation of contents]

1 2 3 4 5

Is the training program detailed suitably enough to be ready for transfer? (5 = excellent, 1 = poor) [completeness of the training program]

1 2 3 4 5

Are the assessment methods for learning progress adequate and coherent with the general and learning goals? (5 = excellent, 1 = poor) [suitability of the learning progress verification methods]

1 2 3 4 5

Are the organisation (time distribution of contents), educational aids (IT instruments..), human resources, the transfer methods adequate to achieve the general and learning goals? (5 = excellent, 1 = poor) [suitability of resources]

1 2 3 4 5

Are the general and learning goals outlined in the training program available to the majority of students in the time foreseen? (5 = excellent, 1 = poor) [efficiency of the whole training project]

1 2 3 4 5

Set B:

1. [S] What elements of the model would you deem as innovative with respect to your current working field?
.....
2. [S] Do you think that the role kept for educational methodologies inside the model can bring advantages to the students? What are they?
.....
3. [S/W] Do you think that the model was successful in its aim of making you aware of teaching and/or learning methods?
.....
4. [W] Do you think that the role reserved for educational methodologies can absorb time and effort that are subtracted from the contents or from the acquirement of know-how ability? If so, which ones and why?
.....
5. [W] In your opinion, are there areas that the training model doesn't take into consideration or are there areas that are insignificant and/or obsolete? If so, please specify.
.....
6. [W] Do you think that there are worthless steps in the model? If so, which ones and why?
.....
7. [W] Do you think that the general objectives of the model can penalise the quick learning required by the job market? In what way and for what reasons?
.....
8. [T] As far as you know, are there other educational methodologies that are efficient in training technical-scientific personnel? Please, indicate them and the learning evaluation parameters used.
.....
9. [O] Do you think that the creation of a database for educational methodologies and a network of teachers – researchers for sharing methods and material is important? Do you have any suggestions for the creation of such network?
.....
10. [T] As far as you are aware, are there any other more effective and efficient training models that share the same general objectives? If so, please specify.
.....
11. [O] Would you be willing to adopt the model as a guideline for your own future training program?
.....
12. [O/T] What are the best contexts for obtaining the maximum output from the proposed model?
.....

Tool Kit no. 3

The validator or validation team must answer to set (A) of questions aimed at evaluating, through a “quality assessment” analysis, the coherence of one or more training programs with the training models (a “quality assessment” for every program analysed must be carried out). The validator then directly carries out the SWOT analysis with the support of the training model and training program(s).

Set A (one or more indicators, found in square brackets, are associated to each question/answer)

Does the training program comply with the coherence between training requirements, general objectives and learning objectives? (5 = excellent, 1 = poor) [requirements-objectives coherence]

1 2 3 4 5

Do the proposed educational methodologies adhere to the guidelines of the training model? (5 = excellent, 1 = poor) [coherence of educational methodologies]

1 2 3 4 5

Are the subjects organised according to the guidelines of the model? (5 = excellent, 1 = poor) [coherence in the organisation of contents]

1 2 3 4 5

Is the training program detailed suitably enough to be ready for transfer? (5 = excellent, 1 = poor) [completeness of the training program]

1 2 3 4 5

Are the assessment methods for learning progress adequate and coherent with the general and learning goals? (5 = excellent, 1 = poor) [suitability of the learning progress verification methods]

1 2 3 4 5

Are the organisation (time distribution of contents), educational aids (IT instruments..), human resources, the transfer methods adequate to achieve the general and learning goals? (5 = excellent, 1 = poor) [suitability of resources]

1 2 3 4 5

Are the general and learning goals outlined in the training program available to the majority of students in the time foreseen? (5 = excellent, 1 = poor) [efficiency of the wholetraining project]

1 2 3 4 5

SWOT ANALYSIS

The validator or validation team must validate the training model by means of the SWOT analysis, following the instructions below:

- **Strengths and weaknesses, particularly with regards to the following aspects:**
 - innovation (question 1),
 - impact on the students (question 2),
 - importance of educational methodologies (questions 3-4),
 - efficiency (question 5),
 - efficacy (question 6),
 - transferability, exploitability (question 12).

- **Threats** (external factors that can determine the failure of the model and its applications) **and opportunities** (external factors that determine the success of the model and its applications) particularly concerning:
 - the real possibility of creating a training model which can be used by the various 'players' involved (for example, diverging interests, different operational contexts, different aims and objectives, alternative educational methodologies) (questions 7-8-10);
 - the validator's experience in applying alternative models (question 10) and the applicability of the model to the validator's activity (questions 9-11-12)
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Internal factors	Strengths	Weaknesses
External factors	Threats	Opportunities