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DIRECTORATE FOR EDUCATION AND SKILLS
EDUCATION POLICY COMMITTEE

EDUCATION 2030: DRAFT DISCUSSION PAPER ON THE PROGRESS OF THE OECD LEARNING FRAMEWORK 2030

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The paper is jointly drafted by the secretariat and experts, in particular, with Dominique S. Rychen and Laura Lippman, and comments from Dr. Phil Lambert, Professor Peter Bishop, and Mr. Ross Hall. Other experts' written contributions include: Professor Michael Young, Dr Katherine Ross, Dr Philip Tomporowski, Dr Anita Collins, Dr Rachael Jacobs, Dr Stephen Billett, and Professor Kimberly A. Schonert-Reichl.
For more details, see [EDU/EDPC(2016)23/ANN1], [EDU/EDPC(2016)23/ANN2], [EDU/EDPC/RD(2016)38], [EDU/EDPC/RD(2016)40]
The participants are invited to:
- COMMENT on the relevance of the transversal competencies for a sustainable future in 2030: i.e. (a) creating new values, (b) dealing with tensions, dilemmas and trade-offs, and (c) taking responsibility
- COMMENT on the relevance of (a) types of knowledge (b) types of skills and (c) types of attitudes and values with regards to the competencies required for people to shape the world in 2030 by thriving in a structurally imbalanced world (resilience), creating new values to the world (innovation), and keeping the world in balance (sustainability)
- COMMENT on the relevance of three interrelated aspects of the competency development cycle: i.e. (a) action, (b) reflection, and (c) anticipation.

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DRAFT DISCUSSION PAPER ON THE PROGRESS: OECD LEARNING FRAMEWORK 2030[1]

Introduction

1.   The OECD conceptual learning framework has been continuously revised through an iterative process in consultation with multi-level stakeholder groups as well as further research. The conceptual framework now presents itself as "a learning compass", building on conceptual underpinnings (e.g. part of the conclusions of the DeSeCo framework as well as new directions of evidence-based curriculum frameworks) to suggest practical use of the framework. To continue the iteration, the delegates are invited to:

- COMMENT on the relevance of the transversal competencies for a sustainable future in 2030: i.e. (a) creating new values, (b) dealing with tensions, dilemmas and trade-offs, and (c) taking responsibility

- COMMENT on the relevance of (a) types of knowledge (b) types of skills and (c) types of attitudes and values with regards to the competencies required for people to shape the world in 2030 by thriving in a structurally imbalanced world (resilience), creating new values to the world (innovation), and keeping the world in balance (sustainability)

- COMMENT on the relevance of three interrelated aspects of the competency development cycle: i.e. (a) action, (b) reflection, and (c) anticipation.

Future we want[2]

2.   In the discourse of "knowledge economies", the demands on education systems have focused on equipping them with the knowledge and skills for economic growth (often represented by macro-economic statistics such as GDP), productivity and efficiency.[3] Today, there is an increasing recognition that an economic narrative is not sufficient. We need a new narrative - going beyond economic growth - that can help shape a country or a region for better lives for individuals, for societies, and for environments.[4]

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1   The experts' paper [EDU/EDPC(2016)23/ANN1] is the source for the reconceptualization of "key competencies for 2030" building on DeSeCo, and [EDU/EDPC(2016)/ANN2] is the source of the Skills domain of this paper.

2 . See EDU/EDPC(2016)23/ANN1; EDU/EDPC/RD(2016)40; EDU/EDPC/RD(2016)38

3   http://www.oecd.org/innovation/research/1842070.pdf

4 . Besides cited examples of OECD, another example is from Europe. The European Commission supported the New Narrative project designed "to identify a new, encompassing narrative that takes into account the evolving reality of the European continent, as well as highlighting that the EU is not solely about the economy and growth, but also about cultural unity and common values in a globalised world. Europe's core values of human dignity, freedom, democracy, equality, and respect for human rights are an essential part of the European project" http://ec.europa.eu/culture/policy/new-narrative

3.   The OECD is committed to **redefine the growth narrative to put the "well-being" at the centre of our efforts**.[5] The *OECD's Inclusive Growth Initiative* has pioneered analysis illustrating how increasing inequality has an adverse impact, not only on social cohesion, but also on economic growth, based on a multidimensional approach. The OECD's *Better Life Initiative: Measuring Well-Being and Progress* presents 11 dimensions of individual well-being, including housing, income, jobs, community, education, environment, civic engagement, health, life satisfaction, safety and work-life balance that contribute to societal developments, including economic capital, human capital, social capital and natural capital. These societal resources will also return to and contribute to the individual well-being.

Figure 1.   The OECD framework for measuring well-being

1. WELL-BEING TODAY AND TOMORROW: AN OVERVIEW

Figure 1.1. **The OECD framework for measuring well-being**
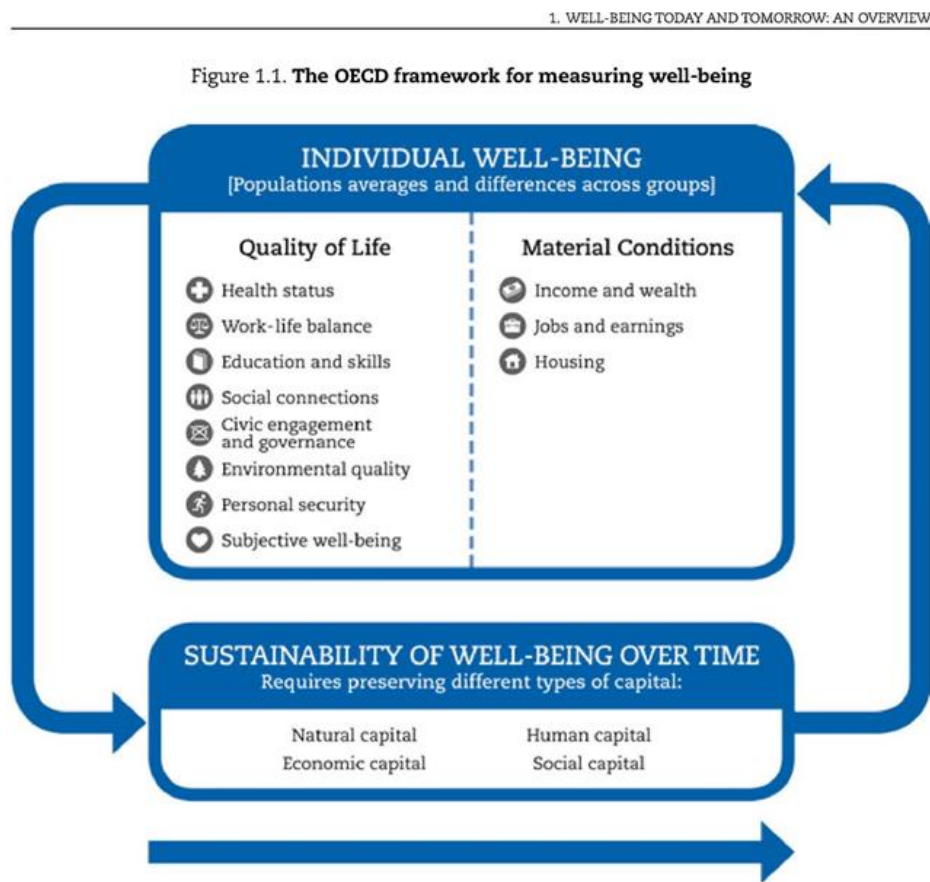
4.   Education has a huge role to play in advancing the well-being agenda for individuals and for societies.[6] How can education systems help students to develop competencies towards both better future both for themselves and for our common goods?

5.   Already a decade ago, the OECD Education ministers (2001) recognised that "sustainable development and social cohesion depend critically on the competencies of all of our population – with competencies understood to cover knowledge, skills, attitudes and values", building on the project

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5 . It is one of the eight overarching goals set out by the Secretary General for the 2016-21 perio. See https://www.oecd.org/about/secretary-general/21-for-21-A-Proposal-for-Consolidation-and-Further-Transformation-of-the-OECD.pdf

6 . The scope of education in a broader sense includes formal, non-formal and informal learning.

Definition and Selection of Competencies for students and adults to lead a successful and responsible life and to face the present and future challenges (DeSeCo) in the beginning of the 21st century.[7] The OECD's Future of Education and Skills 2030 project is launched to **re-visit the DeSeCo key competencies and specify what the different priorities on the demands for competencies are for today's students**.[8] The most important shift of focus is the articulation of competencies that students need to **shape the future themselves towards 2030,** besides learning to live successfully and responsibly in the world to come.

6.   Multiple interrelated factors influence how the future is being shaped. Future and foresight studies provide valuable insights on expected longer-term global trends that will have major societal impact in all spheres of societies, organizations, institutions and ultimately the individual, his or her life and mind. These changes include: rapid technological changes, globalisation, growing diversity, substantial global inequalities, climate change, demographic changes, ecological destabilisation, loss of biodiversity, new forms of communication and interaction, large-scale value changes, instability of norms, conflicts and new forms of violence, poverty and population movements, imbalance between economic, social and environmental development.

7.   These changes are not new. They have existed for decades, but in recent years, these changes are being accelerated. What is more, these changes in various fields are becoming more and more intricately inter-connected. This implies both challenges and opportunities in a world marked by **volatility** (nature and dynamics of change, and the nature and speed of drivers of change), **uncertainty** (lack of predictability), **complexity** (the confounding of issues) and **ambiguity** (cause-and-effect confusion).[9]

8.   Under such circumstances, education policymakers in OECD countries recognised the increasing importance that education systems should contribute to shaping the future in a balanced direction: [EDU/EDPC/M(2015)1] through:

- **Resilience** (thriving in a structurally imbalanced world) [10],

- **Innovation** (creating new value to the world)[11], and

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[7]   DeSeCo, the acronym of the OECD project *Definition and Selection of Competencies: Theoretical and Conceptual Foundations* (www.deseco.ch) was launched in 1998 and concluded with the final report Key Competencies for a Successful Life and a Well-Functioning Society in 2003 and with the Executive Summary in 2005.

[7]. See EDU/EDPC(2016)23/ANN1

[9] . In many ways the challenges of a VUCA world resonates with the contextual analyses and conceptualization of DeSeCo's competence framework which is grounded in a vision of the world as «complex, diverse, interdependent, and conflict-prone».

