26th June, 2015
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REVIEW STUDY OECD DUTCH CURRICULUM: ‘#ONDERWIJS 2032’

Paper #4: BASIC PRINCIPLES FOR CURRICULUM REDESIGN

The rapid increase in which technological change is occurring around the globe creates a world that is volatile, uncertain, complex and ambiguous and thus significantly more unpredictable. Exponential progress in technology increases the gap between education and human learning. The speed and nature of change contributes to an unpredictable context and requires an increased capability for humans to engage with complex challenges, an agility in adapting to new situations, along with a diverse set of individual abilities and competencies, an increased collaboration between cultures, and better harmony within and between countries- all towards the goal of sustainable humanity.

According to economists and educational institutions, systems are falling behind the curve and by 2030 students will have to acquire a new set of knowledge, skills and competencies in order to be prepared for the future. There is a growing consensus that education systems need to change in order to respond to changing demands. One of the most effective ways to address it is through curricula which lie at the centre of the education systems.

The last major changes (for example the introduction of physics, chemistry, biology, dropping latin and greek, etc) to curriculum were effected in the first decades of the 20th century as a response to the sudden growth in societal and human capital needs. As the world of the early 21st century bears little resemblance to that of the early 20th century, education curricula are overdue for a major redesign, emphasizing breadth and depth of abilities, for versatility.

For the purpose of this paper, we will discuss the reason for curriculum redesign, address what is curriculum and provide an overview of the key principles for building a high-quality curriculum. Some of the curriculum models will be reviewed which can serve as potential guidelines during the curriculum design process. At the same time, the key dimensions of 21st century curriculum will be outlined together with an overview of innovative learning environments that support their development. Learning sciences should inform design of every curriculum, thus the summary informed by research will be reviewed. Lastly, we will look at the curriculum reform processes in Scotland, Singapore and Finland which can serve as useful examples for the curriculum reform in the Netherlands.

CURRICULUM POLICIES AND STRATEGIES

All around the world, curricular efforts are bumping into the intractable problem of teaching for 21st century competencies which often ends up overlaid onto existing standards and assessments to little effectiveness as it is difficult to integrate them. Historical inertia has
been so far a large deciding factor when it comes to curriculum design. This makes it hard for systems to innovate and thus generally preclude them from:

1) The careful removal of obsolete topics to make room for new, relevant, and interdisciplinary areas of knowledge (entrepreneurship, citizenship, wellness, etc.)

2) Deeper learning to occur via innovative pedagogical techniques such as projects, case studies, etc.

At the policy level, most countries face political life-cycle instabilities that conspire to keep the system risk-averse:

- Personnel changes: at both ministerial and staff level (rotations)
- Political pressures: the need to balance competing interests and pressures: voters/parents, unions and businesses.

At the workgroup level decisions are made by subject matter experts beholden to human dynamics:

- In relative isolation from the demands of the real world (and the users of discipline itself)
- With often the same players that set up the earlier standards and thus little fresh thinking occurs
- With an eye towards global consensus, which makes it very hard to escape the groupthink and also stalemates courageous changes

Additional potential risks might include:

- Accumulative approach leading to overload: adding more without deleting anything
- Fragmentation: considering different spheres of life as independent from one another
- Incremental change: minor changes without questioning the coherence of the whole

**WHAT IS CURRICULUM?**

Curriculum is the main instrument that articulates development aspirations and education goals and provides a platform for a robust dialogue between development specialists, policymakers and educationists. Curriculum provides structure for the provision of quality learning and articulates both competencies necessary for lifelong learning and the competencies needed for holistic development. Curriculum is among the most effective tools for operationalizing lifelong learning policies, as it ensures vertical and horizontal articulation across levels, sub-sectors and learning settings and provisions (UNESCO, IBE position paper, p.7).

The rationale for an evolving conception of curriculum and the reason for thinking differently about curriculum than we have in the past are:

- A changing society requires adaptive students
- Changing views of intelligence and giftedness
• The need to explore similarities and differences in curriculum for all learners and for gifted learners
• A need to honor the past by building to the future

Curriculum is situated in time but condenses and transcends different time horizons. It spins from the history and learning of the past, through the present and reflects on current concerns and priorities, towards a future and prepares students for successful entry in adult life, lifelong career and personal life. Curricula are also situated in the local and regional context but aims at higher, universal levels of validity.

Effective curriculum should mainly focus on desired learning outcomes. What students need to know and be able to do should be the main driving force that determines the curriculum, not the inputs (disciplines, subjects). Learning sciences should inform curriculum redesign ensuring learning is both challenging and enjoyable, balancing depth and breadth of learning experiences and allowing for personalization based on talents and motivation. Pedagogy is also important component of a well-designed curriculum. Curriculum should balance central objectives with local autonomy of schools and teachers where schools have a high degree of freedom in deciding on the curriculum. At the same time, curriculum should respect and empower teachers’ professionalism in making informed professional decisions.

**KEY PRINCIPLES FOR CURRICULUM DEVELOPMENT**

High quality curriculum should be relevant, driven by meaningful outcomes, flexible to account for student differences and challenging. Seven principles below synthesize common areas of agreement among key general education curriculum experts and professional organizations in order to develop High-Quality General Education Curriculum (Hockett, 2009):

• **Principle 1:** Curriculum uses concepts in its design, organization and implementation.
Concepts allow for coherence in curriculum and focus on nature of the subjects, drawing connections and seeing patterns, avoiding learning in silos. It supports construction of new knowledge.

