

Analyze the jobs and skills expected



Training Engineering :
Efficient training
For skilled graduates

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Objectives

On finishing this sequence you will be able to:

- Give a definition of 'skills'
- Explain goals and the need for analysing careers and work tasks
- Describe the different sources of information to combine in order to define job prospects more accurately
- Suggest a range of procedures to use in order to gather data and analyse careers and work environments in order to understand potential limits or potential accelerators

Introduction

Using the information from *the initial analysis of the job profiles and skills*¹, the following step is to establish exactly which skills future professionals should acquire. This should be done for each level of qualification targeted.



It is essential to define a range of skills covering different fields of competence and adapt to the expected evolution of the job profile.



"Curricula should be developed and monitored through dialogue and partnerships among teaching staff, students, graduates and labour market actors, drawing on new methods of teaching and learning, so that students acquire relevant skills that enhance their employability."

Improving the quality of teaching and learning in Europe's higher education institutions JUNE 2013. Recommendation 7

1 - http://www.supagro.fr/ress-tice/tempus/IF_Eng/Sequence2/co/Sequence2_Tempus_Angl.html

What does Employability Mean?



The French Minister for Employment says " *the capacity to negotiate your way around and through the job market, autonomously adapting your full potential to the situation. Employability is built on acquisition of knowledge, qualifications and professional attitude, it is the way we use our skills and demonstrate our ability to a potential employer.*"

The OIT International Organisation for Employment says " *the aptitude of each one of us to find and keep a job, to climb the professional ladder and adapt to changes all through our professional life*"

Mantz Yorke, Professor of Educational Science and author of 'Employability in Higher Education' says " *a range of skills, know-how, understanding and personal characteristics which make graduates more successful in their search for employment in their field of work, bringing benefits to that sector, society and the economy.*"

What is your definition of 'employability'?



Complement : For more information:

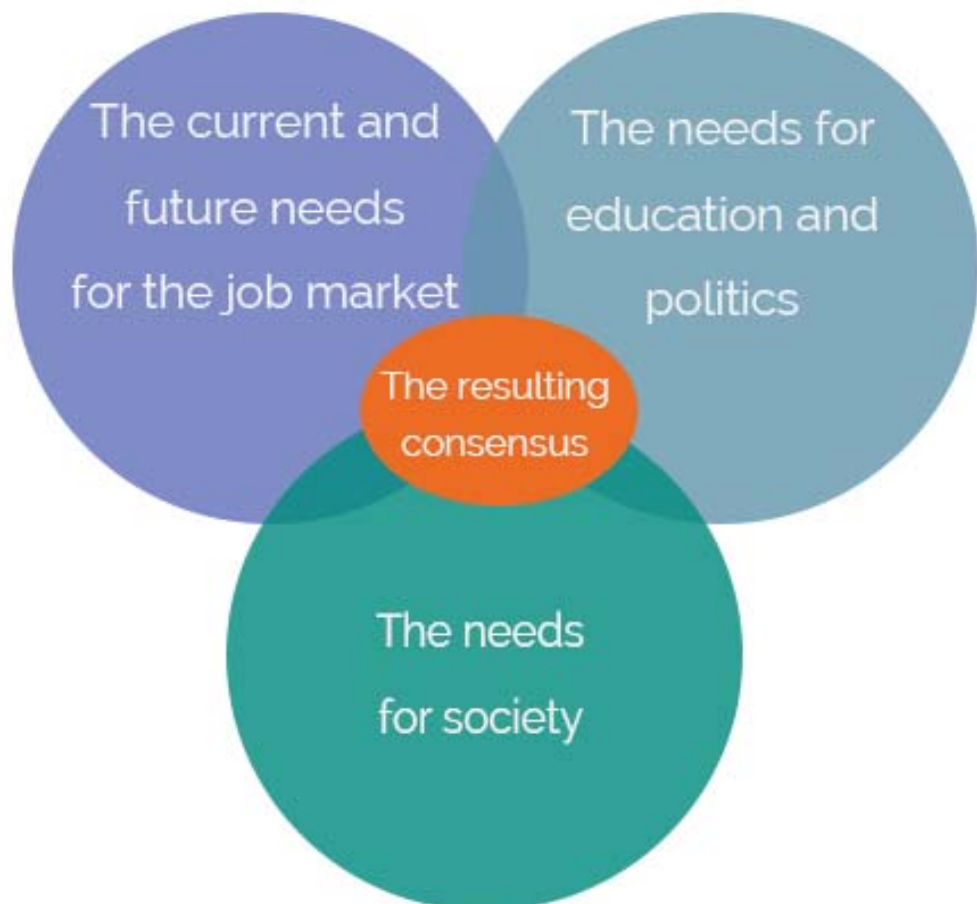
- "Employability in Higher Education: what it is - what it is not(see)", Higher Education Academy/ESEC de Mantz Yorke (2004)

How to Build a Vision from Multiple Inputs



Create a new course for your establishment! What a good idea! Wait! To prepare for what kind of job? and to develop which skills? You cannot create a course without analysing the employment prospects and defining the skills required.