[10] . The Meeting of the OECD Council at Ministerial Level 2016 focused on policy discussions on "Resilient Economies and Inclusive Societies – Empowering People for Jobs and Growth". In building resilient societies, Ministers emphasised the importance of achieving inclusive growth through better social-protection systems and the empowerment of individuals, combined with labour policies that facilitate the participation in the labour market of under-represented groups, such as women, youth, older people and migrants. Ministers called on the OECD to conduct further work on the effects of the distribution of skills on well-being outcomes and job quality, highlighting that poor skills severely limit people's access to decent jobs. They urged further work to implement the Giving Youth a Better Start Action Plan at the national level. Ministers underscored the usefulness of PISA and PIAAC to guide policymakers in unleashing the full potential of human capital. See https://www.oecd.org/mcm/mcm-2014-chair-summary.htm

[11] . The OECD released the Innovation Strategy in 2010. The Strategy was one of the first dedicated horizontal projects in the OECD. Since its launch, it has been well received and affected policy developments in many countries. The 2014 OECD Ministerial Council Meeting (MCM) signalled the importance of carrying out such update. The Meeting of the OECD Council at Ministerial Level 2015 sets out 5 priorities for policy makers that together provide the basis for a comprehensive and action-oriented approach to innovation. These priorities are:
 1. Strengthen investment in innovation and foster business dynamism

- **Sustainability** (keeping the world in balance)[12]

9. Moving towards 2030 balancing between the three directions to ensure individual and collective well-being will require conscious efforts and collective actions. These directions at the collective, social level have been selected based on the policy discussions and priorities. To specify specific competencies and constructs required for 2030, this paper aims to:

- Re-define and re-select relevant competencies for 2030, in line with the three directions that the world should strike a balance. It implies an attempt to explicitly value some competencies over others. What is considered necessary or relevant for 2030 not only depends on the future demands but also on the societal aspirations that give point and direction to education reform.

- Explore how such competencies can be or have been embedded into existing curriculum frameworks as well as how a school curriculum can be mapped in a broader picture e.g. within larger learning systems including communities and families

- Suggest a theory-based practice cycle for such competencies to be developed through lifelong learning.

Figure: Well-being of (individual, collective, requiring a balance between resilience, sustainability and innovation – draft visual, work-in-progress-
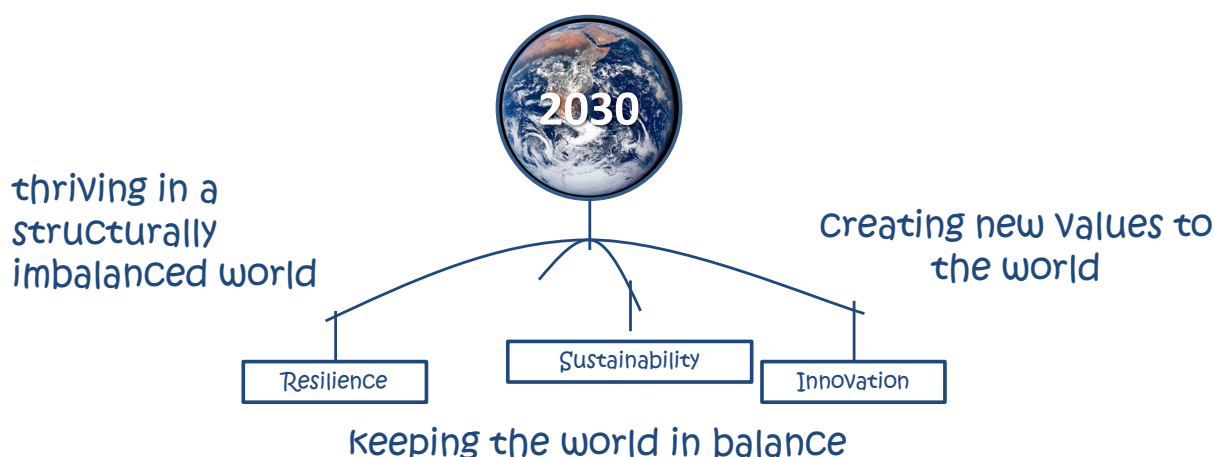
Being able to navigate in time and social space

10. Education can make systematic change towards a better future as it shapes the minds of young people and, therefore, it should empower and inspire them **to create a resilient, innovative and sustainable**

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2. Invest in and shape an efficient system of knowledge creation and diffusion
3. Seize the benefits of the digital economy
4. Foster talent and skills and optimise their use
5. Improve the governance and implementation of policies for innovation
   See https://www.oecd.org/sti/OECD-Innovation-Strategy-2015-CMIN2015-7.pdf

12 . Going beyond the OECD countries, the 17 new goals (the UN Sustainable Development Goals) were adapted as the post-2015 agenda, to build a better world with no one left behind. See http://www.un.org/ga/search/view_doc.asp?symbol=A/69/L.85&Lang=E

society. Education systems should not reproduce the inequality that exists today in the next generations or disengage those students who are at risk, while serving to achieve the excellence and innovation.[13] Education systems should no longer assume that everything can be or should be taught in school, while enhancing the value of schooling. Education systems should not assume that teachers and textbooks can always offer solutions to the problems students are given in classroom, because they are likely to face real-life problems that teachers or textbooks may not have answers for. Thus, education systems should offer quality learning opportunities to all students through which they learn to navigate themselves in identifying issues, finding several responses to these issues, and selecting a response that seems fit for a particular given context.[14]

11. To do so, students should be able to **"travel across a wide variety of contexts"** (Kegan, 2001). They should be equipped with competencies for traveling in **time** (past, today, future) and in **social space** (family, community, region, nation, world) to actively take part in different spheres of life. Thus, education systems should support students to **be able to navigate across unfamiliar contexts.**

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13 . Education systems in a boarder sense includes not only schools but also other actors that share the responsibilities for providing students learning opportunities in a systemic and ecological way, often labelled as "learning ecosystems".

14 . One of the competent human models in psychology is "puzzle solver" (Haste, 2001). The DeSeCo dismissed this model as its theoretical approach because it suggests that there is one right answer that can be arrived at by linear logical processes. In reality, however, "there are several routes to solutions, where for example, feedback loops and multiplex iteration are involved, and where there are a number of possible – and equally useful – outcomes. It is inherently intolerant of ambiguity, uncertainty, and the kind of model associated, in control-theory terms, with 'closed loop-open solution problems, or with fuzzy logic'"(Mc Neill & Freiberger, 1993, in Haste, 2001, p. 95). According to Haste, the problem solver model tends to neglect ambiguity and uncertainty because it is about finding the right answer. In other words, to pursuit simplicity, it tends to cut through diversity and complexity. Hence, this approach was found inadequate when it comes to deal with a messy world and fuzzy boundaries and complex issues that young people and adults will face.

12. In the time of *individual empowerment*[15], in particular, it is becoming increasingly important that today's students be **empowered to navigate in social space and time and to manage their lives in meaningful and responsible ways** by influencing their living and working conditions. It is about acting rather than to be acted upon, shaping rather than to be shaped and choosing rather than to accept choices decided by others. However, acting and operating effectively in and on the world does not mean functioning in social isolation, nor does it mean acting solely in self-interest. It requires an orientation toward the future and a meaningful life plan, and an awareness of one's environment, its functioning (i.e. an understanding of social dynamics and the specific challenges they imply), and the roles one plays and wants to play. It assumes the possession of a sound self-concept and the ability to translate, in a responsible way, needs and wants into acts of will: decision, choice, and action.

13. In the discourse of responding to mega global trends such as the 4th industrial revolution or a planet at risks, the following requirements are often emphasised: creativity, empathy, dealing with ambiguity, engagement with uncertainty, stewardship, patience, sense-making, mind-shift, adaptation in the face of disruptive change, long-term thinking and anticipation and so on. For students to be well equipped to deal with these requirements and tackle complexity in a manageable way, experts would argue that they take on an absolutely crucial function, that is, creating the tools with which they can manage uncertainty and turn it to his or her own advantage" (Callieri, 2001).

The OECD Learning Compass 2030

14. The OECD 2030 learning framework aims to support students to develop a tool, **a compass that can guide them to shape the world in 2030 by thriving in a structurally imbalanced world (resilience), creating new value to the world (innovation), and keeping the world in balance (sustainability).** Anchored in the theoretical underpinnings of the DeSeCo, the Learning Compass embodies "competencies for navigating in time and social space" with three inter-connected critical learning paths:

1. Transversal key competencies for 2030 (i.e. transversal competencies required for 2030 that cut across the DeSeCo set of key competencies)

2. Embedding these competencies into curriculum and mapping the curriculum in a broader context.

3. Development cycle for these competencies

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15 . or the diffusion of power among states and from states to informal networks (the National Intelligence Council, 2012)