- **Principle 2**: Curriculum should be rooted in ideas, principles, and skills essential to the respective disciplines
  - Recognizes what is core and fundamental to the discipline. It goes beyond the content and the classroom, and focuses on what's useful for the kids to know, in a meaningful and engaging way.
  - Reacts to changes in the discipline – new discoveries/methodologies etc.

- **Principle 3**: Curriculum is flexible in response to student differences
  - Developmentally appropriate

- **Principle 4**: Curriculum moves students toward mastery by promoting discipline-based skills and cognitive and metacognitive processes associated with expertise, and progressively developing expertise across grade levels
  - Designed to build/nurture expertise, integrates metacognitive skills in process – thinking about thinking (build in processes for students to self-evaluate and reflect to allow for thinking about areas of improvement, strengths, etc)

- **Principle 5**: Curriculum should emphasize student outcomes, in particular, the goal of deep understanding
  - Curriculum driven by clear student outcomes

- **Principle 6**: Curriculum should be relevant and engaging to students
  - Connects to real life
  - Giving students choice, build on students’ interests, use interactive strategies

- **Principle 7**: Curriculum should be integrative and maintain a balance between breadth and depth
  - Curriculum should be interdisciplinary and integrate topics, concepts, skills, and knowledge from different content standards, different school subjects (e.g., science and history), as well as different areas of intellectual and social life. Intra-disciplinary connections in curriculum show relationships between or within different subject-matter area knowledge, principles, and skills

In summary, high quality curriculum should include the elements listed below:

- Clear focus on the essential facts, understandings, and skills that professionals in that discipline value most
- Provide opportunities for students to develop in-depth understanding
- Organized to ensure that all student tasks are aligned with the goals of in-depth understanding
- Coherent (organized, unified, sensible) to the student
- Mentally and affectively engaging to the learner
- Recognizes and supports the need of each learner to make sense of ideas and information, reconstructing older understandings with new ones
- Is joyful-or at least satisfying
- Provides choices for the learner
• Allows meaningful collaboration

OVERVIEW OF CURRICULUM MODELS

A curriculum model is a format for curriculum design developed to meet unique needs, contexts, goals and purposes. To address specific goals and purposes, curriculum developers design or reconfigure one or more curriculum components (Hockett, 2009).

Figure 1.

The curriculum model provides direction and serves as a framework to organize the curriculum. It is used as a strong theoretical foundation underpinned by research that gives curriculum credibility. There are several curriculum models, but for the purpose of this paper we will look at the Parallel Curriculum Model and Integrated Curriculum Model to review guidelines of exemplary curriculum design for all learners; including those who are highly able and offers suggestions for how general education and gifted education can create curricular conditions conducive to educating all learners well (Hockett, 2009).

Parallel Curriculum Model

The Parallel Curriculum Model (PCM) is unique because it is a set of four interrelated yet parallel designs for organizing curriculum: Core, Connections, Practice, and Identity (Figure 2).

The Core Curriculum

This parallel reflects the essential nature of a discipline as experts in that discipline conceive and practice the discipline. It is the foundational curriculum that establishes a rich
framework of a discipline’s key information, skills, concepts, and principles. It is the starting point for all of the parallels in this model.

The Curriculum of Connections
This parallel expands on the Core Curriculum by guiding students to make connections of key concepts and principles within or across disciplines, across times, across cultures or places, or in some combination of those elements.

The Curriculum of Practice
This parallel guides learners in understanding and applying the facts, concepts, principles, and methodologies of the discipline in ways that encourage student growth toward expertise in the discipline. Its purpose is to help students function with increasing skill and confidence in a discipline as professionals and scholars would function.

The Curriculum of Identity
Curriculum developed according to this parallel guides students in coming to understand their own strengths, preferences, values, and commitment by using the key concepts, principles, and skills of contributors and professionals in a field of study. The goal of this parallel is to help students gain a better understanding of both the discipline and themselves.

There are an infinite number of ways to draw on the parallels. They can be used to revise or design tasks, lessons, or units. With a revised or designed unit “in hand,” a teacher can move back and forth across one, some, or all parallels in a single unit. Furthermore, a classroom teacher can use the parallels separately for different purposes, or teachers can work collectively—within grade levels, across grade levels, or across subjects—to use the parallels to support the learning for all, some, or a few students. Additionally, teachers can use the parallels to modify learning opportunities for students who need something beyond the grade-level curriculum.

The driving force behind decision about when and how to use the parallels stem from teacher expertise, the learning goals, and, most important, the students themselves. Teacher draws on the parallels to make curriculum more meaningful, emotive, powerful, engaging, and more likely to energetically advance the abilities and talents of students. The
PCM holds the power to help students and teachers “see the whole” of what they are learning. It is the hope that curriculum based on this model will optimize student learning and enhance the likelihood that all students will lead productive and fulfilling lives (Tomlinson, et al., 2008).

**Integrated Curriculum Model**

An integrated curriculum is described as one that connects different areas of study by cutting across subject-matter lines and emphasizing unifying concepts. Integration focuses on making connections for students, allowing them to engage in relevant, meaningful activities that can be connected to real life. It is highly enriched, broad-based curriculum with the components of differentiation and customization. Students not only connect and create more real world connections in integrated classrooms, but they are also more actively engaged. Creating an integrated curriculum means that teachers are charged with having to create challenging, fun, meaningful tasks that help students connect to information. Integration helps to achieve retention and engagement in classrooms, which yields higher mastery of content standards. An additional benefit of an integrated curriculum is the ability for students to see skills multiple times. Instead of teaching comprehension strategies in just reading, teaching those strategies across multiple disciplines can give students an opportunity to see and implement it more often. The repetition of the skills being taught creates a higher level of understanding and retention of information for students in the classroom.