In order to carry out this analysis you must consider three sorts of question which provide the multiple inputs necessary to build a complete vision of the trained professional.



The **needs of the economy and of the profession** are expressed by employers, staff, entrepreneurs and former students.

The **needs of society** are voiced by students, families and the civic society.

The **needs of institutions** are formulated by universities, according to their academic requirements and the professor's demands.

The **needs of policy** makers concern law and the legal environment.

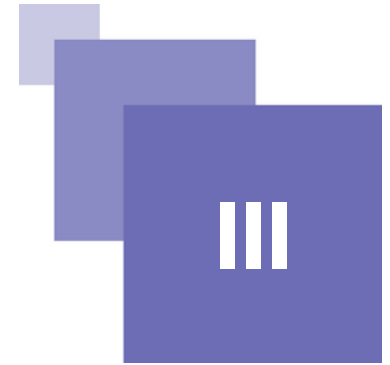
A. Who should be interviewed?

This list can be extended to suit various contexts and situations. Here, it serves to illustrate the point.

Economic/Professional Needs	Social Needs	Institutional /Political Needs
<ul style="list-style-type: none"> • Large companies • Small and medium-sized companies • State-owned and public services, market opportunities • The informal sector • Former students, networks, associations • Other <p>The people to question:</p> <ul style="list-style-type: none"> → The staff → The management 	<p>Students, families and society:</p> <p>How do they see things? How do they see the future? and and How do they fit in?</p> <p>According to defined goals is there a profile which can be considered as priority?</p> <p>Correlate student profile and the professional world</p> <p>Do students need professional experience during their course?</p> <p>How do students see their future?</p> <p>What do students already know about the work context?</p> <p>What do they know and what have they done towards their individual professional project? Have they written their professional information sheet? and have they prepared for an interview?</p> <p>What do they think of their meetings with professionals so far?</p>	<p>To understand the legal framework and legislative constraints texts can be consulted for information on agricultural, food industry, processing industry policy, employment, education, training course and life long learning.</p> <p>Questions can also be addressed directly to the educational establishments:</p> <ul style="list-style-type: none"> • professors can inform you on research topics,skills, approaches, requirements etc. • Boards of Directors can give information on school projects

The way you design and use the survey will determine the pertinence and efficiency to your project.

A Closer Look at Skills



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A. Professional Skills

An issue which arises when defining the content of a 'skills based' training course: which skills precisely? with what value in the professional environment? and in what cases should they be applied?

To grasp these aspects we can consult **academic literature** on the subject.

Academic literature presents an analysis of professional skill development. The goal is to better understand the work context to better train the employees. To obtain information for this kind of study a rigorous analysis of the sector and available career paths must be carried out.

So how can you describe a professional skill?

To be competent you must use skills: you must **take action and adapt** your action to **a range of contexts** occurring within your field of work. A competent professional **knows how to use the right skill** at the right time to achieve maximum efficiency

Guy Le Boterf, a French human resources engineering consultant, states that a skill is "*knowing how to take action by combining cognitive, material, social, cultural and information resources to formulate pertinent solutions*"



Example

Farmers are increasingly having to deal with new and fast changing situations. This has an impact on farming methods and the general development of agricultural practices. The training of farmers must evolve to prepare them for these constant changes but furthermore, all the people working in career paths connected to farming must learn how to adapt.

Take action! use your skills!

- Know how to formulate a response using all the resources available to you, and take action!

Which resources are suited to which issue?

Let's start with personal cognitive, sensory/motor and emotional resources

<p>Cognitive = 'know' General knowledge and knowledge specific to the professional environment</p>	<p>what should be known?/explained?</p>
<p>Sesory-motor = 'knowhow' Practical aptitude</p>	<p>what practices should be learned?</p>
<p>Emotional = 'attitude' Inter-relational skills, communication skills</p>	<p>what is acceptable behaviour?</p>



Note : Skill is nothing without the "power" and "will" to act

Guy Le Boterf speaks of "know how to act / want to act / be able to act"



B. Formulating a Complete Description of a Skill

As mentioned in the introduction, a skill can be described using 4 steps:

1. be capable of
2. + action verb
3. + the nature of the action
4. + who benefits? in what context?

