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Making the future: dealing with uncertainty in developing and delivering vocational education and training

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This contribution challenges the usefulness of prospective data for educational policy design. We all know that the future is uncertain, but for policy goals we pretend that the future is as certain as possible. Forecasting techniques are used to scan future developments and to provide insights for identification of skill needs as early as possible.

Forecasting techniques are not a waste of time but policy making deals with uncertainty. Forecasting can reduce uncertainty to a certain extent, and can help to discover smart policies. However, the real challenge is to develop a learning policy strategy with continuous feedback cycles. Forecasting techniques, combined with evaluative monitoring, should be built into those feedback cycles, in order to play a sophisticated role in policy design and redesign, both at a system level (governmental policies) and a practical level (corporate policies).

The contribution presents experiences with some practical tools (interactive scenario building, a logistic model for responsive vocational education and training) in order to underpin the challenge of a cyclical model of learning.

1. Introduction

Developing curricula for vocational education and training (VET) requires forecasting techniques. We need information on future jobs to design job profiles as a basis for VET. However, we see an emerging knowledge-based economy (Mayer, 2002) in which hyper innovation causes such fast developments and changes, that forecasting techniques are inappropriate as a sole base. Psacharopoulos (2003) made clear that even in the more stable
economy of the late industrial era in the 1970s and 1980s, manpower forecasting techniques were quite unreliable. So the time lag between curriculum design and graduate delivery is too large to trust as sole forecast of skill needs.

In this article I would like to challenge the usefulness of prospective data for (educational) policy design. We all know that the future is uncertain, but for policy goals we pretend that the future is as certain as possible. Forecasting techniques are used to scan future developments and to provide insights for identification of skill needs as early as possible.

The aim of this contribution is not to suggest that forecasting techniques are a waste of time and energy, but to emphasise that policy making involves a great deal of uncertainty. Forecasting can reduce uncertainty for a small extent, and can help to discover smart policies. However, the real challenge is to develop a learning policy strategy (Van der Knaap, 1997; Walker, 2001), in which continuous feedback cycles are built in. Forecasting techniques, combined with evaluative monitoring of trends, should be built into those feedback cycles, in order to have a sophisticated role in policy design and redesign, both at a system level (governmental policies) and a practical level (corporate policies).

2. A cyclical model

For the development of (competence based) VET, we developed a simple feedback model (Gielen, 2000; figure 1).

In this model developments in the labour market are a major source for competence standards. There is an important difference between competences for work and work-related competences (Toolsema, 2003). Competences for work have to do with job specific demands; work related competences have to do with getting and keeping a job, such as career skills and learning skills. In the employability discussion, work-related competences are becoming increasingly important.

Given competence demands, competence standards have to be developed: how can you assess somebody’s skills? Often reduction of information occurs in this phase to produce a lean and transparent set of competences to be handled in the VET system. An example of such reduction techniques can be seen in the Lernfelder discussion in German VET.

Based on these standards, learning processes (instructive within classes, constructive in work environments) have to be developed and executed. The triangle of student, teacher and workplace is pivotal in this process. At the
same time this triangle is the major source of irregularities in the competence production chain.

Assessment procedures, consistent with the learning processes, should prove that students possess target competences at an entry level. Full competences can only be delivered by years of work experience.

The proof of this occurs in the labour market: getting and keeping a fitting job. Data on success in the labour market of young people after school completion should give new input for the next learning cycle.

This cycle makes clear that skill needs information is only a small part of the developmental process. At all stages ‘disturbing’ processes occur, causing information reduction and adding other grounds for taking decisions.

Figure 1. **Design model for VET**

![Design model for VET](Image)

Source: Gielen, Reitsma and Wilbrink, 2000
3. Strategies for the future

Education, including VET, is traditionally designed within a context of certainty: knowledge is judged as true and objective and the instructional techniques are authoritarian, receptive and non-participative. In most VET systems job profiles are handled as true and objective information. The institutional demands in the labour market focus on the exchange value of competences (accreditation and acknowledgement of labour rights; cf. Tomassini, 2000), which imply the stability of qualifications as currency. This emphasis on stability causes the utility value of competences (what to do and how to use in the workplace?) to decline, by a process of canonisation (Brown and Dugid, 1998). The utility value of competences has to be developed after finishing initial VET instead of beginning to develop within VET trajectories.

The exchange value of competences is deeply rooted in the structure of VET. It is a central institutional asset (Nieuwenhuis, 2002): both employers and trade unions support this value strongly. For employers the exchange value implies certainty in hiring processes, reducing transaction costs, while for workers the exchange value forms a guarantee for their labour market success. Thus the exchange value of competences is an unavoidable aspect, because of its (assumed) stability, but the utility value should be brought back in balance.