Although it is designed specifically for gifted-learner characteristics of precocity, intensity, and complexity (VanTassel-Baska, 1995), the ICM emphasizes several components that general education also emphasizes in its indicators of high-quality curriculum. First, the ICM employs a concept-based approach. These concepts are consistent among, and in some cases across, units in various disciplines. Abstractions like systems, change, and cause and effect make complex ideas and content more accessible to students while pushing their thinking to integrated forms. In the development of expertise, ICM equips students with discipline- relevant knowledge and skills, uses methods and materials authentic to the discipline, and incorporates instruction in metacognition.

ICM units within and across grade levels maintain consistency by emphasizing similar processes, themes, and applications. Students revisit and use models of thinking- and research-process methods from unit to unit. Learning outcomes for ICM-based units are clearly delineated. Most activities and lessons are designed toward solving a real-world problem or creating a product. Pre- and post-assessments measure student growth relative to the unit goals. The problem-based learning approach of the science curriculum gives students chances to apply what they have learned to a situation that approximates real-world challenges related to the unit’s science concepts.

**KEY ASPECTS OF 21st CENTURY CURRICULUM**

Curriculum models are helpful formats for curriculum design but the content of curriculum with identified goals and learning outcomes is even more important for curriculum development. At the moment, countries are confronted by an array of new needs and requests such:

- tweaking traditional areas of knowledge (e.g. new topics in Mathematics)
• new areas of knowledge (e.g. robotics, entrepreneurship…)
• paying more attention to skill development (e.g. creativity…)
• a renewed call for character qualities (e.g. curiosity, resilience, etc.)
• more time for student self-reflection (e.g. metacognitive activities)

without the means nor mechanism to decide on their relative importance and how they all interplay. Therefore, a framework of key curricula components is essential to guide thinking about the key dimensions of an education. It is not equivalent to standards but it is a useful tool that helps to make sense of all of the dimensions of an education, and can be a useful guideline for each country to decide how to adapt their standards/curricula accordingly. Center for Curriculum Redesign (CCR) tabulated, analysed and synthesized twenty-six frameworks from around the world and found out that there is a general agreement on the need for four dimensions:

• Knowing (Knowledge – what you know & understand)
• Doing (Skills – how you use what you know)
• Behaving (Character - how you behave in the world)
• Reflecting (Meta-Learning - how you think/learn)

<table>
<thead>
<tr>
<th>CCR Skills for Innovation</th>
<th>OECD DeSeCo</th>
<th>EU Reference Framework Key Competencies</th>
<th>Hewlett Foundation Deeper Learning Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Subject-based skills</td>
<td>Using tools interactively</td>
<td>• Communication in foreign languages; • Mathematical, science and technology • Digital competence • Entrepreneurship</td>
</tr>
<tr>
<td>Skills</td>
<td>Skills in thinking and creativity</td>
<td>Interacting in heterogeneous groups</td>
<td>Communication in the mother tongue</td>
</tr>
<tr>
<td>Character</td>
<td>Behavioral and social skills; also “social and emotional skills”</td>
<td>Acting autonomously</td>
<td>• Social and civic competences • Sense of initiative • Cultural awareness and expression</td>
</tr>
<tr>
<td>Meta-Learning</td>
<td>Reflectiveness</td>
<td>Learning to learn</td>
<td>Learning to learn</td>
</tr>
</tbody>
</table>

Source: Centre for Curriculum Redesign

**Knowledge**: Essential, but more relevance is required. Students’ lack of motivation, and often disengagement, reflects the inability of education systems to connect the content to real-world relevance. Relevance is also critically important to economic and societal needs, not only to satisfy students’ wishes. Thus, there is a profound need to rethink the significance and applicability of what is taught, and simultaneously to strike better balance between the conceptual and practical within the curricula. Traditional subjects (Math, Language, etc..) are of course essential, but must be augmented by modern disciplines (such as Entrepreneurship, ICT literacy, etc..). Tough choices must be made about what to pare back in order to allow for more appropriate areas of focus.
Skills: Higher-order skills such as creativity and critical thinking and ways of working such as communication and collaboration are essential for deeply learning knowledge as well as for demonstrating understanding through performance. Yet, curriculum is already overburdened with content, which makes it harder for students to acquire (and for teachers to teach) these skills. There is a reasonable global consensus that these skills are important, but in spite of this consensus, there are two major barriers which prevent building deep dives into curriculum:

- Overwhelming amounts of prescribed content for each school year allows little time to address skills
- Lack of training for educators in combining knowledge and skills in robust pedagogies and deeper learning experiences.

“Character”: In order to face an increasingly challenging world and to benefit civil and civic society, character qualities, also referred to as social and emotional skills (SES), are essential. Global challenges (such as climate change, financial instability, personal privacy) and societal and personal challenges (such as violence, immigration, health outcomes) have made it evident that future generations need to develop competencies to respond to and address these challenges. Public support is generally widespread, many countries have supportive laws/codes and education philosophers have made a case for it through history. Thus, character development should become an intrinsic part of the education system.

Metacognition: The best hedge against continuous changes is metacognition, the awareness of one’s own learning and cognitive ability. It is essential for activating transference, building expertise, and establishing lifelong learning habits. Metacognition for learning, often called ‘learning to learn,’ involves the learner reflecting on all three of the key learning processes: gaining knowledge and understanding, building skills, and developing character qualities. There seems to be a general agreement from the main frameworks about its importance.