Some examples of action verbs associated with skills:

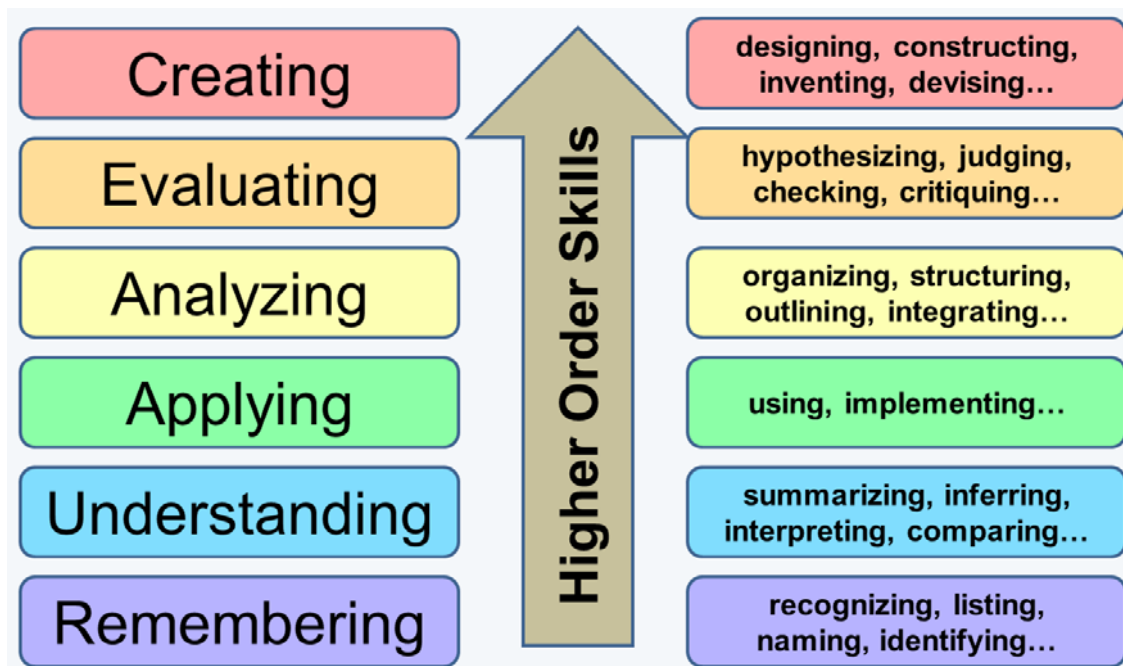
Active verbs to formulate specific goals. This list is not exhaustive and is improvable.

Ability	Exchange	Prevent
Act	Explain	Promote
Administrate	Facilitate	Protect
Affiliate	Follow up	Read
Analyse	Forecast	Reassure
Apply	Formulate	Refrain from
Assist	Fulfil	Register
Assume responsibility	Give	Remove
Avoid	Guide	Request
Build	Handle	Resume
Calculate	Help	Retain
Carry out	Hold	Safeguard
Change	Identify	Say
Choose	Illustrate	Select
Collect	Implant	Send
Compare	Implement	Share
Complete	Infer	Show
Conserve	Inform	Solve
Consider	Interpret	Specify
Contrast	Introduce	Supply
Contribute	Itemize	Synthesise
Control	Justify	Teach
Cooperate	Lead	Treat
Correct	Maintain	Unite
Create	Manipulate	Use
Decide	Meet	Write
Defend	Measure	Etc.
Define	Mobilise	
Demonstrate	Modify	
Describe	Name	
Determine	Note	
Develop	Obtain	
Diagnose	Oppose	
Direct	Organise	
Discuss	Outline	
Distinguish	Participate	

Distribute	Persuade	
Draw up	Place	
Encourage	Plan	
Establish	Play	
Evaluate	Pratice	
Examine	Prepare	
	Present	

Prepared by the Centre for Higher Education in Nursing (Yaoundé, Cameroon) from Michel Charlibois, University of Montreal. (Rev. EPL, August 1973). From the 'Educational handbook for personnal health', J.J. Guilbert, MOS, Publication No. 35.

Bloom's taxonomy is also used for the formulation of skills.



Thinking Skills in Bloom's Taxonomy (illustration by Scott Brande)