Figuer 2. Revised learning conceptual framework - the OECD 2030 Learning Compass: draft visual, work-in-progress Note; the constructs (e.g. creativity, adaptability, empathy) are given as "examples"
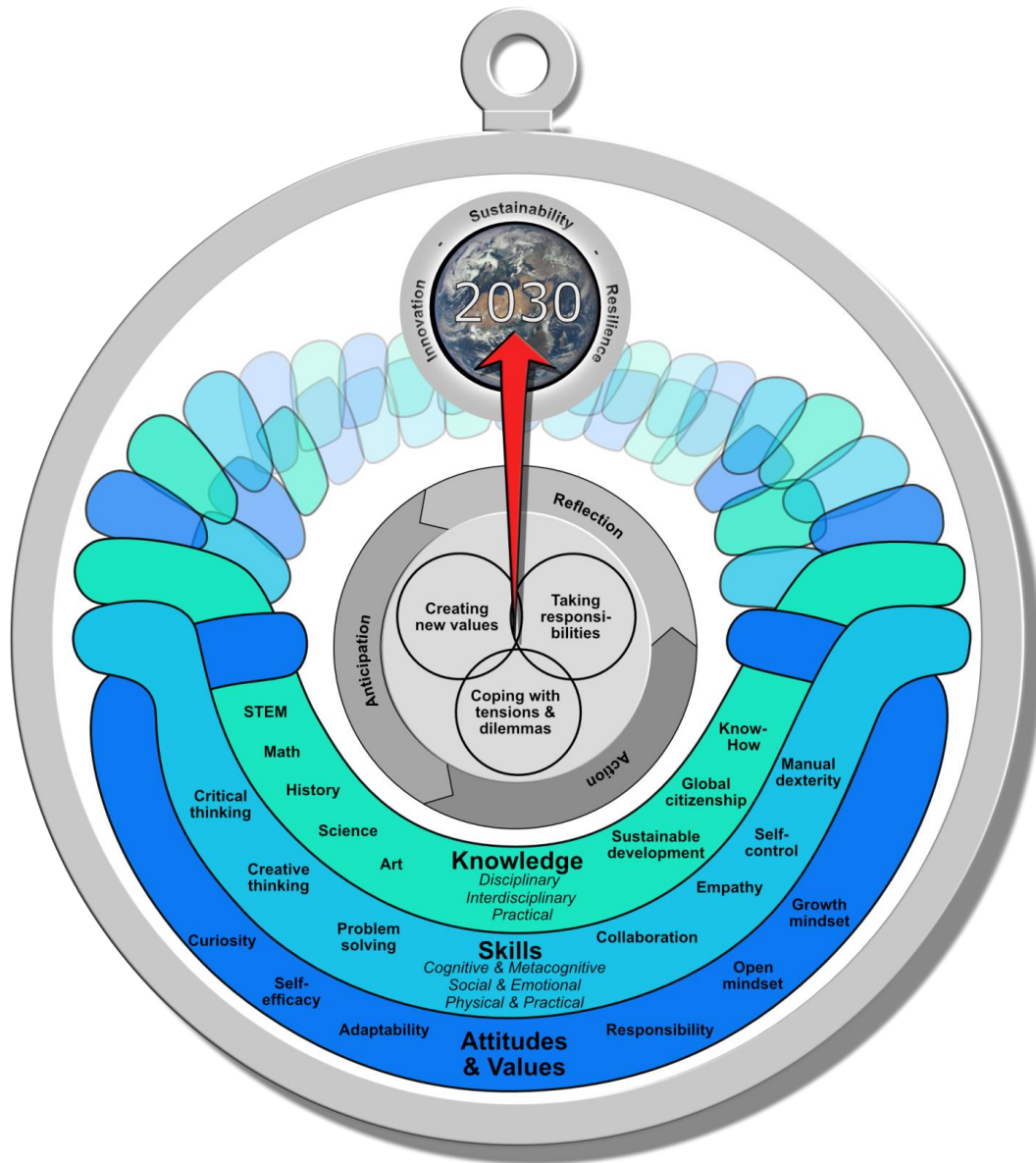
1. Transversal key competencies for 2030 cutting across DeSeCo's set of competencies (DeSeCo 2.0)

15. The DeSeCo constructed three categories of key competencies by way of a deductive approach mainly based on the scholarly theorizations from different disciplines including sociology, psychology, philosophy, economics, history, and anthropology and the subsequent interdisciplinary and multi-stakeholder exchanges.[16]

- *using tools interactively,*

- *acting autonomously, and*

- *interacting in socially heterogeneous groups*

16. While DeSeCo's three categories of key competencies are recognised to be still relevant for 2030, to further, three cross-cutting competencies are being articulated in light of the 2030 context. They are based on the final report of the DeSeCo as well as the common trends identified in recent curriculum frameworks in OECD countries. In many countries individuals are expected to be adaptive and flexible, innovative, creative, open-minded, tolerant, self-directed, and self-motivated, and able to take responsibility for their decisions and actions as lifelong learners, parent, partner, employee or employer, citizen, student, or consumer. In line with the demands for the students to be able to thrive in a structurally imbalanced world (resilience), create new value to the world (creativity), and keep the world in balance (sustainability), **the OECD Learning Compass 2030 articulates three cross-cutting, though interrelated, key competencies across the DeSeCo competencies:**

- *creating new value*

- *dealing with tensions, dilemmas, trade-offs*

- *taking a responsibility*

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16 . Furthermore, within each of the three categories, particular key competencies are listed as the result of an examination of the many lists received from experts and country reports in light of the established normative, definitional and conceptual criteria.

Figure: DeSeCo x Transversal Key Competencies for 2030 (DeSeCo 2.0) – draft visual, work-in-progress-

DeSeCo   Transversal Key Competencies for 2030 (DeSeCo 2.0)
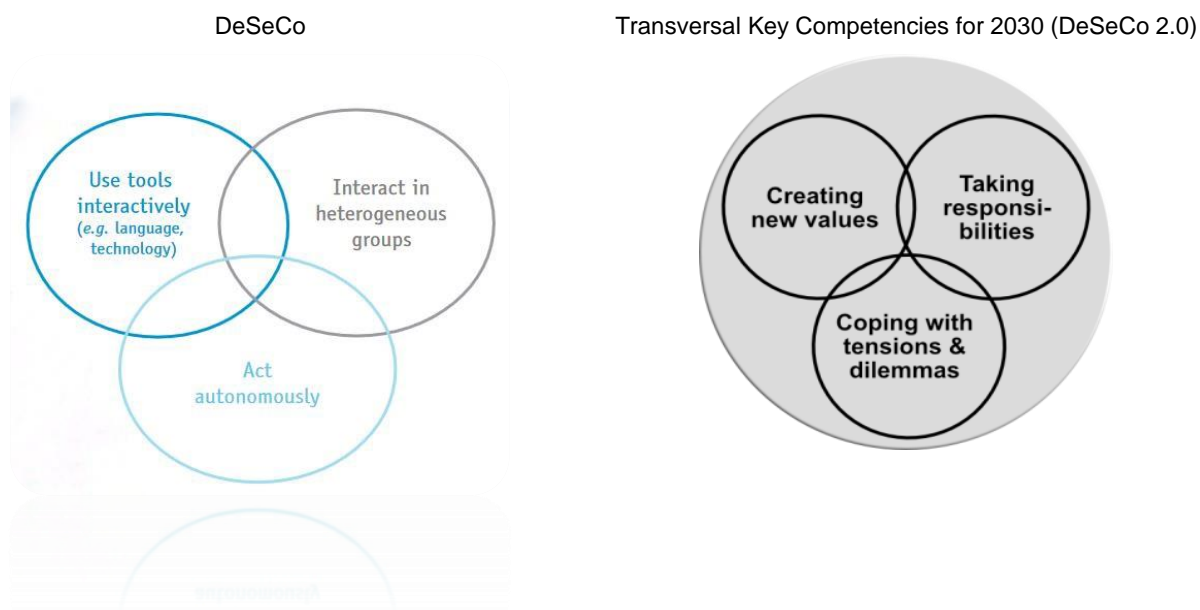
1.1 Creating new value

17. It is about creating new knowledge for and adding new value to the world. The OECD member countries have recognised that new sources of growth are urgently needed to help the world move to a stronger, more inclusive and sustainable growth path, in particular, following the financial crisis and threats of climate change that **innovation can be a critical part of the solution**. They also recognised that innovation can help address pressing social and global challenges, including demographic shifts, resource scarcity and the changing climate, possibly at the lowest cost, and that **innovative economies are more productive, more resilient, more adaptable to change and better able to support higher living standards**. [17]

18. **Education is considered as core to innovation.** Innovation can be embedded into school curriculum but in different means and forms[18]. Broad curricula with appropriate pedagogical approaches will encourage innovation. Innovation includes the creation of **new value, new demands, new jobs, new products, new services, new tools, new processes,** etc. But it should come with ethical decisions. It also applies to **new narratives**. **Sense and meaning making** and the need for new narratives seem to move to the forefront in light of many of the expected social and technological changes towards 2030. For example, the revolutions in biotechnology and Artificial Intelligence are pushing back the current thresholds of life span, health, cognition, and capabilities. This will compel us to redefine what it means to be human, not only in our moral and ethical boundaries but also our relation to others, the environment (Schwab, 2016). [19]

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17 . The OECD Innovation Strategy 2015 An Agenda for Policy Action was adapted at the Meeting of the OECD Council at Ministerial Level. See https://www.oecd.org/sti/OECD-Innovation-Strategy-2015-CMIN2015-7.pdf

18 See EDU/EDPC/RD(2016)38

19 The story teller model emphasizes social and linguistic processes. Narrative, sign, symbol and rhetoric are the core features of cultural transmission and meaning making. The model focuses on the mechanisms by which language, social interaction, and cultural behaviours enact and reproduce expectations and norms.

19. While innovations imply multidisciplinary or inter-disciplinary approaches, academics would argue that disciplinary knowledge would still be fundamentally essential to tackle cross-cutting and complex issues, as knowledge at the boundaries of the disciplines requires an understanding of how emerging disciplines are derived from foundation disciplines, e.g. mechanical engineering from physics and mathematics, or how emerging issues can be decomposed into foundation disciplines to gain necessary knowledge to tackle the issues at the boundaries (Young, 2016).

1.2 Dealing with tensions, dilemmas, trade-offs

20. Countries and societies differ in terms of economic and political goals and priorities, power relations, cultural traditions, environmental settings, available resources, and employment and social opportunities. Increasing diversity and heterogeneity, however, is only one common facet of our world. Globalization, interconnectivity and complexity are other central features. Today the representation of the world as global, interdependent, complex, multipolar, rapidly changing, diverse, conflict-affected, fragile, uncertain has become part of the mainstream discourse. Societies and individuals are expected to be able to deal **with tensions, dilemmas, trade-offs, nexus, non-simultaneity, and non-linear processes** in a constructive, future-oriented way. **Taking a long-term perspective, going beyond the either-or, and at times thinking out of the box** will be critical in the future.

21. The world of volatility, uncertainty, complexity, and ambiguity demands that we **not rush to a single answer, to an either-or solution, but rather deal with tensions, dilemmas and trade-offs** – for instance, between equity and freedom; autonomy and solidarity; efficiency and democratic processes; ecology and economic logic; diversity and universality; and innovation and continuity – by integrating seemingly contradictory or incompatible goals as aspects of the same reality. Reflection with an integrated, holistic view is most likely to lead to the best answer to the often complex, intractable, dynamic, and multifaceted problems posed by the challenges and opportunities of the 21st century. Dealing with ambiguous or contradictory positions and actions is not, in itself, challenging. The challenge, which must be incorporated in key competencies, is dealing reflectively with multiple, dynamic and often conflicting aspects and **recognizing that there may be more than one solution or solution method.** To be prepared for the future, individual have to **learn to think and act in a more integrated way,** taking into account the manifold interconnections and interrelations between contradictory or incompatible ideas, logics, and positions both in short- and long-term perspectives.