Figure 3.
Making it all work together: a curriculum design matrix

In order to redesign curriculum embedding the four dimensions described above, we propose the development of a matrix such as:

<table>
<thead>
<tr>
<th>Skills</th>
<th>Character</th>
<th>Metacognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>Critical thinking</td>
<td>Communication</td>
</tr>
<tr>
<td>Communication</td>
<td>Collaboration</td>
<td>Mindfulness</td>
</tr>
<tr>
<td>Curiosity</td>
<td>Courage</td>
<td>Resilience</td>
</tr>
<tr>
<td>Ethics</td>
<td>Leadership</td>
<td></td>
</tr>
</tbody>
</table>

This matrix needs to be developed for every stage of the students’ learning. Each discipline, to the extent possible, is responsible for teaching the four dimensions, knowing well that some of them may require an out-of-school component (CCR, 2015).

FUNDAMENTALS OF LEARNING

In order to accomplish desired learning outcomes, it is essential to take into the consideration the learning sciences which are importantly enriching our understanding of how people learn best. Classrooms, schools, and education systems cannot change overnight, but neither is it possible to accept arrangements that are in direct contrast to what makes for good learning. If instead today’s schools were designed to leverage knowledge about learning, tomorrow’s generation will more likely become the powerful learners, skilled workers, and engaged citizens we want them to be. The OECD project on Innovative Learning Environments has sought to provide material to help do this. It has put together a volume called The Nature of Learning: Using Research to Inspire Practice, which is based on extensive research findings on different aspects of learning and applications. It provides a powerful knowledge base for the design of learning environments for the 21st century (OECD, 2012). The research was synthesized to create seven transversal “principles” to guide the development of learning environments for the 21st century.

**Principle 1: Learners are at the centre** - The learning environment recognises learners as its core participants, encourages their active engagement, and develops in them an understanding of their own activity as learners.

- Learners are the central players in the environment, and therefore activities centre on their cognition and growth.
- Learning activities allow students to construct their learning through engagement and active exploration.
- This calls for a mix of pedagogies, which include guided and action approaches, as well as...
co-operative, inquiry-based, and service learning.

- The environment aims to develop “self-regulated learners”, who:
  - develop meta-cognitive skills,
  - monitor, evaluate, and optimise the acquisition and use of knowledge,
  - regulate one’s emotions and motivations during the learning process,
  - manage study time well, and
  - set higher specific and personal goals, and are able to monitor them.

**Principle 2: The social nature of learning** - The learning environment is founded on the social nature of learning and actively encourages well-organised cooperative learning.

- Neuroscience confirms that we learn through social interaction—the organisation of learning should be highly social.
- Co-operative group work, appropriately organised and structured, has demonstrated very clear benefits for achievement as well as for behavioural and affective outcomes. Co-operative methods work for all types of students because, done well, they push learners of all abilities.
- Personal research and self-study are naturally also important, and the opportunities for autonomous learning should grow as students mature.
- Learning results from the dynamic interplay of emotion, motivation, and cognition, and these are inextricably intertwined.
- Positive beliefs about oneself as a learner in general and in a particular subject represent a core component for deep understanding and “adaptive competence”.
- Emotions still tend to be regarded as “soft” and so their importance, though accorded in theory, are much more difficult to be recognised in practice.
- Attention to motivations by all those involved, including the students, is about making the learning first and foremost more effective, not more enjoyable (though better still if it is both).

**Principle 3: Emotions are integral to learning** - The learning professionals within the learning environment are highly attuned to the learners’ motivations and the key role of emotions in achievement.

- Learning results from the dynamic interplay of emotion, motivation, and cognition, and these are inextricably intertwined.
- Positive beliefs about oneself as a learner in general and in a particular subject represent a core component for deep understanding and “adaptive competence”.
- Emotions still tend to be regarded as “soft” and so their importance, though accorded in theory, are much more difficult to be recognised in practice.
- Attention to motivations by all those involved, including the students, is about making the learning first and foremost more effective, not more enjoyable (though better still if it is both).

**Principle 4: Recognizing individual differences** - The learning environment is acutely sensitive to the individual differences among the learners in it, including their prior knowledge.

- Students differ in many ways fundamental to learning: prior knowledge, ability, conceptions of learning, learning styles and strategies, interest, motivation, self-efficacy beliefs, and emotion; they differ also in socio-environmental terms such as linguistic, cultural and social backgrounds.
- Prior knowledge – on which students vary substantially – is highly influential for how well each individual learns.
- Learning environments need the adaptability to reflect these individual and patterned
differences in ways that are sustainable both for the individual learners and for the work of the group as a whole. Moving away from “one size fits all” may well be a challenge.

**Principle 5: Stretching all students** - The learning environment devises programmes that demand hard work and challenge from all but without excessive overload.

- Being sensitive to individual differences and needs also means being challenging enough to reach above their existing level and capacity; at the same time, no one should be allowed to coast for any significant amount of time.
- High-achieving students can help lower-achieving students, which helps stretch all learners.
- This underscores the need to avoid overload and de-motivating regimes based on grind, fear, and excessive pressure—not just for humanistic reasons but because these are not consistent with the cognitive and motivational evidence of effective learning.

**Principle 6: Assessment for learning** - The learning environment operates with clarity of expectations using assessment strategies consistent with these expectations; there is a strong emphasis on formative feedback to support learning.