Action Words for Bloom's Taxonomy					
Knowledge	Understand	Apply	Analyze	Evaluate	Create
define	explain	solve	analyze	reframe	design
identify	describe	apply	compare	criticize	compose
describe	interpret	illustrate	classify	evaluate	create
label	paraphrase	modify	contrast	order	plan
list	summarize	use	distinguish	appraise	combine
name	classify	calculate	infer	judge	formulate
state	compare	change	separate	support	invent
match	differentiate	choose	explain	compare	hypothesize
recognize	discuss	demonstrate	select	decide	substitute
select	distinguish	discover	categorize	discriminate	write
examine	extend	experiment	connect	recommend	compile
locate	predict	relate	differentiate	summarize	construct
memorize	associate	show	discriminate	assess	develop
quote	contrast	sketch	divide	choose	generalize
recall	convert	complete	order	convince	integrate
reproduce	demonstrate	construct	point out	defend	modify
tabulate	estimate	dramatize	prioritize	estimate	organize
tell	express	interpret	subdivide	find errors	prepare
copy	identify	manipulate	survey	grade	produce
discover	indicate	paint	advertise	measure	rearrange
duplicate	infer	prepare	appraise	predict	rewrite
enumerate	relate	produce	break down	rank	role-play
listen	restate	report	calculate	score	adapt
observe	select	teach	conclude	select	anticipate
omit	translate	act	correlate	test	arrange
read	ask	administer	criticize	argue	assemble
recite	cite	articulate	deduce	conclude	choose
record	discover	chart	devise	consider	collaborate
repeat	generalize	collect	diagram	critique	collect
retell	give examples	compute	dissect	debate	devise
visualize	group	determine	estimate	distinguish	express
	illustrate	develop	evaluate	editorialize	facilitate
	judge	employ	experiment	justify	imagine
	observe	establish	focus	persuade	infer
	order	examine	illustrate	rate	intervene
	report	explain	organize	weigh	justify
	represent	interview	outline		make
	research	judge	plan		manage
	review	list	question		negotiate
	rewrite	operate	test		originate
	show	practice			propose
	trace	predict			reorganize
	transform	record			report
		schedule			revise
		simulate			schematize
		transfer			simulate
		write			solve
					speculate
					structure
					support
					test
					validate



Example

3 examples of using an action verb, the nature of the action and context. In a work context, 'the qualified professional will be able to...':

Example 1 :

Action verb	Purpose of the action	Contextualization
conduct	a plant production	frequently, promoting

Action verb	Purpose of the action	Contextualization
	workshop	quality and preserving the long term potential of the activity with minimal impact on the environment

Table 1 be able to...

Example 2 :

Action verb	Purpose of the action	Contextualization
negotiate	institutional partnerships	in order to develop financial resources

Table 2 be able to...

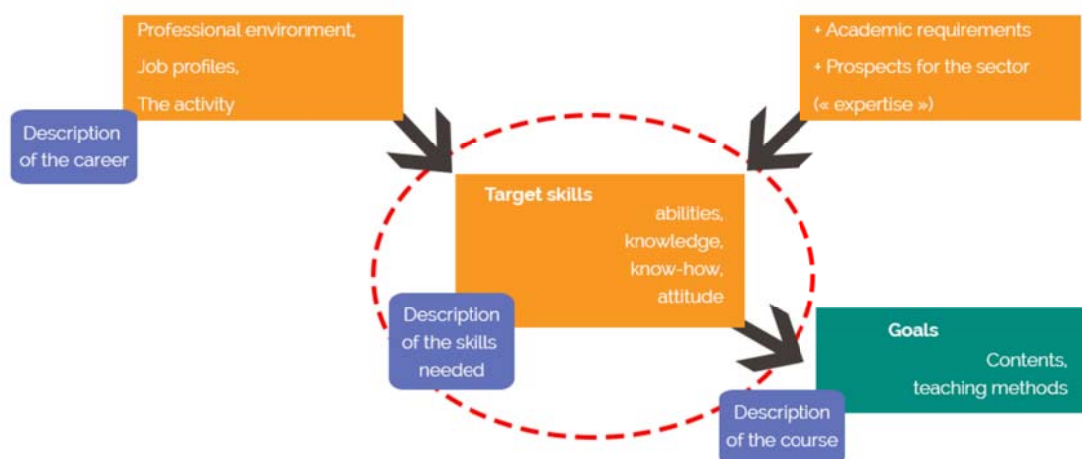
Example 3 :

Action verb	Purpose of the action	Contextualization
create	technological solutions affecting equipment, systems, infrastructure and services	to meet the needs of the environment sector

Table 3 be able to...

C. Identify the Skills Needed

The global procedure



Various ways to identify skills to build

The challenge here is to understand what the expected skills are, from the point of view of professionals. There are various ways to consult them, which will depend on the state of the relationship between them and the institution. Among these different modalities, we can cite, in a non-exhaustive way:

- Document consultation (job descriptions, job offers, job performance

evaluations ...)

- Survey of professionals: this modality implies the existence of an appropriate database, a good return rate or interviewers available
- Qualitative individual interviews with professionals: this involves having access to a representative sample of people, available
- Observations (in work situation): implies having time and access to companies
- Workshops / Focus groups with professionals and their employers (separately): Organizational issues need to be addressed; place; availability; representation of invited guests; animation...
- Work with students back from internship
- Consultation of professionals belonging to the governing bodies of the institution
- Etc.

In the next part, we focus on organizing an investigation. This modality is not in itself the best nor the only one to use; it is best to combine different sources of information.