22. In the light of the increasing cultural and social diversity and the existence of social, economic and ecological imbalances, dealing in constructive way with differences, contradictions, and ambiguities is another frequently mentioned requirement. For example, the concept of sustainable development is one possible answer to the tension between economic growth, ecological constraints, and social cohesion, recognizing their complex and dynamic interplay instead of treating them as separate and unrelated, if not mutually exclusive issues. The competence required for a more complex picture of the world, is the ability to **manage diversity and dissonance in a creative and coping way**, and **avoid premature closure or dissolution into relativism"** (Haste, 2001) **or absolutism.**

23. An individual needs to be able to **meet a similar demand in another context**. The disparity between exiting competencies and competencies needed to meet new demands in and across different contexts is resolved **through adaptation** (Oates, 2003). This understanding is consistent with Piaget's assertion that effective performance is a function of the dialectical interaction between exiting competencies of the individual and the demands of the new situation or context. In cases where competencies are applied in different domains of life, adaptation entails actively and reflectively using the knowledge, skills, attitudes and values developed in one social field, analysing the new fields and translating and adapting the original knowledge, skills, attitudes and values to the demands of the new situation.

1.3 Taking a responsibility (ethical compass)

24. Not all innovations can ensure benefits to the world; innovations can embrace risks to the world. Innovations for economic growth should not endanger the ecological sustainability .Ethics in science is growingly playing a key role for new discoveries in science to contribute to a better future, not to be used for destruction of humankinds (e.g. crones, chemical weapons). Affordability should not be ensured at the cost of low security (e.g. cheap food). Enterprising or entrepreneurial spirit should be accompanied with ethics that should guide enterprises to contribute to building a better common future (e.g. enterprises to take part in "corporate social responsibility" or "creating shared value") and to avoid any misconduct (e.g. OECD's BEPS[20]).

25. Also, the importance of taking responsibility should be increasingly articulated in dealing with tensions, dilemmas and trade-offs. Changes and shifts in power and substantial socio-economic inequalities have the potential for increased conflicts and instability within and among states and regions. Some 1.5 billion people in an estimated 40 countries live in an environment affected by conflict and violence. Key issues include fragility of context, ungoverned spaces, tensions and contestation, insecurity. Furthermore, available data suggest also a decrease of trust in government across OECD countries (OECD, 2014) and social and civic disengagement in democratic processes (OECD, 2013). Discriminatory and extremist ideologies and radicalisation go hand in hand with new forms of violence, some with a global reach. Such developments challenge peace and prosperity and undermine democratic core values and institutions.

26. The DeSeCo suggested that dealing with novelty, change, diversity, ambiguity and uncertainty, and coping with important challenges in a responsible way assumes that **individuals can 'think for themselves'.** This suggests **a sense of responsibility, moral and intellectual maturity,** with which individuals self-regulate when appropriate, and one can reflect upon and evaluate their actions in the light of their experiences and personal and societal goals; what they have been taught and told; and what is right or wrong (e.g. Canto-Sperber & Dupuy, 2001; Haste, 2001). The perception and assessment of what is right or wrong, good and bad in a specific situation is about **ethics.** It implies asking questions related to norms, values, meanings, and limits such as: What should I do? Was I right to do that? Where are the limits? Knowing the consequences of what I did, should I have done it?

27. Answering these questions with critical thinking skills requires the cognitive and metacognitive process by which we evaluate and choose among alternatives consistent with ethical principles. This assumes an overall understanding of the meaning of things, actions, events, experiences and critical values. The process of creating, extending, and applying meaning, knowledge, rules, and values in a reflective manner is an underlying mental assumption of many complex demands. **The importance of value orientation as an integral part of a competence has been widely recognized.**[21]

28. In the international community, an emphasis is being increasingly placed on strengthening global competency and global citizenship. For instance, the OECD plans to include global competency in the 2018 Programme for International Student Assessment (PISA) (OECD, 2016). Deardorff (2013) noted the following elements as key themes across different cultures in regard to global competence: **respect, listening, adaptation, relationship building, seeing from multiple perspectives, self-awareness and**

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cultural humility. The UNESCO's Global Citizenship Education[22] program aims to empower learners to assume active roles to face and resolve global challenges and to become proactive contributors to a more peaceful, tolerant, inclusive and secure world, as part of the *UN 2030 Agenda for Sustainable Development*[23]. The OECD Education 2030 project and the UNESCO Global Citizenship Education program are in close cooperation to make the global agenda a reality in the respective field.[24]

2 Embedding the competencies for 2030 into curriculum

29. Countries have taken different approaches to turning the key and transversal competencies for 2030 into curriculum. However, some emerging trends can be observed, which have laid the foundation of the conceptual underpinnings of the OECD Learning Compass 2030. For students to demonstrate their competencies through action, choice or way of behaving with respect to the demands in a particular context,[25] they will need to be able to mobilize all dimensions of "knowledge", "skills" and "attitudes and values", as is in line with many curricular in OECD countries.

Figure: Key Competencies for 2030 in Curricular Framework – draft visual, work-in-progress-
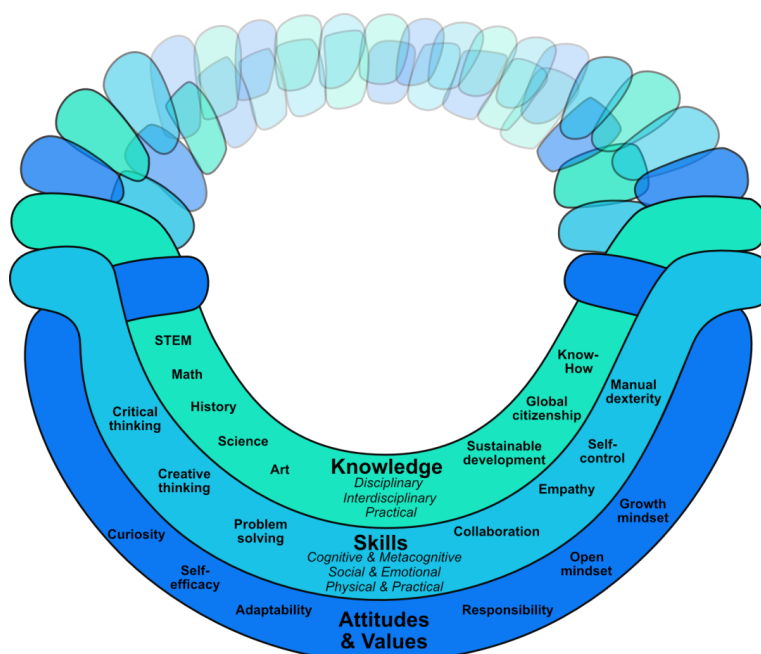
2.1 Knowledge

30. Knowledge will continue to play a key role in the knowledge economies. As mentioned earlier, the social, economic and cultural issues surrounding us are increasingly intricately interconnected, which

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22 http://en.unesco.org/gced

23. The agenda was adopted in 2015 by 193 countries of the UN General Assembly provides a normative reference fame and transformative vision for a better world. This vision echoes with the common values and societal goals to which DeSeCo referred to when defining and selecting key competencies. Furthermore, the Sustainable Development Goal 4.7 aims to ensure that by 2030 «all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development»

24 see EDU/EDPC/RD(2016)38

25 This relates to a "holistic concept" of competence.

would require us to think out of the box or out of the certain disciplines to **find inter-disciplinary solutions**, while at the same time, **deepening the certain disciplinary knowledge** is also required. It is also important to acknowledge the needs for **practical knowledge**, i.e. knowledge of what to do or how to apply a particular skill. For example, if students gain the knowledge of "how to connect dots", they learn to - consciously or unconsciously – identify common or different patterns across different disciplines and suggest interdisciplinary solutions, where possible.

3.1.1 Disciplinary knowledge

31. Navigation in time and space, across different fields and with flexible adaptation to unfamiliar situations, implies **recognising patterns** already encountered in past experiences, establishing analogies between previously experienced situations and new ones, imagining alternatives, **using the patterns** to guide an activity in the world (Canto-Sperber & Dupuy, 2001). It also implies **taking different perspectives** and **exploring** if these patterns can fit in different social, economic and cultural situations. In this context, disciplinary knowledge will continue to be important towards 2030 not only to deepen the understanding the foundational concepts of specific disciplines but also to have a familiarity with the knowledge, values, rules, concepts, laws specific to the discipline and to recognize key patterns within certain disciplines and text if they are applicable to other disciplines.