- The learning environment needs to be very clear about what is expected, what learners are doing, and why. Otherwise, motivation decreases, students are less able to fit discrete activities into larger knowledge frameworks, and they are less likely to become self-regulated learners.
- Formative assessment should be substantial, regular, and provide meaningful feedback; as well as feeding back to the individual learners, this knowledge should be used constantly to shape direction and practice in the learning environment.

**Principle 7: Building horizontal connections** - The learning environment strongly promotes “horizontal connectedness” across areas of knowledge and subjects as well as to the community and the wider world.

- A key feature of learning is that complex knowledge structures are built up by organising more basic pieces of knowledge in a hierarchical way. If well-constructed, such structures provide understanding that can transfer to new situations—a critical competency in the 21st century.
- The ability for learners to see connections and “horizontal connectedness” is also important between the formal learning environment and the wider environment and society. The “authentic learning” this promotes also fosters deeper understanding.

**INNOVATIVE LEARNING ENVIRONMENT**

Laying a foundation that cultivates lifelong, self-directed learning starts at an early age. While much of the discourse on lifelong learning focuses on the later stages of life, it is actually the knowledge, skills, values, and attitudes acquired during the early life-stages that provide the foundation for the lifelong learning habit. Schools are pivotal organisations for laying such foundations (OECD, 2013). The same is true for the teaching of 21st century competencies. The pedagogic model underlying too many schools and classrooms is still aimed at preparing students for the industrial economy, and is very different from the activities at the heart of knowledge-based organisations, societies, and economies. The
curricula, learning experiences and overall environment must be centred on fostering the skills and mind-set of self-directed lifelong learning, with 21st century competencies strategically interwoven through learning experiences (OECD, 2012). Strong focus on engagement, regulation, social learning, emotions, individual differentiation, feedback and holistic connectedness find strong echo in the innovative learning environments described below.

**Cooperative Learning**
In essence, students work together and are responsible for one another’s learning as well as their own. Emphasising thinking and increasing higher-order learning, it has a range of educational benefits, including an alternative to ability grouping and as a way to prepare students for an increasingly collaborative work force.

For example, in the Community of Learners Network (British Columbia, Canada) circle discussions are referred to as Literature Circles, Information Circles and Numeracy Circles, and generally comprise of 4-8 students. Students from the various groups gather to share the information they have acquired, with a teacher facilitating the sharing of information, prompting in-depth thinking, offering feedback, and high lightening key elements of the topic under discussion.

**Learning with Technology**
Learner-centred approaches to technology-enabled learning can empower learners and leverage good learning experiences that would not have otherwise been possible. Technology also often offers valuable tools for other building blocks in effective learning environments, including personalisation, cooperative learning, managing formative assessment, and many inquiry-based methods. Tech-rich is a way to characterise learning environments that make ample use of digital resources and have invested heavily in their technological infrastructure.

For example, in the Internet Classroom, Kkofia Loka Primary School in Slovenia, the school uses a virtual learning environment (“e-classroom”) to individualize student learning. Students work individually or in pairs on teacher-designed materials and tests in order to reach goals and objectives of the official curriculum. The digital system allows teachers to keep track of when individual pupils have performed which activities in the e-classroom, and classrooms are open to parents who wish to observe the activities.

**Inquiry-based Approaches**
Students need opportunities to develop skills such as communication, collaboration, creativity, and deep thinking. One important context to do this is through inquiry-based approaches in complex, meaningful projects that require sustained engagement, collaboration, research, management of resources, and development of an ambitious performance or product. Relevant approaches include:

- Project-based learning
- Problem-based learning
- Learning through design

For example, at the CEIP Andalucia, Seville in Spain project-based research methodology is mainly for work on Knowledge of the Environment. Teamwork, both among students and
teachers, is promoted, encouraging an active student role in learning, increasing motivation towards curricular contents and implementing them in the comprehensive way. Project work is an organized and flexible process which consists of a series of activities structured into different stages: 1) brainstorming and planning 2) search 3) structuring and communication 4) evaluation.

Service Learning
Education engages students in community service that is integrated with the learning objectives of core academic curricula. This experiential approach is premised on providing students with contextualised learning experiences based on authentic, real-world situations in their communities.
For example, The Education for Democratic Citizenship Programme, Colegio Guadalupe, aims to develop learners’ potential to participate actively in society and to become self-directed individuals, while building and integrating knowledge in diverse content areas from real experiences. Students identify problems that affect their own community and then work on generating, implementing and assessing possible solutions to them.

Formative Assessment
Formative evaluation guides learners to better outcomes by providing feedback that continually informs the learner, the teacher, and the learning itself. It is targeted towards three key questions:

1. Where are the learners in their learning?
2. Where are the learners going?
3. What needs to be done to get them there?

For example, in Norway some schools introduced continuous evaluations. Both internal and external ongoing experiences and new issues are dealt with along the way. There are surveys covering both pupils and parents. Digital evaluation system is available for parents to evaluate and liaise with teachers, together with pupils.

Home-School Partnerships
The home is our first, and highly influential, learning environment, so that building connections between the home and school is vital to learner success. This includes proactively involving families in their children’s schooling and extending personalised invitations to them to become involved. Afterschool programmes and extra-curricular activities also offer ways to connect with the family and provide greater connection between home and school.
For example, in the GTVS Europaschule in Austria, parents contribute not only to the planning and administration of classes and the parents ‘association, but also to a cultural café, where they (especially those from a migrant background) and teachers can meet once a month outside school to discuss relevant topics and to form valuable social networks between representatives of different cultures.