In the emerging knowledge-based economy, the predictability of skill needs will decrease rapidly. Training policies based on certain outcomes will have to be replaced by policies focusing on the quality of learning processes and learning skills of employees. Work-related skills will gain importance over direct work skills. Flexibility and diversity should be organised at all levels: flexible expertise of workers, flexible training supply by colleges, flexible regulations from the government. Prescriptive policies are doomed to fail in preparing VET for the future of the knowledge-based economy.

It is important to be aware of the future’s potentials. Three different kinds of potentials can be sketched:

(a) the foreseeable future: based on what we already know, we can foresee a part of the future, especially when timescales are not too large: the nearby future (one, two years, depending on the field we are working in) is quite predictable;

(b) the unexpected future: we know for sure that many unexpected events will happen in a haphazard way. 11 September 2001 is a striking example of huge impact events we could not foresee. On smaller scale we all
have experienced events we could not foresee, but we have survived more or less effectively;

(c) the imaginable future: a third part of the future can be formed through our own fantasy. Depending on our self-efficacy and locus of control, people are able to implement (parts of) their fantasies and wishes for the future by taking appropriate chances. Because of the haphazard nature of the future we can take those chances, depending on our entrepreneurial competences.

Forecasting uses only the first of these future potentials; ambitious policy making should use the power of images (Banathy, 1996) and should give space to images and ambitions of students to help create their own future jobs. Learning policies should also be prepared for unexpected events (Walker, 2001) and feedback mechanisms should be built into policy design, to monitor and to react to the unexpected. Banathy pleas for an intelligent approach for system evolution and system design: the future is not a mechanistic extension of the present. ‘The ability to shape change – rather than being its victims or spectators – depends on our competence and willingness to guide the purposeful evolution of our systems, our communities, our society’ (Banathy, 1996, p. 1).

Figure 2. **Methods for scanning the future**

Source: Bilderbeek et al., 2002
There are several methods for scanning the future, reflecting to different degrees the optimism in Banathy’s plea. Most forecasting techniques are based on data from the past, with trends extrapolated towards the future, sometimes embedded in optimistic and pessimistic alternatives. Such techniques are not resistant to unexpected events and do not reckon with active design efforts.

Exploration techniques are used for dealing with the unexpected and creative part of the future. Scenario techniques are well known for developing future constructs in an intelligent way, using forecasting techniques as a basis, but going beyond the extrapolation of existing knowledge.

Backcasting techniques are used for trials of how to realise fantasies. The starting point in these techniques is the designed, desired future, from which backward reasoning leads to policies for the present time.

In smart policy design, mixed strategies are used, consisting of forecasting, backcasting and explorative methods. However, in most cases they are used in a linear way: based on the threefold information, policies are fixed and put into action in an inflexible, unlearning way. This is policy design as a blueprint factory. Adaptability and learning capacity is needed in policy making for dealing with structural uncertainty (Walker, 2001).

4. Scenario analysis as an example

Scenario analysis is a type of complex forecasting technique: combining the extremes of extrapolated dimensions in different ways, gives the opportunity to build a variety of outlooks for the future. The process of building scenarios interactively is often more important than the final output in scenario descriptions. Managers and policy-makers often see the future as an extension of today; the scenario building process makes them aware of their own prejudices and narrow views.

A common approach to scenario building (but not the only one) is taking two central dimensions of the domain of interest, mapping out four different scenario fields. Other important issues are built in as common aspects, to be dealt with in each scenario. During the construction process central dimensions and common aspects often turn out to be interchangeable. Figure 3 presents an open scenario system; figure 4 presents an example, made for management decisions within a Dutch agricultural-educational institute. Trend information is gathered, as in forecasting research, for each of the dimensions and aspects and extrapolated in extreme combinations.
The construction process ends up with four imaginable and consistent worlds, all fitting with existing statistical data (by playing with optimistic and pessimistic alternatives).

Figure 3. **Plotting the playground**

![Diagram showing four scenarios with different aspects]

Source: Bilderbeek et al., 2002

Figure 4 shows an example of a scenario analysis for knowledge production within the Dutch agricultural sector. The vertical dimension is about the kind of products to be produced: e.g. vegetable commodities or specialised knowledge for innovation in agriculture. After World War II, Dutch agriculture developed into one of the most successful exporting systems in the world (next to the USA and Denmark). The increasing density of the Dutch population has created immense competition in the use of scarce space and WTO discussions have changed the protective food policies of the EU. Therefore, the sector has to redirect itself, with the production of highly innovative products as a realistic alternative.

