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The end of eternity: Shaping the future of vocational education and training

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Abstract
The future of vocational education and training will look very different, as automation and artificial intelligence will make many manual, repetitive jobs obsolete and the VET systems will have to address fast several complicated challenges. Currently the discussion focuses on the accelerating pace of changes both in job creation and destruction. Another dimension that will significantly change education and training systems is the fact that most of us will live significantly longer than our parents, and in many cases the babies born today are expected to live for at least 100 years.
Cedefop project "The changing nature and role of VET in Europe" (2016-18), covering the 28 EU member states, Iceland and Norway, took a step back and painted a comprehensive picture of VET developments in Europe, identifying challenges as well as opportunities. The outcomes of the project are presented highlighting developments from different perspectives (institutional, pedagogical and socio-economic) Building on the analysis of developments since 1995, the potential pathways are presented in brief. Reference is made to Cedefop's work on the dynamics of change in VET and the wider European policy context highlighting the joint work that started in Copenhagen in 2002 and continued with the Bruges- Riga cycle.

Key words
Vocational education and training (VET), Skills, Lifelong learning, Education and training policy, future of VET, Competence, National qualifications framework.

Περίληψη
Το μέλλον της επαγγελματικής εκπαίδευσης και κατάρτισης διαγράφεται πολύ διαφορετικό, καθώς οι αυτοματισμοί και η τεχνητή νοημοσύνη θα καταστήσουν πολλές χειρωνακτικές, επαναλαμβανόμενες εργασίες ξεπερασμένες, με αποτέλεσμα τα συστήματα ΕΕΚ να πρέπει να αντιμετωπίσουν γρήγορα αρκετές περίπλοκες προκλήσεις. Επί του παρόντος η συζήτηση επικεντρώνεται στον επιταχυνόμενο ρυθμό αλλαγών τόσο στη δημιουργία όσο και στην κατάργηση θέσεων εργασίας. Μια άλλη διάσταση που θα αλλάξει σημαντικά τα συστήματα εκπαίδευσης και κατάρτισης είναι το γεγονός ότι οι περισσότεροι από εμάς θα ζήσουν πολύ περισσότερο από ότι οι γονείς μας όταν μάλιστα σε πολλές περιπτώσεις τα μωρά που γεννιούνται σήμερα προβλέπεται να ζήσουν τουλάχιστον 100 έτη.
Το έργο του Cedefop 'Η μεταβαλλόμενη φύση και ρόλος της ΕΕΚ στην Ευρώπη' (2016-2018), που καλύπτει τα 28 κράτη-μέλη, την Ισλανδία και τη Νορβηγία, ανέτρεξε στο παρελθόν προκειμένου να δημιουργήσει μια πλήρη εικόνα των εξελίξεων της ΕΕΚ στην Ευρώπη και προσδιόρισε προκλήσεις και ευκαιρίες. Τα αποτελέσματα του έργου παρουσιάζονται δίνοντας έμφαση στις εξελίξεις μέσα από διαφορετικές προοπτικές (θεσμικές, παιδαγωγικές και κοινωνικο-οικονομικές). Έχοντας ως βάση αναφοράς την ανάλυση των εξελίξεων από το 1995, παρουσιάζονται με συνοπτικό τρόπο πιθανές

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διαδρομές. Γίνεται αναφορά στη δουλειά του Cedefop στη δυναμική των αλλαγών στην ΕΕΚ και στο ευρύτερο πολιτικό πλαίσιο, υπογραμμίζοντας το κοινό έργο που ξεκίνησε στην Κοπεγχάγη το 2002 και συνέχισε με τον κύκλο Ρίγας – Μπρυζ.

Λέξεις- Κλειδιά
Επαγγελματική εκπαίδευση και κατάρτιση (ΕΕΚ), Δεξιότητες, Δια Βίου Μάθηση, Πολιτικές εκπαίδευσης και κατάρτισης, το μέλλον της ΕΕΚ, Ικανότητα, Εθνικό πλαίσιο προσόντων

Losing stability

The "End of Eternity" is the title of a famous 1955 science fiction novel by American science fiction writer Isaac Asimov, with mystery and thriller elements on the subjects of time travel and social engineering. Its premise is that of a causal loop – a type of temporal paradox in which events and their causes form a loop. In "The End of Eternity", members of the time-changing organization Eternity seek to ensure that their own organization is founded as history says it was, by ensuring the conditions for that event happen as history says they happened. The main idea behind is to keep things stable and avoid any type of unforeseen developments. Things should be taken as granted and therefore this title is closely connected with our old-fashioned way of understanding "work for life".

Generations were raised with the motif: a) follow your learning pathway (school, college, university), b) acquire the necessary skills and competences to exercise a job and c) after several working years, move to retirement. This motif, this life pattern, is no longer valid in all its dimensions as we will see later on. Learning has changed, skills and competences need a continuous update process and retirement has become another tricky case. A job for life is a thing of the past, for people of all ages. This brings to us another very interesting quote by the author of the end of eternity: *It is change, continuing change, inevitable change, that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be*.