CASE STUDIES OF COUNTRIES’ CURRICULUM REDESIGN

Scotland: Curriculum for Excellence (CfE)
After the creation of the Scottish Parliament in 1999, Scottish Ministers were aware that the world and society was rapidly changing as a result of globalisation, trade, the speed and complexity of information sharing and the internet. The Government realized it is essential not to only keep up with these changes but also anticipate the future as far as possible. Consequently, in 2002 the Scottish Executive set up a “National Debate on Education” to invite comments from a variety of stakeholders to consult and develop its long term education policy. Over 20,000 people took part and in general expressed confidence in Scotland’s education system but concerns were raised that the secondary curriculum was dominated by academic subjects and too exam-focused. Responses endorsed the view that education had to change in order to prepare young people to live and work successfully in the 21st century. The National Debate suggested that change was needed to:

- Reduce overcrowding and cluttering in the curriculum
- Make learning more active, challenging and enjoyable
- Make better connections between the stages in the curriculum from 3 to 18
- Achieve better balance between academic and vocational subjects
- Broaden the range of learning experience for young people
- Equip young people with core skills
- Make sure that approaches to assessment and certification support learning
- Offer more choices to meet the needs of individual young people

In response, the Government established a Curriculum Review Group, with membership from central and local government, Higher and Further Education, schools and parent groups. It was tasked to identify the purposes of education and the principles for the design of the curriculum. It produced a Curriculum for Excellence which was endorsed by the Minister of Education and received positively by stakeholders. It was agreed that the Government will set long-term objectives and that teachers could have considerable autonomy about how to achieve them. The aspiration of the curriculum was to enable young people to develop their capacities as:

- Successful learners
- Confident individuals
- Effective contributors
- Responsible citizens

The seven principles on which the curriculum was constructed were: 1. challenge and enjoyment, 2. personalization and choice, 3. Depth, 4. Relevance, 5. Breadth, 6. Progression, 7. Coherence. A Curriculum Review Programme Board was established to advise Ministers, and steer the work towards a new curriculum. Following a period of consultation, research and a review of existing curriculum guidance, they published A Curriculum for Excellence. It is one of the most ambitious programmes of educational reform ever undertaken in Scotland focusing on what the Scottish education system should be delivering for children and young people from ages 3 to 18. The attributes of Curriculum for Excellence are that every child and young person should:

- know they are valued and will be supported to become a successful learner, an effective contributor, a confident individual and a responsible citizen - the “four capacities”
experience a traditionally broad Scottish curriculum that develops skills for learning, skills for life and skills for work, with a sustained focus on literacy and numeracy, that encourages an active, healthy and environmentally sustainable lifestyle and builds an appreciation of Scotland and its place in the world

benefit from learning and teaching that strikes a balance between equipping them with the skills for passing exams and skills for learning, skills for life and skills for work

benefit from an assessment system that supports the curriculum rather than leads it

experience a smooth transition into qualifications and

be entitled to support towards entering a positive post-school destination.

One of the main components of CfE that describes the main objectives and scope of CfE is: *A Framework for Learning and Teaching*. It sets out five entitlements that every learner should receive. These are:

- A coherent curriculum
- A Broad General Education
- A Senior Phase where the student can continue to develop the four capacities and also obtain qualifications
- Being able to develop skills for learning, skills for life and skills for work, with a continuous focus on literacy and numeracy and health and wellbeing
- To receive personal support to enable them to gain as much as possible from the opportunities which CfE can provide and receive support in moving into a positive and sustained destination.

CfE is a broad curriculum framework that provides a coherent curriculum, assessment and qualifications approach for all children and young people from the ages 3 to 18. Unlike previous curriculum approaches, it doesn’t provide a centralised model that teachers can take and apply across Scotland. Rather than a specified national curriculum, the broad national framework set out in the *CfE Experiences and Outcomes* structured within the curriculum areas provides a new landscape for curriculum planning, where schools, practitioners and their partners have local flexibilities to design the curriculum around the needs and aspirations of the individual. CfE is designed to promote holistic achievement, as defined by the attributes and capabilities of the four capacities. This is an important shift of emphasis as it ensures that a high priority is given to the development and wellbeing of the whole person through the curriculum, rather than only narrow academic aspects. It is intended to enable local decisions to guide personalisation and choice so that learning needs can be met in a much more tailored way than previously. CfE promotes blended learning that balances the need for knowledge, understanding and skills. This approach is intended to develop skills, including higher order thinking skills and apply them in the contexts that are relevant and meaningful in the modern world. The framework is designed to ensure that achievement pathways have strong progression in learning through ages 3-18 as children and young people build on their learning in the Broad General Education phase (ages 3-15) in order to specialise in working towards taking National Qualifications in the Senior Phase (ages 16-18). In accordance with the principles, the important aims are to:

- focus on making learning more engaging and relevant to the real world
- offer learning which provides both depth and breadth
- increase personalisation and learners' choice within the framework
- raise standards for all
- enable young people to improve their confidence, skills, achievement and attainment
- provide more flexibility, giving teachers greater professional freedom
- offer a simple and effective structure of qualifications and assessment
- provide skills for work options, with appropriate recognition for vocational learning and broader achievement
- develop literacy and numeracy, and other essential skills for life and work
- provide for subject teaching alongside cross-subject and inter-disciplinary activity.