The horizontal dimension is the social cohesion under which the sector has to work: cooperation or competition. All extreme positions are imaginable, based on past and present trends and figures. The combination leads to four different future worlds with large different consequences for economic, educational and science policies.
Figure 4. **Four scenarios of Dutch agriculture in 2008**

Within such four scenarios, different policy strategies can be built in, e.g. labour market and training policies. By this, analyses can be made of the robustness of strategies (applicability in more than one scenario) and policy risks can be estimated. So, policy making can be made smart.

However, using scenario approaches is risky. Policy-makers and managers tend to believe in their future scenarios, fitting the best into their policies. They forget that each scenario has a probability of zero occurrence in reality. Wishful thinking is part of policy making. Political scientists (Walker, 2001) warn of such approaches, exactly because of the unpredictability of the future. A second risk is that robust strategies are middle of the road: to realise optimal results, chances have to be taken by sometimes choosing extreme policies. The third risk is linear thinking: design, implement, execute and (sometimes) evaluate. However, policies influence the future in unexpected ways (self-fulfilling and self-denying prophecies), so constant reassessment is necessary.

5. **Adaptive policy design as challenge**

Walker (2001) pleads for a learning policy approach, which is prepared for smart adaptations of designed actions. This implies sharp actions for the near future and more open, fuzzy lines for the longer term. Policy design should be incremental in nature, developing over time and reacting on all kinds of
signals. Future views such as forecasting, scenarios and backcasting should result in awareness of the vulnerabilities of designed policies. Walker argues that precisely at the vulnerable spots in the design, signposts and monitoring systems should be installed and hedging actions should be prepared. Policy-makers should be prepared to adapt their measures and regulations according to the results of monitoring. For policy-makers this means a cultural shift: they have to show vulnerability instead of certainty. This is a major problem in momentary politics (Van der Knaap, 1997).

Figure 5. **A logistic model for responsive VET**

For curriculum development in VET, we formulated a line of thought analogous to adaptive policy. Figure 5 offers a practical example of adaptive policy in skills needs identification. It is a logistical model for monitoring changes in skill demands and translation of demands into course supply. The bell curve represents the life cycle of a new technology (process, product or service), as a *pars pro toto* for innovation. Five stages can be discerned, with different action patterns for course delivery:

(a) in the design or creative stage of new developments: VET (i.e. colleges, teachers) should just be there and participate, knowing what is happening and experiencing movement (both students and teachers);

(b) in the implementation stage: facilitate learning processes on the shop floor by reflection; delivery of tailor-made short courses;
(c) when new developments are going to ‘flop’, no further action is needed. It is difficult to forecast that with certainty;
(d) from implementation to regular use: embedding the knowledge of former stages into regular courses and training delivery;
(e) in case use ends: retract courses from regular training supply (one of the difficult decisions for teachers and colleges); keep expertise updated for later users.

The example shows that skill need identification is not a simple binary button, but implies understanding innovative processes and the risks of failure. The policy reaction is analogously not binary: the different stages for course delivery can only be set into action, based on a sophisticated monitoring and interpreting system.

6. Concluding remarks

Design of VET policies, both at macro (EU and national) and local level (colleges and companies), is not a matter of linear thinking from forecasting data towards course delivery. The future is haphazard, and forecasting techniques are not able to reduce that uncertainty. Smart policy has to be proactive: creating the future by knowing your targets and the targets of other relevant players in the field. This needs political and societal debate, which can be scaffolded by trend analyses and other techniques for future scanning. Available data should be used smartly. Prescriptive regulatory systems are not for designing blueprints, but for knowing and naming vulnerabilities in policy design. Policy making means balancing between the Scylla of planned economy and the Charybdis of chaotic anarchy. Trusting the results of forecasting techniques fits the model of a planned economy, whereas an open training market will not lead to general upskilling of the workforce (Crouch, Finegold and Sako, 1999; pp. 196-218). Policy design has to be seen as an intelligent human action, says Banathy (1996), in which creative and reactive activities have to be in balance.

VET policy should be prepared for change, based on a cyclical model of policy learning. Monitoring, evaluation and reassessment should be built into policy design, to be able to adapt continuously to the changing environment without losing sight of agreed targets.

Navigating VET through the ocean of the knowledge-based economy is a creative skill: the weather forecast delivers essential information, but choice of destination does not depend on it. That is a matter of political discourse!
7. References


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