Pinpointing the Need for Training by Using a Survey

IV

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A. Goals and Results of the Survey



Note

'Survey' is the term employed to describe the means used to acquire information (financial resources, human resources) in a given time-frame, from many different sources. This term can cover:

- An analysis of texts, documents and literature on employability, national figures for the sector, etc.
- Questionnaires aimed at a specific target group; professionals, students, former students, professors and teaching staff. The preparation of these questionnaires includes the method for sorting and qualifying the results, perhaps using a grid.
- The validation of the information retained involves soliciting the opinions of the different teams involved in the course creation

The main goal of the survey is to assemble all the information possible on a particular sector to identify exactly which skills will become the basis for the development of the programme. The following questions must be answered at this stage:

- **What is the state of the work activity and career profiles at the present moment?**
- **What exactly does the professional do? How? Under what conditions and in what context?**
- **What are the short to mid-term developments to be expected?**

Goals of the survey can be global, precise or macro depending on the professional sector

- Development trends: Booming? Why? Changing legislation? Innovation? Offer and demand?
- Context: Urbanisation? Regular demand? Local production? International links?
- Human resource profiles: current employees? Size of the workforce? Qualifications? Family businesses? Training? Supervision? Management? Organisation?
- Equipment: old or new machinery/tools? Processing procedures? Traditional? Using latest research models?

Information on the employment opportunities for the sector

- Does the sector provide much employment currently?
- What are the trends affecting job profiles to be seen in job offers?

Once the sector is well described, and the map of trades clarified, we can specify more specifically for the trades covered by the training, the activities and functions performed.



Example

- Example of an interview guide in agri-food production(see)
- Sample Interview Guide for HR Managers in Agribusiness(see)

The survey can also provide data on how professionals could become involved in new training programmes: in the preparation stage with decision taking on modalities and conditions

- How are the professionals currently involved in improvement schemes?
- Is there a link with the national education system?
- In what way do they currently participate in training: by speaking at conferences? by holding practical skill workshops? by sharing information? by having students do work placements? by commissioning student projects?
- Are they involved in designing training programmes for their staff? How do they do this? Do they help set-up and help run training programmes?

B. First Tangible Result: The Detailed Description of the Career Profile



Advice

Several countries already have descriptions for career profiles, unless it is an emerging profile which caters for new needs. In the latter case it will be necessary to observe and identify needs according to contexts in the country concerned or related to the specific evolution of careers or specific fields of work. This data then needs to be analysed and adapted to local needs.

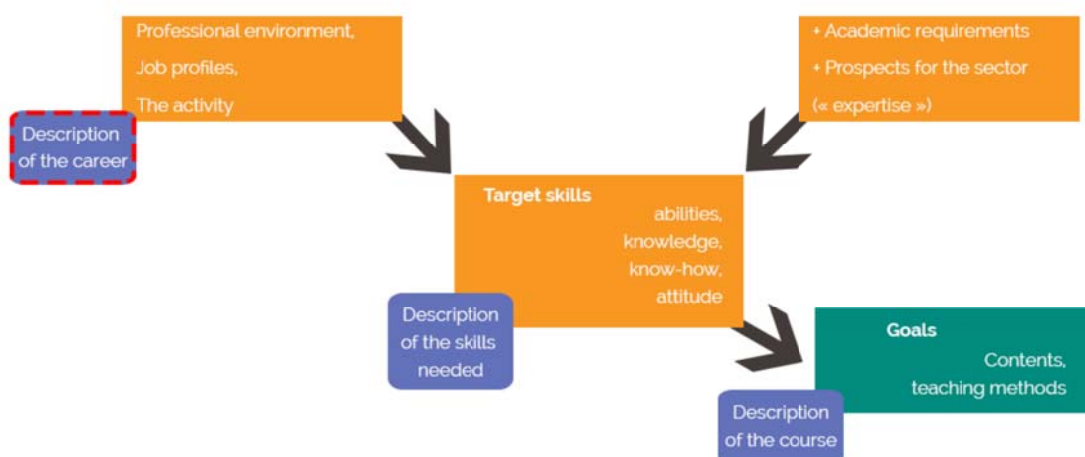




The goal is to draft an accurate description of the profession using the information from the survey:

- The sector of activity and the career prospects targeted
- The standards for that profession or that branch of the profession

This document holds significant weight for influencing policy as it is the fruit of all the the parties concerned and is the basis on which training for the sector will be designed



1. Suggested presentation of information for a reference document

Context	Content
Introduction <ul style="list-style-type: none"> • Context, evolution 	<i>General information concerning work environment and evolution of the professional context :</i> <ul style="list-style-type: none"> - Socio-economic information, facts & figures on the sector; specific fields of work, employment rate, gender ratio, social issues, technical issues - Information on prospects in the field of work, techniques and equipment, legislation trends, company policy, corporate identity etc. and expectations for future employment trends
1. Analysis of employment and job description:	
<ul style="list-style-type: none"> • Job title 	<i>Describe characteristics specific to each post</i>