Becoming obsolete

When discussing about change it is highly interesting to look to the book "The Half-Life of Facts: Why Everything We Know Has an Expiration Date", by Samuel Arbesman, a complexity scientist, whose work focuses on the nature of scientific and technological change. The book is an engaging, popular introduction to several topics within information science. The title comes from the notion that one can measure the

rate at which papers within a discipline become obsolete, assigning a half-life[2] to each field. Facts decay over time until they are no longer facts or perhaps no longer complete. According to Arbesman, information has a predictable half-life: the time taken for half of it to be replaced or disproved. Over time, one group of facts replaces another and as our tools and knowledge become more advanced, we can discover more — sometimes new things that contradict what we thought we knew, sometimes nuances about old things. Sometimes we discover a whole area that we didn't know about. The rate of these discoveries varies and our body of engineering knowledge changes more slowly, for example, than does our body of psychological knowledge.

As Arbesman points out, in the last century the world's population has increased from 2 billion to 7 billion, we have taken on space travel, and we have altered the very definition of science. Our world seems to be in constant flux. With our knowledge changing all the time, even the most informed people can barely keep up. All this change may seem random and overwhelming, but it turns out there is actually order within the shifting noise.

Under this perspective if we consider the half-life of information, we will soon realise that many people assume that whatever they learned in school remains true years or decades later, a statement that is so untrue today. It is very important to understand that the qualifications that someone acquired through a learning process run a huge risk to become partly obsolete and actually useless. A century ago, it would take 35 years for half of what an engineer learned when earning their degree to be disproved or replaced. By the 1960s, that time span shrank to a mere decade. Today that figure is definitely even lower. In 1966 in the paper entitled "The Dollars and Sense of Continuing Education," Thomas Jones calculated the effort that would be required for an engineer to stay up to date, assuming a 10-year half-life. According to Jones, an engineer would need to devote at least five hours per week, 48 weeks a year, to stay up to date with new advancements. A typical degree requires about 4800 hours of work. Within 10 years, the information learned during 2400 of those hours would be obsolete. The five-hour figure does not include the time necessary to revise forgotten information that is still relevant. A 40-year career as an engineer would require 9600 hours of independent study. We should keep in mind that Jones made his calculations in the 1960s. Modern

[2] Half-life is the time required for a quantity to reduce to half of its initial value.

estimates place the half-life of an engineering degree at between 2.5 and 5 years, requiring between 10 and 20 hours of study per week.

Of course, these theoretical calculations cannot be applied in one move in everyday life and it is almost impossible to comply with these requirements. What can be done is the necessity to recognize and accept the need for lifelong learning and the adoption of processes and initiatives that will permit and press systems to foster and spread all types of learning. Keeping up with technologies and modern developments requires an investment in knowledge and an increase of efforts in this area.

Cycles of innovation

It is also interesting to observe the pace of changes. One common way to measure success of the biggest technological innovations of our history is by looking at the level of users. Hitting the desired 50 million users mark is a sure sign of triumph, but how quickly are top technologies taking to reach this magic number?[3]

If we compare some of the biggest consumer products from the last 250 years, we can easily identify a trend. In today's tech-fuelled and tech-led world, top products are reaching high levels of consumers in incredibly short amounts of time. Back in 1874, Alexander Graham Bell delivered the first phone to the public. In 1877 the first telephone line was constructed, the first switchboard created and the first telephone exchange was in operation. It took 3 years for the phone to be in the homes of nearly 50,000 people.

75 years later the phone was in homes of 50 million people, on a global level. In comparison, it took the radio just 38 years to have 50 million owners and the television as little as 13 years! Technologies truly revolutionised the way we communicate with and viewed the world and the World Wide Web, appeared in 1989. Invented by English scientist Tim Berners-Lee, the World Wide Web took the world by storm as in 4 years, 50 million users were surfing the internet. In 2004, 19-year old Mark Zuckerberg released thefacebook.com. Today we of course know this as Facebook; the world's largest social media network with over 2 billion users! It took Facebook just two years to hit the 50 million mark.

[3] http://blog.interactiveschools.com/blog/50-million-users-how-long-does-it-take-tech-to-reach-this-milestone.

Despite its popularity today, this is actually quite slow compared to other social media channels. Instagram took a little less than two years (around 19 months to be more precise). YouTube and Twitter were even faster, 10 months and 9 months respectively. Amazingly, with the simple availability and popularity of mobile apps, reaching 50 million users seems to be getting faster and faster. Highly popular games such as Angry Birds or Candy Crush are doing this in less than two months! That's 60 days for one app to be downloaded by 50 million people.

All this is an indication of the rapid pace of change which is unparallel in the history of humanity. This pace influences deeply all learning processes.

Living long

But there is another element we should take into account. Many of us have been raised on the traditional pattern of a three-stage approach to our working lives: education, followed by work and then retirement. But this well-established pathway is already beginning to collapse - life expectancy is rising, final-salary pensions are vanishing, and increasing numbers of people are following multiple careers. Whether you are 18, 45 or 60, you will need to do things very differently from previous generations and learn to structure your life in completely new ways. This idea was elaborated in an excellent way in the book “The 100-Year Life” by Lynda Gratton and Andrew Scott[4].