32. Furthermore, with the growing need to advance knowledge in specific disciplines, specialized knowledge will continue to be important. In some contexts, such as the growing trends towards global value chains, specialized knowledge and expertise in certain sectors are expected to (OECD, 2013).[26]

Curricula examples

33. Recognising the importance of disciplinary knowledge, interdisciplinary and practical knowledge, while at the same time, addressing the challenges of curriculum overload or competing subjects, countries take different strategies with curriculum redesign. **One example is to re-organise specific subjects into "key learning areas".** For example, in the 1990s, New Zealand recognised that all areas of human endeavour are of equal value has led to the curriculum to reframe "subjects" as "**key learning areas**" without a distinction between "core/ non-core", i.e. English, Maths, Science, Social studies, PE/ Health, Design and Technology, and Arts (Kennedy, 1995). The movements towards "STEM – science, technology, engineering, and mathematics" (with some variations e.g. STEAM – stem + art and design) is an example of grouping certain subjects for a particular purpose. Currently, Japan is in the process of curriculum reform, including subject reorganisation. According to the current draft, Japan is planning to introduce some new subjects by reorganising existing subjects into wider learning areas. One example in upper secondary education is 'exploration on math and science', which is to foster interdisciplinary and multi-angled thinking skills across math and science. This learning area is intended to focus on learning process how students identify problems, how they address these problems, and how they find solutions or reach conclusions. It is intended to foster deeper thinking skills as well as attitudes such as persistence, and self-efficacy. In social science, "national history" and "world history" will be merged and reorganised into "history". At the basic level, it will focus on a landscape of both Japanese history and world history with particular observations on how they interact. Advanced subjects will remain as "exploration on national history" and "exploration on world history" as optional subjects. This will allow those students who are interested in specific knowledge on each subject to have opportunities to go more in-depth, building on the basic knowledge or fundamental concepts of history (e.g. perspectives).
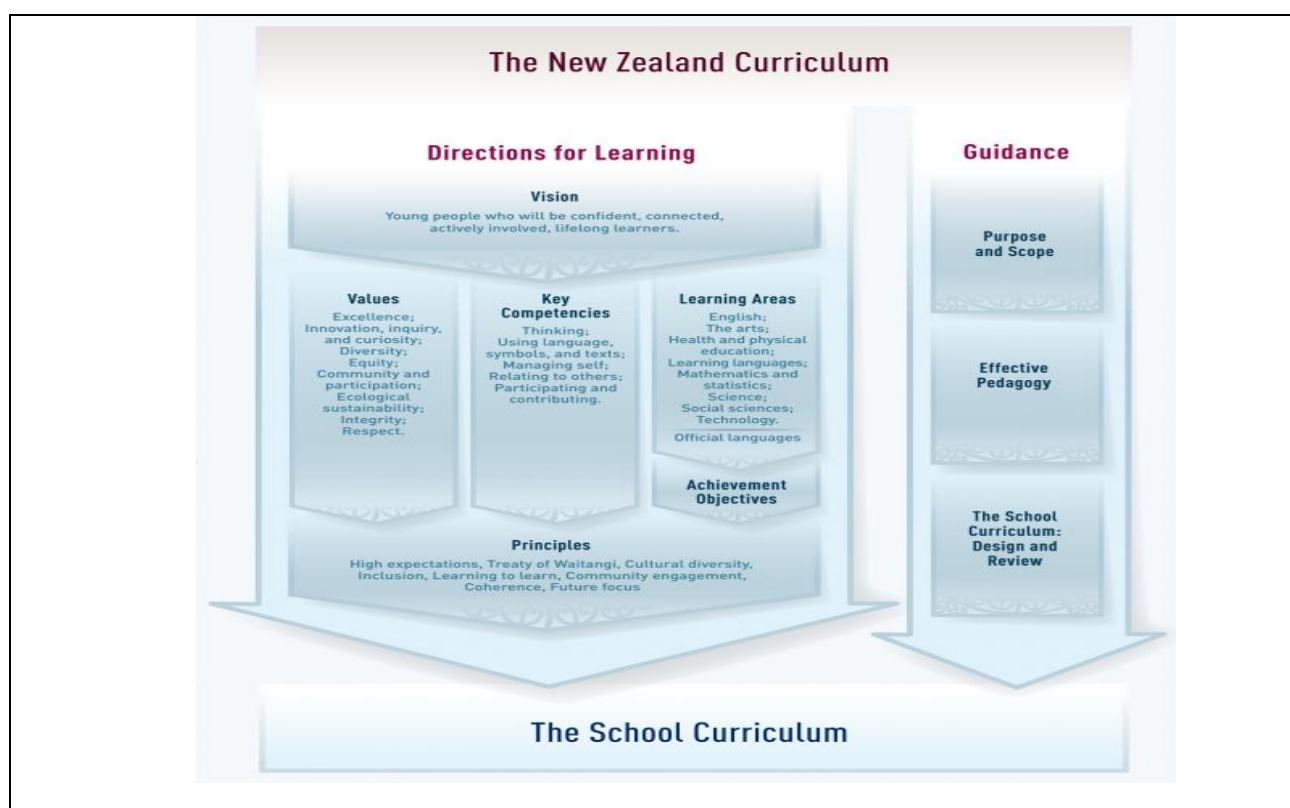
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26 . https://www.oecd.org/sti/ind/interconnected-economies-GVCs-synthesis.pdf

34. Another example of redesigning disciplinary knowledge is to embed core competencies or general capabilities into learning areas or subjects. When reorganising subjects into key learning areas, New Zealand also took a more dynamic curriculum redesign by embedding "key competencies" as essential skills or learning new basics (Mayer, 1992), in line with the OECD's definition and selection of key competencies of the time (1996-2001). The redesigned curriculum in New Zealand was launched in 2007 after an extensive review of the curriculum was undertaken between 2000 and 2002 with teachers, parents, policy makers and groups from the community and industry (Box 1). The impetus to review the curriculum arose in response to the fact that the New Zealand population was becoming increasingly diverse, technologies were becoming more sophisticated and the demands of the workplace were growing in complexity. The revised curriculum was based on the holistic and integrated competence model, articulating the key competencies with the role of values and the key learning areas that encompass the traditional foundation disciplines in educating the whole person.

BOX 1: NEW ZEALAND's NATIONAL LEARNING FRAMEWORK

The New Zealand curriculum has an holistic view of the abilities and skills children should learn includes:

- **An overall vision** –i.e. for young people to be confident, connected, actively involved, lifelong learners.

- **Values** – i.e. for students to value, including **excellence**, by aiming high and by persevering in the face of difficulties; **innovation, inquiry, and curiosity**, by thinking critically, creatively, and reflectively; **diversity**, as found in our different cultures, languages, and heritages; **equity**, through fairness and social justice; community and participation **for the common good**; **ecological sustainability**, which includes care for the environment; **integrity**, which involves being honest, responsible, and accountable and acting ethically, and; to **respect** themselves, others and human rights.

- **Principles** which guide schools in their decision making and curriculum planning. The principles are **high expectations**, **Treaty of Waitangi**, **cultural diversity, inclusion**, **learning to learn**, **community engagement**, **coherence** and **future focus**.

- **Key competencies**, including **Thinking** - is about using thinking processes to make sense of information, experiences and ideas; **Using language, symbols, and texts** - working with, being able to understand, and making sense of the codes (languages and sybols) in which knowledge is expressed; **Managing self** - having self-motivation, a "can-do" attitude, and seeing oneself as a capable learner; **Relating to others** - is about interacting effectively with a range of different people in a range of different situations, including things like being able to listen well, recognise different points of view, and share ideas; and **Participating and contributing,** being involved in communities, such as family, whānau, school, and be able to contribute and make connections with other people.

- **Learning areas (or subject areas),** including English; the arts; health and physical education; learning languages; mathematics and statistics; science; social sciences; and technology. In theTe Marautanga o Aotearoa, 9 learning areas are identified: Pāngarau (Mathematics); Putaio (Science); Hangarau (Technology); Tikanga-a-iwi (Social Sciences); Nga Toi (The Arts); Hauora (Health and wellbeing); Te Reo Māori (Māori language and literature); Te Ro Pākehā (English language); and Ngā Reo (learning languages).

The New Zealand Curriculum

Directions for Learning

Guidance

Vision
Young people who will be confident, connected, actively involved, lifelong learners.

Purpose and Scope

Values
Excellence;
Innovation, inquiry, and curiosity;
Diversity;
Equity;
Community and participation;
Ecological sustainability;
Integrity;
Respect.

Key Competencies
Thinking;
Using language, symbols, and texts;
Managing self;
Relating to others;
Participating and contributing.

Learning Areas
English;
The arts;
Health and physical education;
Learning languages;
Mathematics and statistics;
Science;
Social sciences;
Technology.
Official languages

Achievement Objectives

Effective Pedagogy

The School Curriculum: Design and Review

Principles
High expectations, Treaty of Waitangi, Cultural diversity, Inclusion, Learning to learn, Community engagement, Coherence, Future focus

The School Curriculum

35. In order to tackle interdisciplinary and complex issues, understanding the key conceptual understanding of disciplinary foundations is still essential (Young, 2016). Thus, another strategy is also observed, i.e. **separating "key concepts" or "big ideas" from the "detailed content knowledge" in specific subject areas, and separating "general competencies" and "subject-specific competencies".** The New Zealand curriculum defines key concepts as the following: "Key concepts are the ideas and understandings that we hope will remain with our students long after they have left school and have forgotten much of the detail. Key concepts sit above context but find their way into every context. Students need time and the opportunity to explore these concepts; to appreciate the breadth, depth, and subtlety of meaning that attaches to them; to learn that different people view them from different perspectives; and to understand that meaning is not static. By approaching these concepts in different ways and by revisiting them in different contexts within a relatively short time span, students come to refine and embed understandings".[27]

36. For example, in the New Zealand curriculum, three key concepts are introduced for math with an implication for applicability to other disciplinary areas: [28]

Change and variation	Students uncover stories in which variation is omnipresent. Mathematics and statistics can be used to model the beating of the heart and explore the efficacy of heart medications.
Structure and generalisation	Students unlock stories using models, abstractions, and representations. Mathematics and statistics can be used to investigate climate change and design new virtual worlds.
Argumentation and proof	Students tell stories using evidence and reasoning. Mathematics and statistics can be used to triangulate forensic data and prove Pythagoras' theorem in more than 300 different ways.

27 . http://seniorsecondary.tki.org.nz/Social-sciences/Business-studies/Key-concepts/What-are-key-concepts
28 . http://seniorsecondary.tki.org.nz/Mathematics-and-statistics/Key-concepts

37. In social sciences, four key concepts are suggested to support authentic understanding in history and support students to be able to think like "historians": [29]

Significance	Historians weigh the importance, durability, and relevance of events, themes, and issues in the past and the appropriateness of using the past to provide contemporary lessons; historians debate what is historically significant and how and why the decisions about what is significant change.
Continuity and change	History examines change over time and continuity in times of change. Historians use chronology to place these developments in context. Historians debate what has changed, what has remained the same, and the impact of these changes.
Cause and effect	Historians investigate the reasons for and the results of events in history; they debate the causes of past events and how these events affect people's lives and communities. Historians study relationships between events to identify pervasive themes, ideas, and movements, such as terrorism, revolution, and migration.
Perspective	There are multiple perspectives on the past (both at the time and subsequently). Interpretations of the past are contested – historians base their arguments on historical evidence and draw from a variety of perspectives.