Context	Content
<ul style="list-style-type: none"> Situating this position 	<ul style="list-style-type: none"> - Positioning, type of business /organisation, its place inside the organisation - Situate the job profile within the business/organisation/activity and hierarchy - Work conditions: work schedules, timetables, mobility, seasonal tasks, physical constraints
<ul style="list-style-type: none"> Tasks 	<p>One position works on a range of activities targeting one goal. The job profile is the total of all the routines and activities carried out by one person to reach that goal.</p> <p>For example: a farmer handles production, management, sales, treatment etc.</p> <p>Or: the key tasks of a manager can be : planning, supervising, coordinating, informing, advising, training, budgeting and financial management.</p>
<ul style="list-style-type: none"> Level of autonomy and responsibility 	<p>The level of autonomy is of great interest as this has a direct link with training needs.</p>
<ul style="list-style-type: none"> Job prospects 	<p>Describe future trends for a career and expected diversification towards other connected fields of work.</p>
<p>2. Tasks :</p>	
<ul style="list-style-type: none"> Description of work tasks according to context 	<p>List activities and tasks according to career(s) target(s) context(s), using data collected from real cases</p> <p>For example, for farming production :</p> <ul style="list-style-type: none"> - organisation of crops - maintaining supplies - cultivation system supervision - harvesting - Etc ... <p>Indicate the level of instruction needed to meet the level of knowledge and know-how needed for the job profile.</p>



Note

The presentation framework may vary slightly according to different uses. In France:

Some example :

- The employment agencies have a directory of careers and job profiles.
- The Ministry of Agriculture has a directory of careers inside the Ministry and



partner establishments.

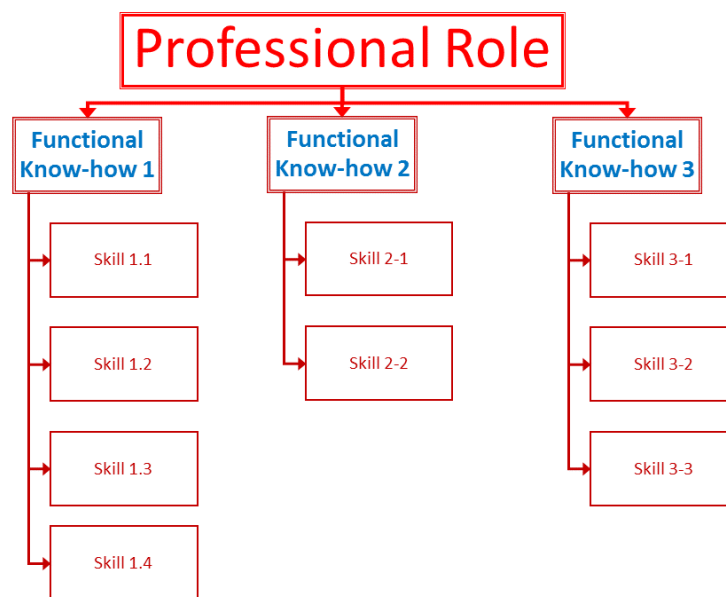
Different countries, Ministries, universities may have a similar directory. The content will be similar even if arranged differently.

Do you have access to documents describing career skills? Where can you find them?
When were they written? Which careers are described? Who wrote them?
What form can they be found in? How have they been used to design course content?

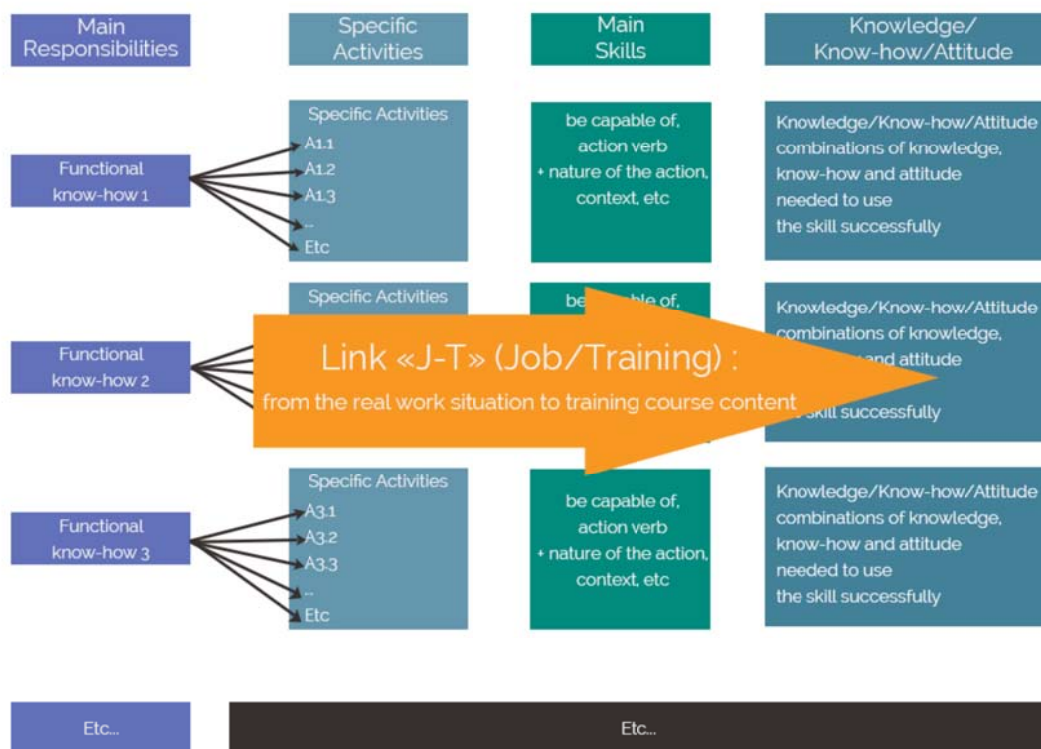
C. The Connection Between the Job and the Course