The authors make clear, it will take a lot more than good wishes to make sure that a hundred years is a blessing, not a curse. Life expectancies have been rising by up to three months a year since 1840, and there is no sign of that flattening. Gratton and Scott draw on a 2009 study to show that if the trend continues, more than half the babies born in wealthier countries since 2000 may reach their 100th birthdays. They show that under the current system it is almost certain you won’t be able to save enough to fund several decades of decent retirement. For example, if your life expectancy is 100, you want a pension that is 50 per cent of your final salary, and you save 10 per cent of your earnings each year, they calculate that you won’t be able to retire till your 80s. People with 100-year life expectancies must recognise they are in for the long haul, and make an early start arranging their lives accordingly.

But how to go about this? Gratton and Scott advance the idea of a multistage life, with repeated changes of direction and attention and working for longer. Material and

[4] http://www.100yearlife.com/.

intangible assets will need upkeep, renewal or replacement. Skills will need updating, augmenting or discarding, as will networks of friends and acquaintances. Earning will be interspersed with learning or self-reflection. As the authors warn, recreation will have to become "re-creation".

Future of work and future of education and training

Having into your mind all the above-mentioned elements, instability, the danger of becoming obsolete, the pace of cycles of innovation and longevity, the future of work and the future of education and training are obviously going to look very different. Automation and artificial intelligence have already started making many manual, repetitive jobs obsolete and according to the McKinsey Global Institute, robots could replace 800 million jobs by 2030[5], while a "skills evolution" could open up a raft of new opportunities.

Facebook owner, Mark Zuckeberg, described very precisely the peculiarities of the current situation: "*Our policy (at Facebook) is literally to hire as many talented engineers as we can find. The whole limit in the system is that there are not enough people who are trained and have these skills today*."

It is clear that labour market change has been accelerating in recent years and that dynamics go far beyond shifts in sectors and occupations. The broad patterns of workplace transformation and of changing skill needs[6] in today's jobs are, however, visible and give us some clues as to likely future developments. For example, findings from Cedefop's European skills and jobs survey show that 43% of EU workers have seen the technologies they use at work (machines, ICT systems) change in the past five years or since they started their current job; 47% experienced changes in their working methods and practices. Such trends, which are necessarily underpinned by an array of upskilling and reskilling measures, are likely to continue in the coming years.

It seems that developments follow an increasingly accelerating pace. And in this respect VET cannot avoid being involved in the discussions on the way ahead and how education and training will meet the challenges that global developments and technology bring. Discussion actually focuses on this accelerating pace of changes both in job creation and destruction. However, discussion is still quite controversial. Some

[5] https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages
[6] https://www.cedefop.europa.eu/files/9137_en.pdf

estimates have put the risk of automation as high as half of current jobs, while others forecast a considerably lower value of 9%. Still, all occupations will go through change and the majority of analysts agree that on average one-third of the skillsets required to perform today's jobs will be wholly new by 2020 (World Economic Forum 2018). When things change quickly, analysis and understanding of what is happening must rapidly follow. To seize opportunities and mitigate risks, policy-makers and businesses need timely and reliable information to anticipate and prepare for future skill needs and jobs. The European Commission's New skills agenda for Europe[7] had already recognised back in 2016 the need for developing reliable skills intelligence to map short- and long-term trends and support education and labour market actors in a context of rapid change. It had also flagged the potential of using the internet and big data analysis to improve data on skill needs and trends.

At the same time, education and training systems are not keeping pace with these shifts. It is expected that 65% of children currently entering primary school will have jobs that do not yet exist and for which their education will fail to prepare them, worsening skills gaps and unemployment in the future. Even more urgent, is the fact that underdeveloped adult training and VET systems are unable to support learning for the currently active workforce of nearly 3 billion people.

Changing role of VET

Addressing the future of vocational education and training is a political priority at European level. The tri-partite Advisory Committee on Vocational Training (ACVT) adopted unanimously on 3 December 2018 an opinion on the future of vocational education and training post-2020. This opinion sets a shared vision of governments, trade unions and employers' organisations from EU Member States and partner countries on how to make vocational education and training (VET) systems fit for addressing the future societal and economic challenges.

The opinion[8] stresses the dual objectives of VET for fostering social inclusion and excellence, the role of VET in supporting acquisition of job specific and transversal skills, and calls for a better balancing of investment and funding between initial and continuing VET. The opinion calls for the setup of excellent, inclusive and lifelong

[7] https://ec.europa.eu/social/main.jsp?catId=1223
[8] https://ec.europa.eu/social/main.jsp?langId=el&catId=1146&newsId=9263&furtherNews=yes.

VET and defines the building blocks of future fit vocational education and training and the three key objectives to achieve this vision related to the (a) content of VET, (b) provision of VET and (c) governance of VET systems. It also takes into account stakeholders views on the main features of the future European cooperation in VET and possible actions to be carried out at European level.

The 'Changing nature and role of VET in Europe' was a Cedefop project covering the period 2016-2018 and giving insight on the future trends in VET. The research fed directly into the political debate by shaping the priorities of the Austrian Presidency (second semester 2018) and informing the above-mentioned opinion of the ACVT. The project was managed and supervised by Cedefop, Department for VET systems and institutions. Cedefop expert Jens Bjornavold, was responsible for the conceptualisation, research and all project publications. The research has been carried out by a consortium led by 3s Unternehmensberatung GmbH, represented and led by Jörg Markowitsch, and included the Danish Technological Institute, the Institute of Employment Research (University of Warwick), the Institute of International and Social Studies (Tallinn University) and Fondazione Giacomo Brodolini. The Federal Institute for Vocational Education and Training (BIBB) in Germany was supporting the project as a subcontractor.