3.1.2 Inter-disciplinary knowledge

38. One key area of cognitive development, noted in the literature more recently, is the knowledge and understanding of other cultures (Eccles & Gootman, 2002). Key developmental scientist (e.g. Eccles & Gootman, 2002) identify in-depth knowledge of more than one culture as a crucial component to cognitive development, particularly as youth get older. This aspect of cognitive development seems to have growing importance as youth today are faced with global interconnection. As globalization trickles down into education, this may include promoting cognitive skills such as exposure and training in other languages, perspective-taking and empathy (which are included in the social and emotional domain), and expanding attitudes and values to be more inclusive and reflective of a broader social context (OECD, 2016).

Curricula examples

39. One approach to teach students **inter-disciplinary issues** (e.g. ICT literacy, global competency, innovation and entreprising, sustainable development) is **by embedding them into existing curriculum** instead of creating "new subjects" so as to avoid curriculum overload. To respond to such growing demands, countries have attempted to embed such inter-disciplinary aspects either into **the desired student outcomes** (e.g. Australia's "ICT literacy" and "intercultural understanding" as part of general capabilities) (Box 2), or into **content areas as cross-curricular topics**. Estonia takes both approaches (Box 3).

BOX 2: AUSTRALIA'S NEW NATIONAL LEARNING FRAMEWORK

Central to the Australian curriculum is the concept of general capabilities, enabling students to become successful learners, confident and creative individuals and active and informative citizens. The capabilities encompass knowledge, skills, behaviours and dispositions across seven areas: literacy, numeracy, information and communication technology, critical and creative thinking, personal and social capability, ethical understanding and intercultural understanding.

General capabilities are embedded in individual learning areas but encountered right across the curriculum. Students are expected to develop capabilities by applying knowledge and skills confidently, effectively and appropriately in complex and changing circumstances. Teachers are expected to teach and assess capabilities by incorporating them into the content of individual learning areas.

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29 . http://seniorsecondary.tki.org.nz/Social-sciences/History/Key-concepts

BOX 3: ESTONIA's NATIONAL LEARNING FRAMEWORK

Estonia sets out eight "general competences" including: cultural and value competence; social and citizen competence; self-management competence; learning to learn competence; communication competence; mathematics, natural science and technology competence; entrepreneurship competence; and digital competence.

Also, as interdisciplinary topics, "cross curricular topics" are suggested, such as "lifelong learning and career planning", "environment and sustainability", "civic initiative and entrepreneurship", "cultural identify", "information environment", "technology and innovation", "health and safety", and "values and morals".) These general competences and cross-curricular topics are well aligned.
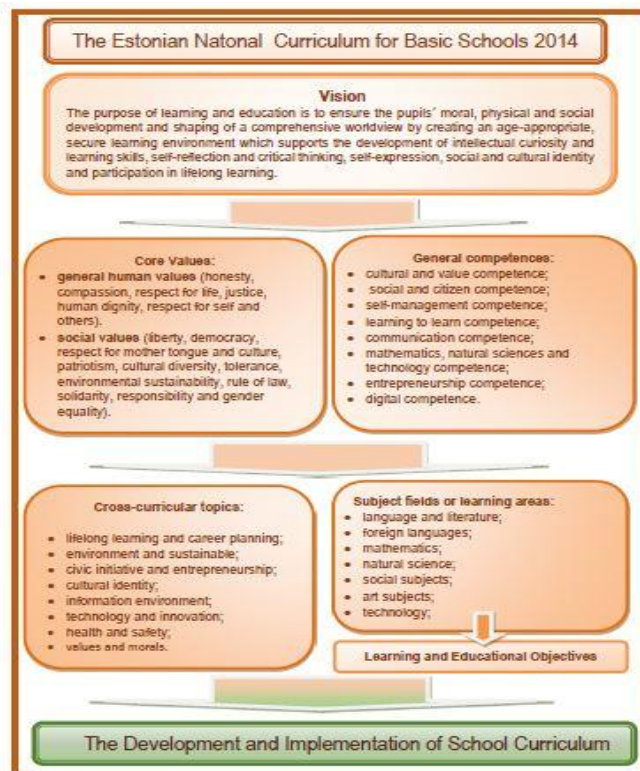
40. Finland is currently rolling an innovative reorganization of disciplines. A significant reform was proposed in 2010 to regroup all subjects as "themes" and to significantly increase the share of optional studies, which faced a wide opposition and did not proceed to the parliament. In 2012, an incremental reform was proposed and approved to introduce interdisciplinary aspects as "phenomenon-based studies" but through subjects, and to include transversal goals, including thinking and learning to learn, cultural skills, self-sufficiency, multiliteracy, ICT, labour market and entrepreneurship, participation and sustainable future. The implementation is planned in the year of the writing this article, so there is no evidence yet whether or not such phenomenon-based studies through subjects, along with general competencies, while maintaining the total instruction time constant, will work.

3.1.3 Practical knowledge

41. In the face of increasing digitalization and the call for creativity and innovation it is important to emphasize the importance of **practical knowledge and a certain craft logic**. Through understanding of how something is done, or made (e.g. **procedural knowledge, "knowing how"**), e.g. a series of steps, or actions, done to accomplish a goal, often characterised such as strategies, productions, and interiorized actions' (Byrnes & Wasik, 1991, p. 777). Such knowledge is **intricately built with declarative knowledge** along a continuum of knowledge. Some are **domain-specific** (procedural knowledge in mathematics), others are **transferrable across different domains** (e.g. understanding possible actions or a sequence of these actions that will lead to appropriate solutions when implemented appropriately). The procedural knowledge develops through problem-solving practice, and thus is tied to particular problem types (within disciplines, or in life in general).

Curricula examples

42. The new curriculum of British Columbia, Canada suggests a "concept-based, competency-driven model", with many curriculum innovations including the introduction of big ideas or key concepts within/ across disciplines, as well as embedding practical knowledge and skills within/ across disciplines i.e. core competencies (broadly defined general capabilities which students can use them every day in school and in life) and curricular competencies (more subject-specific and grade-specific) (Box 4).

BOX 4: THE BRITISH COLUMBIA, CANADA: New Curriculum

The British Columbia, Canada, presents **a "concept-based competency-driven" model.** The BC Canada new curriculum places the core competencies along with literacy and numeracy foundations and essential content and concepts at the centre of the redesign of curriculum and assessment. Core competencies are defined as "sets of intellectual, personal, and social and emotional proficiencies that all students need to develop in order to engage in deep learning and life-long learning". Through the provincial consultation, three core competencies were identified:

- Communication
- Thinking (Creative thinking, Critical thinking)
- Personal and Social (Positive personal and cultural identity, Personal awareness and responsibility, Social responsibility)

In order to foster the Core Competencies, while at the same time ensuring subject-specific deeper learning, the new curriculum is designed based on the curriculum principle which consists of three elements; "Know-Do-Understand". These three elements correspond to the Content (Know), Curricular Competencies (Do) and Big Ideas (Understand) respectively.
- **Content (Know):** The Content learning standards — the "Know" of the Know-Do-Understand model of learning — detail the essential topics and knowledge at each grade level.

- **Curricular Competencies (Do):** The Curricular Competencies are the skills, strategies, and processes that students develop over time. They reflect the "Do" in the Know-Do-Understand model of learning. While Curricular Competencies are more subject-specific, they are connected to the Core Competencies.

- **Big Ideas (Understand):** The Big Ideas consist of generalizations and principles and the key concepts important in an area of learning. They reflect the "Understand" component of the Know-Do-Understand model of learning.

Content (Know) is the detail of the essential topics and knowledge that "students are expected to know" at each grade level. For example, the Science for K4, students should know following contents, for example. (These are not exhaustive lists)
- Sensing and responding by humans, other animals and plants
- Phases of matter
- The effect of temperature on particle movement
- Energy has various forms and is conserved
- Local changes caused by Earth's axis, rotation, and orbit

Curricular Competencies are subject specific competencies which include the skills, strategies and processes that students develop through each subject. While Core Competencies are to be developed across the curriculum, Curricular Competencies are explicit statements of "what student is expected to be able to do" at each grade level in each area of learning. In parallel to the example of Science for K4, curricular competencies include;
- Demonstrate curiosity about the natural world (Questioning and predicting)
- Suggest ways to plan and conduct an inquiry to find answers to their questions (Panning and conducting)
- Use tables, simple bar graphs, or other formats to represent data and show simple patterns and trends (Processing and analysing data and information)
- Identify some simple environmental implications of their and others' actions (Evaluating)

The Big Ideas consist of generalisations and principles and the key concepts of each learning area. The Big Ideas are what students will understand at the completion of the curriculum for their grades. Students are expected to bring those ideas beyond a single grade and even after their completion of education. The example of big ideas in the Science curriculum for K4 include:
- All living things sense and respond to their environment
- Matter has mass, takes up space, and can change phase
- Energy can be transformed
- The motions of Earth and the moon cause observable patterns that affect living and non-living systems.

Detailed curriculum of each subject, which includes all those three elements, are available on the web and instructional examples and other materials will also be added to the website.

3.2. Skills

43. There is a consensus that the skills domain should address a broad range of skills that help today's students to achieve not only academic success but also their physical and psychological well-being towards a better future in 2030, for example, the aforementioned Estonian curriculum sets out the vision that the educational goals should aim to "ensure the pupils' moral, physical and social development and shaping of a comprehensive overview by creating an age-appropriate, secure learning environment which supports the development of intellectual curiosity and learning skills, self-reflection and critical thinking, self-expression, social and cultural identify and participation in lifelong learning".

44. Thus, three sub-domains are agreed for the Skills domain: i) cognitive & metacognitive skills, ii) social & emotional skills, and iii) physical and practical skills. Currently, preliminary background research is being conducted to explore which constructs should be most relevant for 2030 [EDU/EDPC(2016)23/ANN2] guided by the following 4 principles:

- **Relevant for 2030**: likely to help people live successfully and responsibly and a compass that can guide them to shape the world in 2030 by thriving in a structurally imbalanced world (resilience), creating new value to the world (innovation), and keeping the world in balance (sustainability).

- **Impactful**: proven (or thought capable of being proven) to have a significant bearing on their future life outcomes

- **Malleable**: can be developed through the processes of learning

- **Measurable**: can be given (or thought capable of being given) a comparative numerical value on a scale, or in other means.