It is effective to divide up the functional know-how of the professional into skills which can be acquired before starting the job

From the professional role, in a specific field of work, to a list of skills required



From the reality of the job to course contents...LINK « J-T » (Job-Training) :



Skills can then be broken down into know-how - to know how to be.

These 3 components then make it possible to identify what, in the training will be the object of course (knowledge & expected knowledge). The know-how and the know-how lead to reasoning what the contents of training will offer in terms of TP, TD, internships, works of groups ... etc, all modalities which allow the students to develop real capacities professional, operational, in various situations.

Here we see how the job-training-employment nexus can be realized.

We will return to these questions in sequence 6 of this course.

D. The Choice of Method for the Survey

Suggested procedure:

Remember, there must be a logical step by step progression when gathering and then correlating results

1. To define the present state of the career or future career, gather data on career description, gather data on skills per job profile
2. Gather data on existing job profiles and on probable new job profiles needed for the sector or related branch of work
3. Knowing how qualifications are being modified or created to be more adapted to future needs, create a grid to use for analysis of the results of the surveys and correlating data. Write instructions on how to use the grid

4. Carry out the surveys - think about who will carry out the survey, on whom and on how many people. Are you are more interested in facts or figures?
5. Pooling, correlating, analysing and interpreting the gathered data
6. Establish descriptions of careers and skills to use for designing training courses

E. The Strategy for Collecting and Organising the Data



Example : At Montpellier SupAgro, Myriam Perez-Dumoulin, Professional Insertion Advisor

The following video shows how a "watch", more than a skill survey, can be done. There is not only one way of doing this work, however.

VIDEO

Speech:

Find the job you are looking for, achieve your professional goal! That is the sentence every graduate wants to hear when they engage on a training program.

And that is the point that every master course commits itself to guarantee to their former students.

So let's look for the magic recipe that will lead us to build up the training program that will fulfill the labor market needs.

Three main pathways to identify the skills and competences that are expected on the market and that must be given on the training program.

First, we can proceed **to analyse the job offers** that circulate and that ask for the professional profile issued from our program. We fix a concrete period of time, for example between April and June, no need to go for very long periods. We identify the key words that will help us to catch the relevant job offers. And then we pinpoint the different channel from where we will access to the offers. On the text of these offers we will be able to find the skills and competences expected from the candidate. Afterwards from other side we can also analyze the job conditions to know if there are mainly positions abroad, fix-term or temporary contract... that is a kind of information that can always be useful for entice new students.

Second, we can **go and interview employers** that are looking for candidates to fulfil the kind of position given by our training program. What we want to know is what are the skills and competences that they seek on a candidate profile. To approach these employers the best option is to mobilise one's network. People that already know the Institution that will be hosting the training program might be more sensible to answer to your request in a good mood. The best way to proceed to the exercise is to go for open interviews and let employers talk.

Third, we can **go and ask to freshly new graduates** with a similar professional profile what their needs on complementary training for having an access to the studied position are.

So these are the skills and competences we have identified, now we just have to construct the different modules that will build up our training program.

So this is the wonderful theory, reality is different. Very often training programs have to answer to the needs of the job market, and as a result they are usually built under a certain urgency context and under the constraints of the different stakeholders and their call for proposals. Most of the times what it happens is that we are asked to undertake this kind of study when the training program is already

designed. Besides, because of the requirements of each trainer it is very difficult to try to make the training program evolve drastically, we can mainly try to model it. Our approach, the results of our study give a solid base for engaging into negotiations among trainers for making the program progress.