The changing nature and role of VET led the way in the debate about VET's future. By analysing developments in the sector over the past two decades, it was able to examine current challenges and to point to future opportunities. The project focused on a range of issues relevant to VET's development: its changing definition and conceptualisation; the external drivers influencing VET developments; the role of traditional VET at upper secondary level; and VET from a lifelong learning perspective and at higher education levels.

In the final project phase, scenarios outlining alternative progress paths for European VET in the 21st century were presented. The scenarios were also based on a survey asking experts in the 30 countries covered by the project to share their views of how national VET systems are perceived and are changing. The results of this survey offered an insight into the diversity of national VET solutions, while also pointing to common trends and shared challenges. The project looked at VET from a multifaceted viewpoint, combining a system/institution perspective with both pedagogical/epistemological and socioeconomic/labour market perspectives. This makes it possible to observe how vocationally oriented learning forms and formats are spreading, and how a closer link to

the labour market is developing, including in institutions not traditionally defined as vocational. In the next sections we will have a closer look to the project starting with the initial need behind, that is how to predict a very complicated future.

Predicting the future

The idea of predicting the future has practical difficulties. In an article published in the Economist an analysis of a toolkit for predicting the future was presented[9]. To see what lies ahead in technology and other areas like education, training and the labour market, you have to look to the past, the present and the imagined futures. Predicting exactly how the future will play out is impossible. But, if you look in the right places, it is possible to make some educated guesses along the way.

Today technological developments change so rapidly the landscape that forecasting has become an even more complicated process. Computer technology is climbing dramatically in powers of 10 and it is actually progressing more each hour than it did in its entire first 90 years. In reality we have an exponential growth in computing power and as the leading futurist Ray Kurzweil[10], Google's Director of Engineering describes, the singularity point is not far away. In his law of accelerating returns predicts an exponential increase in technologies like computers, genetics, nanotechnology, robotics and artificial intelligence in such a degree that before 2045 machine intelligence will be infinitely more powerful than all human intelligence combined.

It is interesting that historical analogies, across years, decades or even centuries, make it possible to foresee the social and cultural impact of new inventions, put hype and scepticism into perspective, provide clues about how a technology might evolve in future, and provide a reminder that problems blamed on new technologies are often the result of human nature. Analogies are never perfect and of course history never repeats itself exactly but analogies do not have to be perfect to be informative. We can observe many repeating patterns in the history of technology, on both short and long timescales. Whether such concerns are merited or not, an understanding of reactions to past technologies can give valuable indications about how new developments might be received.

Cedefop research on the changing nature and role of VET project decided to take a step back and paint a comprehensive picture of VET developments in Europe, identifying

[9] https://medium.economist.com/a-toolkit-for-predicting-the-future-2f24757d9699.
[10] https://futurism.com/kurzweil-claims-that-the-singularity-will-happen-by-2045.

challenges as well as opportunities. To achieve this, two major decisions were taken. First, a detailed analysis of VET developments since 1995 was carried out and second looking at developments from different perspectives (institutional, pedagogical and socio-economic) which allowed an in depth-analysis of trends.

By studying developments over time, the project managed to capture the dynamic and changing character of VET. Much existing research on VET can be described as 'snapshots in time', mapping and analysing policies, institutions and practises without reference to the past. This can create a picture of VET as static and stable, not taking into account changes over time. The changing nature and role of VET illustrated how national VET systems are constantly developing; through small daily steps, through policy reform and sometimes in response to external shocks. An important research-lesson is therefore that 'history matters' and must be taken into account when making decisions on the future. This approach also documents the 'path dependency' of national VET systems. Their developments cannot be seen in isolation from the past. VET systems have developed in response to national, regional and local conditions and requirements. However, we are not living (only) in the past.

Tomorrow is another today

The second place to look for glimpses of the future is the present. As William Gibson, a science-fiction writer, once memorably put it, "the future is already here—it's just not very evenly distributed". Meaning that technologies have surprisingly long incubation periods; they may seem to appear overnight, but they don't. In the Economist article we are asked to look back to 2001 and realise that mobile handsets with cameras and colour screens were already commonplace in Japan. They could display maps with walking directions and allowed users to download e-books, games and other apps. Journalists and analysts were visiting Japan to see these phones in action. And whenever Japanese visitors to European and US technology conferences passed around their handsets, they were treated as though they were artefacts from the future that had fallen through a rift in the space-time continuum. Japan arrived in the future early because of the isolated, proprietary nature of its telecoms industry; its domestic market was large enough to allow its technology companies to experiment with new ideas without worrying about compatibility with other countries' systems. It was several years before consumers in Europe and the US could buy handsets with comparable features. For a while *Wired*

magazine had a column called “Japanese Schoolgirl Watch”, predicated on the idea that what Japanese schoolgirls (the most passionate users of early smartphones) do today, the rest of us might be doing tomorrow.

In this respect the Cedefop project had the opportunity to use this “glimpses of the future” approach. By analysing developments in 20 European countries there was a strong base of interesting information and practices that will sooner or later emerge at European level.