45. The selection of constructs are also based those that are part of the focuses of current curriculum redesign in participating countries as well as the alignment of the focuses of constructs in the planned curriculum analysis [EDU/EDPC/RD(2016)40; EDU/EDPC/RD(2016)43], as well as the constructs that are relevant to the OECD large-scale surveys such as Early Learning Study, PISA, and PIAAC.

46. For each sub-domain, some examples are listed as preliminary key constructs that are currently under review. It is important to note, however, there is no clear-cut distinction or categorisation of constructs under each sub-domain because construct analysis requires a complex process due to following reasons.

47. First, we need to have a clearer understanding about the complex nature of some constructs, i.e. **multi-faceted** and thus difficult to be classified into a single domain or a single sub-domain. For example, while there is a general consensus that "critical thinking" is a construct as part of "cognitive skills", "empathy," is generally understood as a multi-faceted construct and therefore it is often categorised under different domains or sub-domains according to different sources, different focuses, and different definitions. The Council of Europe's Competencies for Democratic Culture Framework classifies "empathy" as part of both "cognitive" and "emotional" skills as it includes "cognitive perspective-taking, which involves apprehending and imagining the perceptions, thoughts and beliefs of other people", "affective perspective-taking, which involves apprehending and imagining the emotions, feelings and needs of other people", and " sympathy, which involves feelings of compassion and concern for other people based on apprehending their cognitive or affective state or condition or their material situation or circumstances" (Council of Europe, 2016). In other literature, empathy is also considered an attitude (Shapiro, 2002), which is considered as a different domain than "skills".

48. Second, we need to be aware that some constructs are more **context-dependent**, while others are less so. For example, "leadership" can be defined, understood or expected in different ways in different cultural contexts and, depending on the definition, it is not necessarily understood that "the more, the better" in some cultures. In comparison, "integrity" is often suggested as "common" values across different cultures, and it can be expected that having more integrity is better in the scale.

49. Third, we need to consider the **age-appropriateness** of developmental trajectories of certain constructs. A growing body of research findings from neuroscience, learning science, and developmental or cognitive psychology has shown that not only cognitive but also social and emotional skills are malleable (i.e., can be taught and learned) over the life course. Moreover, the life-cycle approach to construct analysis has revealed that the scope of and the selection of key constructs that are developmentally appropriate or most sensitive to brain development may vary across different ages. For example, the key constructs in early years that matters for later student outcomes such as education attainment, employment, health, law abiding and happiness and life satisfaction include verbal skills, numeracy, social skills, locus of control and motor skills (Schoon, Nasim, Sehmi, Cook, 2015) while more and varied constructs in various domains, i.e. knowledge (including disciplinary; inter-disciplinary; practical), skills (including cognitive & meta-cognitive; social & emotional; practical & physical) and attitudes and values may be more salient across middle childhood or adolescence.

50. Fourth, some constructs can be defined within **subject-specific** contexts or more broadly. For instance, "self-efficacy" can be defined broadly as part of "life skills", but PISA has measured "self-efficacy in math", ICCS has measured "students' political internal efficacy" (Schulz et al., 2008). These measurement tools are designed differently for different subjects/ themes or for a different scope even though the construct "self-efficacy" is considered the same.

51. Therefore, the main purpose of the construct analysis is not to seek consensus on which construct belongs to which sub-domain due to the reasons above and oftentimes different disciplines use different categorisations and definitions for the same construct. Thus, the construct exercise seeks to review research that shows how such constructs are inter-related with other constructs across/ within domains as well as to build knowledge on these constructs with regards to (a) "relevance for 2030", (b) impactful, (c) malleable and (d) measurable. Therefore, the suggested list of constructs is tentative but necessary to frame the discussions.

3.2.1 Cognitive and eta-cognitive Skills for 2030

- Basic cognitive skills/ general cognitive skills

- Critical thinking skills

- Creative thinking

- Problem-solving skills

- Reflective thinking / meta-leaning skills

- Responsible decision making

- Self-awareness

- Perspective taking and cognitive flexibility (e.g. think outside the box)

- Other executive functions

3.2.2 Social and emotional skills for 2030

- Engagement (communicate, cooperate, and collaborate)

- Self-regulation/ self-control

- Self-efficacy / positive self-orientation

- Entrepreneurship / enterprising/ initiative-taking

- Mindfulness

- Empathy

- Compassion

- Aesthetic engagement

- Conflict resolution

- Motivation (e.g. to learn, to contribute to others, to contribute to society etc.)

- Leadership

- Resilience[30] / stress resistance

- Goal orientation and completion (including grit, persistence, self-orientation)

- Risk management (risk taking and assessment)

3.2.3 Physical and practical skills towards 2030

- General kinaesthetic skills / motor skills (the ability to coordinate movement)

- Manual dexterity and skills related to classroom skills or learning strategies (e.g. general ICT skills)

- Manual dexterity and skills related to arts, music and physical education for 2030 (e.g. crafting, drawing, performing drama, playing music instruments, singing, playing sports, physical exercises)

- Manual dexterity skills related to certain professions and sectors in the changing context (e.g. operating new machines, dentistry or giving remote operations with technology)

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30 . It is important to note that there is a misconception of "resilience" in some countries. Resilience is not about "enduring" (e.g. militaristic "toughness" or staying up late to finish a project); it's about "recharging" (e.g. trying hard, stopping, recovering, and trying again; being stronger such as by turning adversities into opportunities).

- Manual dexterity and skills related to use advanced tools for everyday life (e.g. riding a bike, giving first-aid skills)

3.1. Attitudes & Values domain

52. Attitudes are defined as 'a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour' (Eagly & Chaigen, 1993, p.1). Further, it suggests that attitudes can be formed and changed and are generally considered much less enduring and stable than other personality attributes such as traits or temperament (Schwartz & Bohner, 2001). Attitudes are considered separate from and more malleable than personality tendencies and values. Furthermore, recent work in education and youth development programs has suggested that the order of how curriculum (knowledge, skills, attitudes and values[31]) is implemented is key. If youth first develop a positive attitude toward learning, and they value of what is being taught, and then develop the skills needed to be successful at learning something, they are much more likely to learn and understand the knowledge that is being imparted. Thus, reversing the concept from KSA to ASK is suggested, to represent the effective process of first developing attitudes that are conducive for learning, developing skills that enable learning, and then, finally, acquiring and integrating knowledge (Proctor, 2016).

53. Values are guiding principles by which particular beliefs, behaviours and actions are judged to be good or desirable (adapted from Halstead and Taylor, 2000). Values develop through a process of exploration and experimentation, where young people make sense of their experiences and refine what they believe (CCSR, 2015). The OECD PIACC adopts the definition of personal values as "core conceptions of the desirable within every individual and society" (Rokeach, 1979). A similar definition is, "conceptions of the desirable that influence the way people select action and evaluate events" (Schwartz and Bilsky, 1987, p. 550).

54. Based on commonly identified attitudes and values in research, national curricula, as well as in international assessment frameworks, preliminary list of constructstic includes:

- Adaptability / Flexibility / adjustment / agility

- Open mindset (to others, new ideas, new experiences)

- Curiosity

- Global mindset

- Growth mindset

- Hope (related to optimism, self-efficacy)

- Pro-activeness

- Gratitude

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31. Knowledge, skills, and attitudes, or KSA's are often considered the essential components of educational programs, and are based upon Bloom's taxonomy that includes cognitive (knowledge), psychomotor (skills) and affective (attitudes) learning (Bloom, 1956).

- Identity / spiritual identity

- Respect for self, others (including cultural diversity)

- Trust (in self, others, institutions)

- Responsibility (including locus of control)

- Benevolence / Altruism/ Motivation to contribute to others and common goods

- Ecological sustainability

- Justice

- Integrity

- Equality / Equity

Curricula examples

55. Embedding "values" is increasingly recognized as integral part of the curriculum, while the selection and scope of values may vary across countries due to its national and local contexts. The Singaporean curriculum highlights that the competencies are to be learned in the context of Singaporean core values at the centre of learning, i.e. **respect, resilience, responsibility, and harmony**, not that learning the 21st century competencies in a vacuum (Box X). They are expected to be embedded into every subject. At the same time, a particular subject "character and citizenship education" is included in the syllabus where concrete guiding principles are provided along with the examples of contents, pedagogies, and assessments.

56. Scotland aims to embed values "**wisdom, justice, compassion and integrity**" in its curriculum. While Scotland broadly defines its core values, Estonia specifies what students should value as "general human values" (i.e. **honesty, compassion, respect for life, justice, human dignity, respect for self and others**) and "social values" values (i.e. **liberty, democracy, respect for mother tongue and culture, patriotism, cultural diversity, tolerance, environmental sustainability, rule of law, solidarity, responsibility and gender equality**) and both core values and general competences are to be embedded into learning areas and cross-curricular topics Furthermore, the importance of "values and morals" are articulated by being suggested as one of the cross-curricular topics (Box X). The Education 2030 curriculum analysis is currently reviewing the types of values commonly addressed across participating countries [EDU/EDPC/RD(2016)40].

BOX 5: SINGAPORE'S NEW NATIONAL LEARNING FRAMEWORK

Singapore's *21st Century Competencies Framework* puts the primary emphasis on **values**: respect, responsibility, resilience, integrity, care and harmony.

Values shape a young person's **social and emotional** competencies, such as self and social awareness, relationship management, self -management and responsible decision-making. They also inform **21st century competencies** such as Civic Literacy, Global Awareness & Cross Cultural Skills, Critical and Inventive Thinking Skills and Communication, Collaboration and Information Skills. These competencies have been developed to address globalisation, changing demographics, technological advances and other trends. Together, they are intended to nurture a confident person, a self-directed learner, a concerned citizen and an active contributor.