What ever is the case, the most important thing above having the perfect training program is to engage into this approach in order to facilitate evolutions of the program that will enable it to improve continuously.

According to your defined goal your strategy for collecting the data on skills can be organised in different ways.

Existing contexts with inherent constraints: access, time-scale, human resources, limited budget, transport, uncooperative professionals can define the approach you are able to apply.



Example

- A suggested framework for organising the collection of information - 'Projet Tradpro'(see)



Examples



V

Bioengineering Science and Technology for the Environment
Master of Science Degree 29

A Pragmatic and Participative Method for Creating a Document
for Reference at 'ESA' in the Ivory Coast, for a Career in
Engineering 29

A. Bioengineering Science and Technology for the Environment Master of Science Degree

Creation of documents for reference

The department of 'Sciences et Technologies de l'Environnement (STE)' from Gembloux Agro-Bio Tech faculty of Liege University' took advantage of a change in name of their bioengineering diploma to revise the programme of the course. The skills approach was adopted in order to increase the aptitude of their future graduates in response to the (future) needs of the sector. Former students and future employers participated in the validation of the new document of reference describing skills needed for the sector. This document outlines the key steps to creating such a document and its use in developing coherent course content.

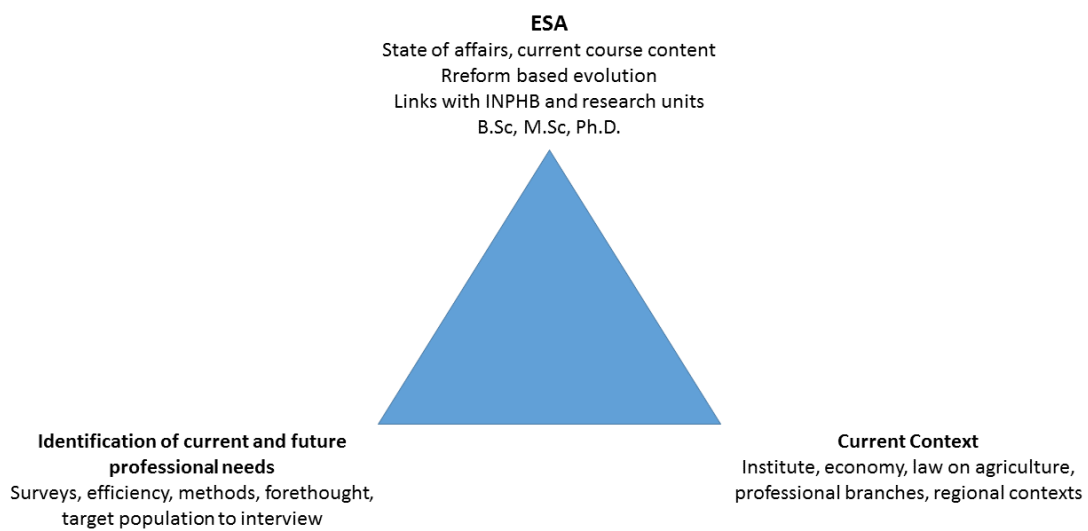
B. A Pragmatic and Participative Method for Creating a Document for Reference at 'ESA' in the Ivory Coast, for a Career in Engineering

For efficiency and pragmatism the participative approach were used. The time-scale for this ESA project was challenging and the financial investment and human resources was limited.

It was therefore imperative to rationalise and optimise the individual, collective and teams of human resources to achieve their goal. Students were not asked to help with the survey as the influence on the responses was judged to be too strong, despite the potential for learning. The idea was to analyse the professional activity of the ESA and to gain the implication of the people interviewed who would be encouraged to set up or teach in a new training course.

The schema below depicts the systemic approach used to guide the thought process which the different participants slowly adopted. This is just a basis on which to build, it will be amended as new needs become apparent when members of the ESA team and professors add new input.

Examples



The Manual for Sequence 5



VI

Conclusion

Preliminary analysis of skills and careers is absolutely vital before beginning the revision or creation of a course. Before writing a document of reference, the method used for gathering information on skills needed by future graduates must be adapted to the sector and associated branches as well as the institutional context.

To avoid being too restrictive, the skills described should emanate from a pre-established method which opens the scope for responses covering a larger range of considerations than would be instinctive. The time allotted to this preliminary phase must be sufficient to allow pertinent results. The involvement of professors and teaching staff early on in the development stage is beneficial to their sense of commitment and has an impact on the quality of the new or revised course.

Now you can go back to the homepage:

> *Homepage of the Training Course Engineering Module²*

Continue your training by discovering Sequence 6 :

> *Sequence 6: Develop the overall program curriculum and build teaching units³*

2 - http://www.supagro.fr/ress-tice/tempus/index_en.html

3 - https://www.supagro.fr/ress-tice/tempus/IF_Eng/Sequence6/co/Sequence6_Tempus_Angl.html