The project was inspired by the two competing narratives of vocational education and training (VET) existing side by side in Europe today: A pessimistic narrative sees VET as being increasingly marginalised and as losing ground to general and academic education. VET is seen as a sector under threat and is perceived as a second-choice option, not attractive to the best and most ambitious students and learners. Automation and digitalization, furthermore, will lead to a polarization of the labour market, reducing the relative importance of the medium-level skills which traditionally have been at the heart of VET. The optimistic narrative, by contrast, sees VET as thriving and as becoming increasingly important. The traditional strengths of VET, notably its close links to the labour market and its focus on work-based learning, are seen as essential for addressing the rapidly changing skills needs of the labour market and society at large. As a consequence, VET delivery takes new forms, is expanding to higher levels and is increasingly addressing the needs of adults in need of lifelong learning.

Given that both narratives co-existed in most countries, research was initiated in a situation of genuine uncertainty regarding the overall direction of European VET. It was by no means clear whether the sector was under threat or indeed thriving. To remain open to different possibilities, some basic methodological choices were made:

Following Cedefop’s definition of VET ([11]), the project deliberatively avoided limiting VET to a particular level (low, medium, higher) or phase of education and training (initial or continuing VET). While not underestimating the importance of initial VET at medium skills and qualifications levels, this broad definition made it possible to capture developments and changes that would otherwise have been outside the scope of the project.

[11] Cedefop defines VET as ‘education and training which aims to equip people with knowledge, know-how, skills and/or competences required in particular occupations or more broadly on the labour market’

In line with the broad definition above, a multi-faceted research strategy was used focussing on (a) national definitions and conceptions of VET, (b) the external factors influencing VET, (c) development of student numbers in initial VET over time, (d) the lifelong learning dimension of VET as well as (e) VET at higher levels.

Importantly, and reflecting the choice to depart from a broad definition of VET, a multi-perspective analytical model was applied. It was acknowledged that VET should not exclusively be understood as a set of institutions. VET implies a certain understanding of knowledge, skills and competences (epistemology) and a particular approach to teaching and learning (pedagogy). VET also needs to be understood in relation to its socio-economic context, notably the labour market and society. By combining the focus on system/institutions, epistemology/pedagogy and socio-economic context, a richer and more complete picture of European VET and the way it changes was achieved.

These methodological choices directly influenced the research, notably by combining the focus on traditional initial VET with a focus on lifelong learning and higher VET. As a result, the following findings and conclusions from the project were observed and are considered of particular importance as they directly feed into the debate on the future of VET in Europe:

In a minority of countries, notably Denmark, France, Germany, Poland and the UK, the proportion of students attending initial VET has declined. In a majority of countries, however, we observe stable or growing participation in VET. Growth can in particular be observed in countries with traditionally weak VET systems, for example in countries like Spain. It is also noteworthy that countries like the Netherlands and Finland, with strong VET traditions, have seen increased participation, notably by addressing adult learners. However, the relative stability of IVET in many European countries cannot be taken for granted. Demographic developments and the steady ageing of Europe's population means that initial VET providers increasingly have to compete with general education when recruiting students. While VET has done well so far in the majority of countries, its relative position is not a given. A decline in the demand for medium-level skills, as predicted by Cedefop (2019), may influence negatively the relative position of VET in the overall education and training landscape. The strength of the VET system and its attractiveness to learners is also a reflection of national strategies and priorities.

Many national VET systems 'came to age' in the decades covered by the project. Departing from fragmented systems directly linked to industries and sectors, the 1990s and early 2000s saw the development of comprehensive national systems with clearly

defined roles in relation to general and academic education. These reforms have been important for better matching VET-provisions to the overall needs of the labour market. While VET systems have a long tradition in crafts and industry, new comprehensive systems have been better able to address the needs of the service sector, to mention one example. These systems have also been able to better address the need for transparent and permeable systems; removing dead-ends and allowing learners to progress in learning. These developments have, more recently, been linked to the development of national qualifications frameworks (NQF) clarifying the role of VET in relation to other parts of the education and training system.

The delivery and provision of VET has changed and evolved in the decades covered by the project. VET is now delivered by an increasingly diverse set of institutions applying a growing variety of learning formats and settings. While we normally tend to see countries as favouring either a school or apprenticeship-based VET-model, we increasingly see that these main models are being supplemented and complemented, by alternative forms of education, training and learning. This diversification is in some countries linked to changes in governance where local and regional providers are given more space for tailored developments.

Since the 1990s the number of VET-qualifications on offer has steadily dwindled in most countries, refocussing VET on broader occupational areas. This change signals a need to address broader fields of skills and competence, reducing the focus on job- and occupationally specific skills. In many cases this refocussing goes hand in hand with a stronger focus on general subjects as well as transversal/transferable skills. The reduction in the number of qualifications can be seen as a way to prepare students to deal with inevitable change.