CfE places literacy, numeracy and health and wellbeing at the centre of all learning, in all curriculum areas, as the responsibility of all practitioners. It emphasises the important contribution to learning of the ethos and life of the school as a community, of the ways in which learning is organised and of inter-disciplinary work. It also encourages recognition of young people’s personal achievements within and beyond school, through partnerships which support learning, e.g. with business, arts and community organisations, in addition to school-based learning.

**National standards and expectations**

National standards for learning and progression for the whole curriculum are described in the Experiences and Outcomes. It recognises the importance of the quality and nature of the learning experience in developing attributes and capabilities, and in achieving active engagement, motivation and depth of learning. Experiences and outcomes apply to the totality of experiences which are planned for children and young people, including the life and ethos of the school, inter-disciplinary studies and opportunities for personal achievement, as well as learning in curriculum areas and subjects. The eight curriculum areas covered are:

1. Expressive Arts
2. Languages and Literacy
3. Religious and Moral Education
4. Social Studies
5. Mathematics and Numeracy
6. Sciences
7. Technologies
8. Health and Wellbeing

The Experiences and Outcomes are presented within a framework of levels for ages. The eight curriculum areas are set out in linear development which describes progress in learning through the levels. The introductory statements within the framework provide broad aims of learning within the curriculum area and act as a reference points for planning. However, in designing programmes of learnings, teachers are encouraged to cluster these experiences and outcomes in ways that give rich and deep learning experiences rather than seeing each experience and outcomes as an independent learning context. Staff can also extend the development of skills, attributes and capabilities and the development of
understanding into more challenging and high levels of performance within and across levels.

National support is promoting organisation of learning around ‘significant aspects of learning’ which are helpful as teachers plan for coherent groups of experiences and outcomes to meet local needs and circumstances and to address personalisation and choice. These significant aspects of learning refer to the core learning against which learners’ progress can be compared periodically and support holistic judgements about progress and achievement of levels. For assessment purposes, significant aspects of learning are intended to give a greater confidence that children and young people are making strong progress in learning through the Broad General Education phase.

**Policy Developments**

The significant focus of the Scottish Government is to faithfully develop and implement CfE in order to achieve the best outcomes for learners. To that end, the Learning Directorate in the Scottish Government (SG) oversees policies to ensure sufficient accommodation and human resources to deliver the school system, as well as sponsoring the work of Education Scotland. However, there are a number of areas where, within the framework of CfE, a number of specific policies are promoted. These include:

- **Action on literacy and numeracy**: Literacy Action Plan was published by the Scottish Government in October 2010, and a Standing Literacy Commission was set up to oversee delivery of the relevant commitments.
- Activity on **Raising Attainment** and equity.
- The Learning Directorate are also taking forward the following specific curriculum developments:
  - Creating the conditions in schools in which every child will learn two languages in addition to their mother tongue, to be rolled out by 2020
  - Developing the concept of One Planet schools, including action on professional standards for sustainability education and leadership in schools on environmental and global citizenship issues as well as outdoor learning and children’s rights. This is referred to as Learning for Sustainability (LfS) and
  - Developing the concept of “Scottish Studies” in our schools, creating a distinct strand of learning focused on Scotland

**Implementation process of Curriculum for Excellence**

From the start, the development of Curriculum for Excellence has been characterised by a significant amount of consultation and engagement. Ministers wanted the developments to be informed by professional and public dialogue. There has also been strong ongoing cross-party political support throughout the process. CfE was intended to offer flexibility in the way in which teaching and learning is managed, provided the four capacities are delivered. The approach to curriculum change within CfE has been based on engagement of practitioners and other stakeholders in a continuous process of professional learning and development. The CfE curriculum model is intended to allow for depth of learning across a range of subjects up to General Education Phase, in order to provide a strong grounding for
progression into the Senior Phase, and opportunity for a more varied and flexible set of learning experiences and qualifications which reflect an individual learner’s strengths and interests. Many schools and Local Authorities have made effective use of this increased freedom and have innovated, developing more effective teaching practice. Indeed, it has been a central aim of CfE to improve overall attainment, both national and locally, partly by providing Local Authorities and schools with the freedom to innovate locally.

Singapore: “Teach Less, Learn More”

Singapore’s recent education reforms have brought sweeping changes to the country’s approach to teaching, learning, and the curriculum, in an effort to promote a more “student-centred, values-centric” education. In an effort to implement a more nurturing education system, there are two key steps in the current shift towards a student-centric, values-driven education:

- Laying out the vision of student-centric, values-driven education
- Putting in place and implementing the many pieces of strategies and structures to systemically drive and support this vision.

By 2004-5, Singapore’s government had more or less identified the kind of pedagogical framework it wanted to work towards, and called it Teach Less, Learn More. This framework urged teachers to focus on the “quality” of learning and the incorporation of technology into classrooms and not just the “quantity” of learning and exam preparation. The vision of student-centric, values-driven education is primarily about nurturing the children of Singapore to be equipped with the core skills and competencies to be economically productive and to flourish in the VUCA (volatile, uncertain, complex and ambiguous) world, as well as to be imbued with the Singaporean values to be successful, moral and committed citizens of the country. To unpack that vision, the ministry has spelled out four attributes:

1. “Every Student, an Engaged Learner”;
2. “Every School, a Good School”;
3. “Every Teacher, a Caring Educator”;
4. “Every Parent, a Supportive Partner.”