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57. Discussions in the international community also mirror the increasing importance of fostering common values through education for individuals' better life and for societal well-being. The OECD is committed to support countries to recover **trust** in institutions and among communities, which will require a stronger effort to develop core values of citizenship at school (**tolerance, respect, fairness, personal and social responsibility, integrity and self-awareness**) towards more inclusive, fair, and sustainable economies and societies."[32]

58. The values included in the OECD Global Competency Framework include "valuing **human dignity**" and "valuing **cultural diversity**" as guiding principles for attitudes such as "**Openness towards people from other cultures**", "**Respect for cultural otherness**", "**Global-mindedness**", and "**Responsibility**".[33] The SDG 4.7 includes Global Citizenship Education, which suggests to foster an attitude supported by an

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32 . The OECD's Proposal for Consolidation and Further Transformation of the OECD"21 x 21"
https://www.oecd.org/about/secretary-general/21-for-21-A-Proposal-for-Consolidation-and-Further-Transformation-of-the-OECD.pdf

33 . https://www.oecd.org/pisa/aboutpisa/Global-competency-for-an-inclusive-world.pdf

understanding of multiple levels of identity; knowledge of global issues and universal values such as "justice", "equality", "dignity" and "respect", as well as aptitudes for "networking and interacting with people of different backgrounds, origins, cultures and perspectives", and behavioural capacities to "act collaboratively and responsibly to find global solutions for global challenges", and to "strive for the collective good".[34] The Council of Europe Competence Framework for Democratic Culture includes values (i.e. valuing "human dignity and human rights", "cultural diversity", "democracy, justice, fairness, equality and the rule of law") as well as attitudes (i.e. "openness to cultural otherness and other beliefs", "world views and practices", "respect", "civic-mindedness", "responsibility", "self-efficacy", and "tolerance of ambiguity").

59. The G7 Summit Leaders' Declaration 2016 recognises the importance of common values and principles for all humanity (e.g. "Freedom", "Democracy and respect for privacy", "Human rights", "Human dignity") at this time of the rise of violent extremism, terrorist attacks and other challenges. The values articulated in the United Nations instruments (e.g. the Universal Declaration of Human Rights; the UN Charter; the UN Millennium Declaration) include "Equality", "Freedom", "Justice", "Dignity", "Solidarity", "Tolerance", "Peace & Security", and "Sustainable Development".

3. Competency development cycle for shaping the future

60. The transversal competencies for 2030, embedded in curriculum, should be developed in a continuous, spiral cycle. A "competent human" is self-sufficient, able to focus attention and plan, has a future orientation, is adaptable to change, has a sense of responsibility, has a belief that one can have an effect and is capable of commitment (Haste, 2001). This calls for continuous **"reflection-anticipation-action"**, which makes a learning spiral in which students can develop the key competencies for 2030 in a lifelong and life-wide learning perspective, i.e. to learn to navigate through real-life challenges, going beyond the classroom and schools, and take the future into account when deciding and acting.

Figure: Competencies Development– draft visual, work-in-progress-
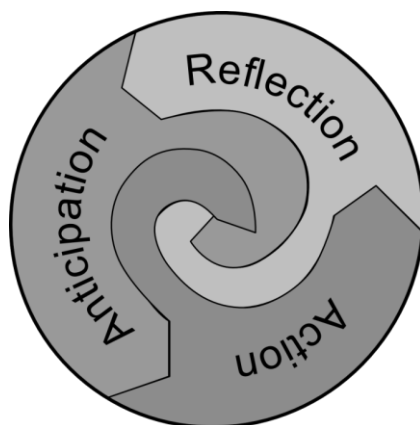
3.1 Reflection

61. The first and fundamental grounding for a competent human is **reflective practice**. Many scholars and experts agree that dealing flexibly with novelty, change, diversity and uncertainty in a responsible way calls for the development of reflectivity (reflective practice), a higher level of mental complexity that implies the combined use of self-directed and self-motivated skills, creative thinking skills, encompassing

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34 . http://unesdoc.unesco.org/images/0022/002277/227729E.pdf

appropriate motivation, ethical, social and behavioral components along with cognitive and intellectual components (Canto-Sperber & Dupuy, 2001). Underlying is **an "objectivation" process**: What was "subject" in our knowing becomes "object" (Kegan, 2001).

62. It is about the ability to take a critical stance when deciding, choosing and acting, such as, by stepping back from the assumed, known, apparent, and accepted, reflecting upon a given situation from other, different perspectives, and looking beyond the immediate situation to the long-term and indirect effects of one's decisions and actions. This competence level requires individuals to reach a level of social maturity that allows them to adopt different perspectives, make independent judgments and take responsibility for their decisions and actions. Social maturity includes one's *awareness* or *consciousness*; awareness of the past (memory), present (mindfulness) and future (including optimism) determine the extent to which we are reflective, can anticipate, and are willing to take actions. This active and reflective approach is based on a model of human development in which individuals are able to integrate increasing levels of complexity into their thinking and actions.

3.2 Anticipation

63. The second element that is critical for the competencies needed in 2030 in light of complex demands is the internal competence structure, covering a wide range of psychosocial attributes. This will include not only the knowledge base (such as history, environmental changes, current demographic changes, current news events) and cognitive skills (such as analytical or critical thinking skills, or general problem-solving skills) to anticipate the future needs or the consequences of today's action on future, but also social and behavioural components such as motivation, emotions, and values. Without this, students will have difficulty to cope with challenges and opportunities of the world. They should feel excitement about real life and the future, instead of believing that the future is already determined by nature or by others outside of their control. The importance of **"student agency"** is being prevalent in today's and tomorrow's curriculum and teaching practices.

3.3 Action

64. A third element critical for the competencies needed in 2030 is the willingness to and the required competence level for individuals to take responsible actions. Underlying is an **action competence model** that is holistic and dynamic in the sense that it relates complex demands, psychosocial prerequisites and context into a complex system that makes competent performance or **effective action** possible.[35] Agency implies that one can have active interaction with one's environment, including active involvement in one's own learning and development (Haste, 2001). Committed individuals and groups have changed the future before. Everyone has the power to change their future and the future of those around them if they commit to a vision of preferred future, and act (Bishop, 2016), instead of feeling that "there is not much we can do to change the future or to achieve a more preferable future than would ordinarily occur". [36] It is important to note that non-committed individuals are also – through every single decision and action – *unavoidably* shaping their future and our collective quality of life such as through unconscious or often times ignorant decision and action. Costs of no action can be considerable when such actions lead to unintended or long-lasting negative consequences.

Curricula examples: lifelong, self-directed learner

65. How can this competency development cycle be translated into curriculum? In the rapidly changing world where new knowledge and tools are created at a faster rate of change than ever and where learning

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35 For an in depth elaboration on the concept of competence see Weinert (2001)
36 . See EDU/EDPC/RD(2016)38

opportunities exist anywhere anytime, making this learning spiral an everyday habit is of critical importance so that all students can be **a lifelong, self-directed learner**. This has been increasingly articulated in the visions statements in current curriculum of many OECD countries. For example, the New Zealand curriculum includes, in its vision statements, that they envision that their children and students be "confident, connected, actively involved, lifelong learners", who are "literate and numerate", "critical and creative thinkers", "active seekers, users, and creators of knowledge", and "informed decision makers". It further aligns key competencies from early years, school and tertiary education, taking into account the age-appropriateness (Box 6).

BOX 6: New Zealand conceptual framework coherent across early childhood, school, and tertiary education

Towards the clear vision set out by curriculum (i.e. confident, connected, actively involved lifelong learners), New Zealand also sets outs a framework to indicate how the selected key competencies at different learning stages are aligned, in accordance with the developmentally age-appropriateness.

For example, a sense of "belonging" in early years will be developed into "participating and contributing" in school curriculum, and furthered into "operating in social groups" at the tertiary level.

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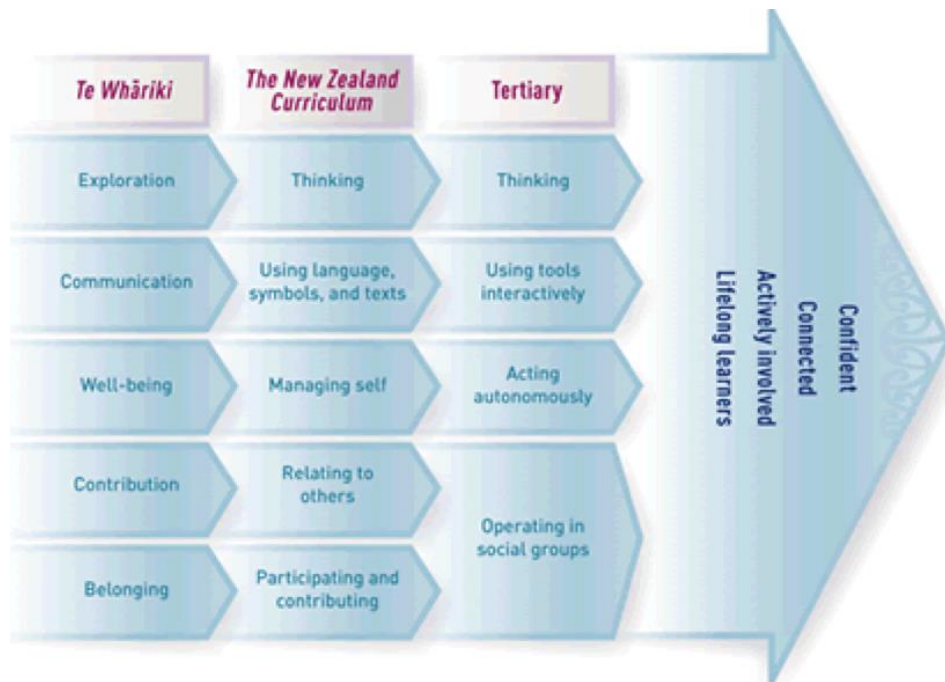
66. Countries also articulate the importance of lifelong learning by highlighting the core competencies, general capabilities or curricular competencies which will play a key role in becoming a lifelong learner, in particular, metacognitive skills such as **learning strategies, self-direction, self-reflection, self-management, academic mindset**. The New Zealand curriculum suggests "**student agency**" in classroom practices[37], e.g.

- students setting, managing, & reflecting on learning goals and processes (metacognition) through online learning journals

- students leading discussions with parents & teachers over reporting progress (3 way conferencing)

- students being responsible for cross-curricular homework tasks

- students contributing to school & classroom decision-making e.g. contexts for learning

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37 . Presentation of the New Zealand Curriculum – The Journey So Far – by Sonia Glogowski, Acting Project Manager, NZ Curriculum, Ministry of Education.

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