In line with the reduction in the number of VET qualifications, and the broadening of their scope, we observe a blurring of lines between initial VET and general upper secondary education. It is becoming more difficult (not least for statistical purposes) to say which schools should be defined as VET or not. Hybrid programmes combining general subjects and vocational specializations are becoming increasingly common. The redefinition of institutions, in the same way as a broadening of qualifications, is very much linked to changing skills and competence requirements and needs: To what extent should VET focus on job or occupationally specific skills and competences; to what extent is there a need to emphasise transversal and transferable skills allowing people to

cope with (inevitable) change. Addressing this 'epistemological challenge' must lie at the heart of any discussion on the Future of VET.

The increased role played by VET at higher levels – at European qualifications frameworks (EQF) levels from 5 and up to 8, is a significant development captured by the project. While the strengthening of post-secondary VET (EQF level 5) is of particular importance, the increasing importance of vocationally oriented provisions at EQF levels 6 to 8 is noteworthy. The expansion of VET to higher levels illustrates the 'epistemological' challenge referred to above: While practice based learning forms an important part of this expansion, there is not always agreement on how to combine and integrate this with research and discipline-based knowledge. The project observes a tension between what we have termed 'academic' and 'vocational' drift in this area, reflecting an ongoing debate on what should termed higher education. The general shift to learning outcomes-based programmes and qualifications, focussing on skills and broader competences as well as theoretical knowledge, have increased the visibility of higher VET.

The project points to the link between initial and continuing VET and considers it as a weak point in many European countries, potentially leading to a marginalisation of VET in these countries. While a few countries are making headways in implementing operational lifelong learning approaches, others seem to lack the traditions and the mechanisms to make this happen. The divide between frontrunners and those lagging behind as regards lifelong learning can be seen as a serious threat to vocational education and training in the long run.

The vision thing

The third place to catch glimpses of what is coming next is in the imagined futures. Scientists, futurists, researchers take interesting ideas and carry them to their logical conclusions. Futuristic tales provide visions of how the world of education and training might look with ubiquitous artificial intelligence, technological developments but also with prolonged expected life durations.

Attempting to subsume the national diversity observed through the analysis into pre-defined and simplified categories may distort rather than support a deeper understanding of challenges and opportunities. National VET systems are not isolated from each other, the project also points to a number of shared trends. These not only reflect increased

mutual learning between countries, partly due to EU-initiatives, but also the increased impact of global technologies, markets and labour markets.

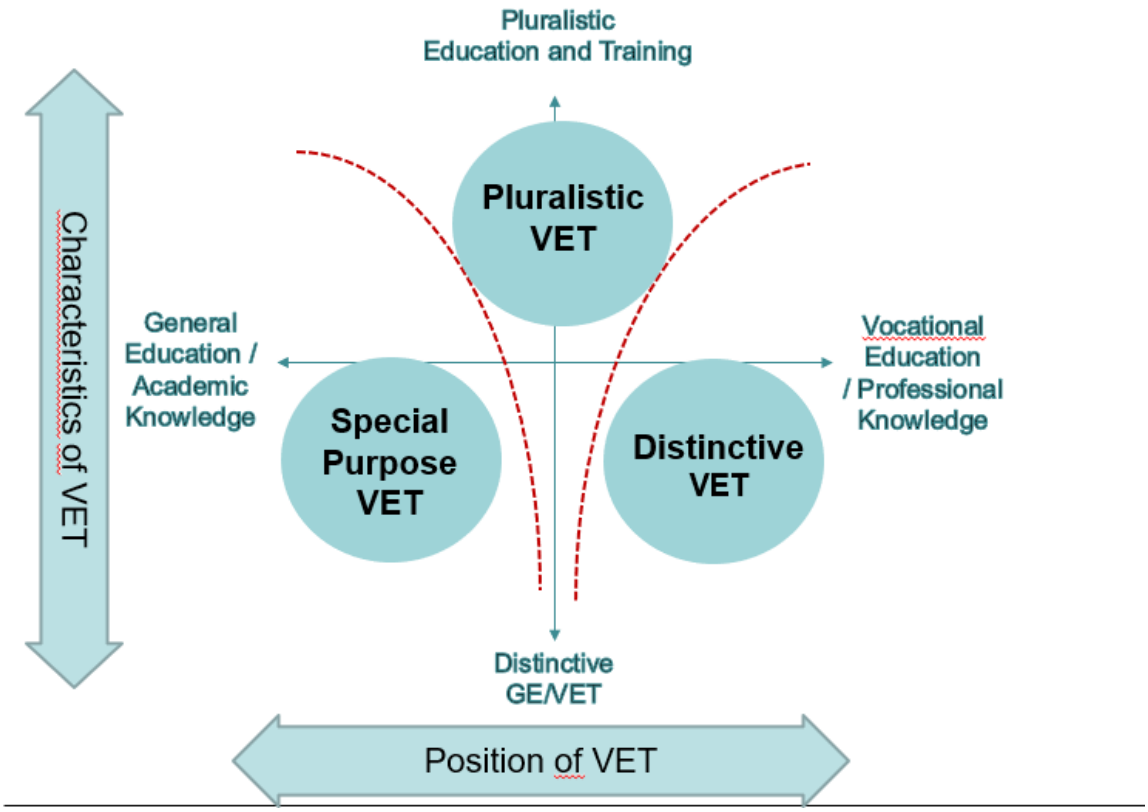
Building on the analysis of developments since 1995, a series of potential development paths – scenarios or trends - were developed. Seeking to identify plausible and consistent pictures of how VET could evolve in the next decades, these 'scenarios' highlight the choices policy makers and stakeholders face in this area. While not pretending to be predictions of the future, these scenarios and the methodology they build on can be used by national authorities and stakeholders to identify challenges and opportunities ahead.

These broader observations and conclusions provide the basis for the scenario-model concluding the project with the following important points:

The "scenarios" are not meant as predictions of the future but as an analytical tool allowing stakeholders to observe and address critical features of their own system. Referring to two key-dimensions, the position of VET within the overall education and training system (general-vocational) and the characteristics of VET (as distinct or diversified), the approach makes it possible to capture the specificity of a national approach but also to position it in a wider European and international context. This model avoids the use of a pre-defined typologies and opens up to an analysis addressing not only institutional but also epistemological and socio-economic features of national systems.

Cedefop sees the outcomes of the project as important for the cooperation with and future support to national and European VET stakeholders. The basic VET scenarios within education space can be seen in the diagram below:

Figure 1: Overview of the three basic scenarios and their position in the two-dimensional model



Source: Cedefop 2019.

The future basic scenarios are fundamentally different from one another and imply highly different policy choices in the years to come. In short, they are:

1. Pluralistic VET with lifelong learning at its heart in which the distinctions between vocational and general education become more and more obsolete;
2. Distinctive VET with occupational and professional competence at its heart, which not only means that VET clearly differs from general education, but also that VET dominates the education system and we can speak of a 'VET hegemony'; and
3. Special-purpose or 'marginalised' VET with job-oriented training at its heart, in which some very specific forms of VET have survived in an education system which is dominated by general and higher education.

They have been based on a model emphasising two important dimensions and tensions: pluralistic versus distinct development; and academic versus vocational drift. In pluralistic development, VET systems are becoming more diversified with fuzzier lines between them and general education. Conversely, where VET is seen as a distinct education and training strand, a return to its 'traditional roots' is encouraged. Academic drift means programmes and institutions are less work- and practice-oriented and

general subjects are prioritised. Vocational drift, however, means stronger practice- and work-based orientation, occasionally leading to new vocational programmes and institutions. These dimensions stand out as significant both in the mapping of the 1995-2015 developments and in the stakeholder survey responses. Combining them offers three main development scenarios that imply highly different policy choices in the years to come.

Scenario 1: Lifelong learning at the heart – Pluralistic VET

This scenario broadens our understanding and conception of what is meant by VET. The emphasis is on vocationally and labour-market-oriented learning at all levels and in all institutional settings. Vocationally oriented learning will not be restricted to the institutions explicitly defined as VET providers today, but form part of an integrated lifelong learning approach. Pluralistic VET implies redefinition of its overall position in the education and training system. The focus on VET as a separate and distinct subsystem will become less relevant as there is a greater need for connecting and combining different forms of learning. The currently observed blurring boundaries between VET and general education at upper secondary level point in this direction, underlining the need to combine vocational skills and general subjects. The focus will be on overall skills and competence developments, not on VET as a separate sector. This approach also requires a new orientation or focal point where VET is anchored in broader qualification profiles with a weaker link to specific occupations and jobs. It reflects the rapidly changing nature of occupation-specific skills and competences and the need for continuous updating and relearning. It also manifests the increasing importance of transversal skills and competence as a basis for coping with change.

The VET target group will be significantly broadened, notably by addressing the needs of learners of all ages systematically and through a strengthened relationship between initial and continuing VET. Individually tailored learning solutions, project and problem-focused learning will become indispensable. Progression and pathways of vocationally oriented learning throughout life and portability of vocational learning will be a key feature of pluralistic VET. This requires transparent delivery at all levels and reducing barriers to transitions and progression. The envisaged shift to more comprehensive skills and competence strategies and policies will influence the governance of vocationally oriented learning. Broader skills sets and a weaker link to

specific occupation and job profiles may require involving a wider group of stakeholders, adding to and complementing the role traditionally played by social partners.

While EU-level policy will not interfere in the content and structure of VET, its role in relation to transparency, transferability and portability of skills and qualifications will increase. Flexible pathways and the possibility to transfer broader skills sets across different types of education and training require even stronger coordination and governance mechanisms than today. If these mechanisms are a weak link, the pluralistic scenario runs the risks of fragmentation and increasing inequalities.

Scenario 2: Occupational and professional competence at heart – Distinctive VET

The distinctive scenario seeks to strengthen the existing and dominant conception of VET as focused on entry into occupations and professions. VET's position as a separate education and training subsystem with clearly defined providers and institutions is reaffirmed and strengthened. The visibility of the VET sector is seen as critical to ensuring parity of esteem with general education.

As opposed to other education and training subsystems, learning at workplaces is regarded as a key defining element of VET. VET will be organised around the requirements and identities of clearly defined occupations and/or professions. This ensures a close link to the labour market and emphasises a need for balanced commitment of education and training systems, as well as employers and trade unions. Young people in initial education and training will be seen as the future core target group.

Expansion of VET to higher levels is in line with this perspective. A key task of VET will be to help make young people mature professionally; enable specialisation but at the same time open up to renewal and innovation. Work- and practice-based learning will be given priority. A main aim will be to establish work-based learning as a 'gold standard' across occupational areas and at all levels, including EQF level 8. This is seen as ensuring a basis for future progression in people's learning and professional careers.

Social partners' role in governing VET will be reaffirmed, reflecting VET's link to occupations. EU-level policy may support the distinct model by promoting cross-border cooperation and agreements on occupations and sectors, for example setting common standards. The distinctive scenario runs the risk that rapidly changing technologies and

labour markets raise questions on the role of medium-level skills and the long term-stability of occupations.

Scenario 3: Job-oriented training at the heart – Special purpose and/or marginalised VET

This scenario narrows down the understanding and conception of VET. Its focus is on training for jobs, reskilling and upskilling for short- and medium-term labour market needs. VET's position in the overall education and training system will be increasingly linked to continuing and further training in the labour market. Employability in its narrow sense is of key concern, as is the ability to respond to groups at risk. Employability in the broader sense, empowering people to develop in a lifelong learning perspective, is taken over by general education at all levels.

This reduced VET role reflects the effect of declining youth cohorts, limiting the ability of traditional VET to 'compete' with other education and training sectors. This approach implies reorientation of VET to the skills needs of rapidly changing jobs and labour market functions. VET focuses on short- and medium-term skills needs; less on basic and transversal skills and competences. These latter are the responsibility of general and academic education and training.

VET's target group is reduced, mainly to adults in need of immediate re- or upskilling or at risk of unemployment and social exclusion. Shorter training courses, increasingly offered through open educational resources, are likely to become the predominant learning forms. In terms of pathways and progression opportunities, this scenario emphasises a need for more transparent training offers. These will make it easier for adult learners to access courses and programmes directly relevant to their needs.

This approach implies radically different VET governance, where individual companies and sectors play a key role. The role of the education and training system will be reduced. EU-level policy will need to ensure transparency and portability. However, this will form part of labour market policies rather than broader lifelong learning policies. This scenario runs the risk of underestimating the importance of basic and transversal skills and competence in meeting the needs of the labour market and society.

Various issues have to be addressed regarding future European cooperation in vocational education and training. The traditional distinction between education and training subsectors (general, vocational and higher education, initial and continuing VET) is not always practical when it comes to identifying and responding to new

challenges. By operating on the basis of a too narrow a definition of VET, policy-makers risk overlooking the need for vocationally oriented education outside the traditional VET sector. Future policy cooperation should focus on how education and training systems as a whole can promote and support practice oriented and work-related learning. VET development may also require solutions spanning several subsectors and involving institutions and providers currently operating alone.

It is unlikely that the scenarios will materialise in their 'pure' or 'ideal'. Aspects of one scenario might dominate a country's VET system, influencing the way VET is provided and understood, while aspects of the other scenarios might also be present for parts of a country's VET system. In this sense the above scenarios and their characteristics can be considered as basic analytical building blocks to describe future VET systems.

Shaping a common future

European cooperation in VET was and still is one long process with many stops. It is based on the open method of coordination (OMC) which is an EU policy-making process, or regulatory instrument, formally initiated by the Lisbon European Council in 2000. The OMC does not result in EU legislation but is a method of soft governance which aims to spread best practice and achieve convergence towards EU goals in those policy areas which fall under the partial or full competence of Member States. 'Peer pressure' and 'naming and shaming' are terms often used to describe this process of learning and improvement, and these may hint at processes of greater weight than the apparently 'soft' nature of the governance implies.

In the area of vocational education and training there is a framework for continued policy developments in the countries. At the same time, complex and newly emerging challenges require acting on several fronts, as the unprecedented refugee crisis.

Despite the evident continuity with previously devised initiatives, countries' policies and actions were often in an evolutionary and preparation stage. Continuity involves adjusting and complementing deliverables to meet the objectives set and reflect policy agenda developments. Trends that emerged in the past have been confirmed in the latest report on European cooperation (Cedefop, 2018). Borderlines between VET for youths and adults, initial and continuing training are becoming less clear cut. For some countries, the work on VET is part of a natural evolution to strengthen its position in the overall education and training system and retain its role and relevance *vis-à-vis* the

labour market. For others, this work is driven by the need to strengthen VET's role and its relevance. While many actions are still in the pipeline, evidence suggests that countries have made considerable steps forward.

The report of European cooperation includes candidate countries, an indication signalling the need for a broader perspective turning in the long run the European to global. It seems that globalisation and technological evolution and developments will be the catalyst that will create the necessary synergies and peer learning at a global level.

The world of education and training in the years to come will be in a state of continuous change. This future changes will not only modify the content of learning but it will also differentiate the learning provision and will also affect duration, assessments and recognition. The role of teachers and trainers will no longer be the "secure" traditional one but will have to catch up with developments. Education and training institutes will have to turn to agile bodies managing transitions and changes and reinventing their role.

We have reached the end of our "eternity", entering a period of opportunities but also of big challenges. It seems we are close to what Lewis Carroll called the "Red Queen Effect" meaning we can't be self-satisfied or we'll fall behind. In the emerging world we have to run faster and faster just to keep up with where we are and in order to survive another day we have to run faster and more efficiently. We have entered a period that in the learning process we have to evolve together with the systems (e.g. education and training systems, labour market) we interact with. And we should not forget what Charles Darwin said: "It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change".

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