On the strategies and initiatives, numerous of them have been announced to comprehensively and systemically drive and support the vision. For example, the 21CC framework and the new Character and Citizenship curriculum have been launched and efforts have been made to embed them into the practices and culture of the school. Yet another example is the abolition of school league tables and modification of the school achievement awards to change the incentives for schools to focus more sharply on holistic development of the students, and blunt the focus on academic achievements. A quote in the Minister of Education’s recent work plan seminar 2013 speech illustrates the seriousness of the ministry in its efforts to strengthen the focus on holistic development: “To deal with the demands of a VUCA environment, good grades in school are not enough. In fact they might not even be relevant.” This is the reason why the Ministry of Education is making a shift to rebalance the education system towards holistic education and values-centricity. Nurturing the students with the right competencies and core skills, as well as the
right personal, moral and citizenship values is a national imperative. The different strands of values “are intertwined and are critical for the success of the individual and society” (Heng, 2011). Ensuring Singapore’s continued relevance and competitiveness in the new economic landscape in a globalized world is always on the minds of the policy makers. In the face of modernization and globalization, it is also imperative that the Singaporean identity and way of life is preserved.

Vision
The vision of the Ministry of Education (MOE) is “Thinking Schools, Learning Nation”. To prepare a generation of thinking and committed citizens who are capable of contributing towards Singapore’s continued growth and prosperity, the Ministry is constantly revisiting its curriculum to ensure that the skills and knowledge taught in schools meet the challenges of the 21st century.

Singapore education system
The Singapore education system aims to provide students with a holistic and broad-based education. Given the multi-cultural and multi-racial characteristics of Singapore, the bilingual policy is a key feature of the Singapore education system. Under the bilingual policy, every student learns English which is the common working language. Students also learn their mother tongue language (Chinese, Malay or Tamil), to help them retain their ethnic identity, culture, heritage and values.

Holistic development of students
The Desired Outcomes of Education (DOE) articulates the importance of holistically nurturing students to become well-rounded persons - morally, intellectually, physically, socially and aesthetically through a set of eight core skills and values.

The eight core skills and values are:
1. Character Development
2. Self-Management Skills
3. Social and Cooperative Skills
4. Literacy and Numeracy
5. Communication Skills
6. Information Skills
7. Thinking Skills and Creativity
8. Knowledge Application Skills

It is envisioned that students at the end of primary education, secondary education and pre-university would have acquired these eight core skills and values.

Broad based curriculum
Singapore’s national curriculum aims to nurture each child to his full potential, to discover his talents and to develop in him a passion for life-long learning. Students go through a broad range of experiences to develop the skills and values that they will need for life. The broad-based curriculum imparts literacy, numeracy, bilingualism, the sciences, humanities, aesthetics, physical education, civics and moral education and National Education.
Over the years, the curriculum has been reviewed to address the need for a common set of values, knowledge and competencies and at the same time, allow differentiation to meet the needs of students with different talents and abilities. To enable students to achieve the learning outcomes of each specific subject and the DOE, three broad areas are considered: curriculum, teaching strategies and assessment.

Teaching Strategies

Classroom management, pedagogy

Content

Aims & objectives, skills & competencies, values & attitudes

Assessment

Formative and summative

Students’ Learning Experiences

The content states the aims and objectives, the skills and competencies required for the syllabi and the values and attitudes that the syllabi hope to impart to the students. Appropriate teaching strategies are designed for successful classroom delivery of the syllabi, using effective teaching and learning materials. To evaluate if students have learned what has been taught, students are tested through formative and summative assessments.

Curriculum Framework

Every child in Singapore has the opportunity to undergo at least ten years of basic education. This comprises 6 years of compulsory primary education and 4 years of secondary education. Students have to sit for major national examinations at the end of their primary and secondary education. Beyond secondary education, students move on to post-secondary institutions based on their eligibility and choice.

Primary School Curriculum

At the primary level, students go through a six-year course aimed at giving them a good grasp of the English Language, Mother Tongue Language and Mathematics. In addition, students learn Science, Social Studies, Civics & Moral Education, Music, Art & Crafts, Health Education and Physical Education. At the end of Primary 6, students take the Primary School Leaving Examination (PSLE), which assesses their suitability for secondary education and places them in the appropriate secondary school course that will match their learning pace, ability and inclinations.

Secondary School Curriculum
As MOE focuses on a broad-based education, all students are offered a combination of core and elective subjects at the secondary level. The core subjects include English Language, Mother Tongue or Higher Mother Tongue, Mathematics, Combined Humanities, a Science subject. The choice of electives includes a humanities subject, a science subject and literature in Chinese. The basket of core subjects ensures that students experience a broad-based and balanced education while the electives cater to a range of student interests and abilities.

To inculcate a global outlook in students, MOE offers foreign languages in French, German, and Japanese to students who have the ability and the aptitude. This allows students to tap on opportunities beyond Singapore’s shores. MOE has expanded the range of foreign languages to include Arabic and Bahasa Indonesia. For selected students who do not take Chinese or Malay as a second language, MOE also provide opportunities for them to offer these languages though the Chinese or Malay (Special Programme). Going forward, MOE will provide opportunities for more students to learn conversational Chinese and Malay.

The secondary school curriculum is differentiated according to the abilities and interest of the students. Students undergo one of four courses designed to match their learning abilities and interests.

Looking ahead

Singapore’s national curriculum will continue to provide students with a strong foundation in the core areas of literacy, numeracy and scientific literacy as these core areas provide the foundation for future learning. The study of the humanities will be reinforced as the humanities have the value in developing students’ ability to understand and appreciate different perspectives, as well as nurture cultural sensitivities and civic awareness.

The national curriculum structures will be loosened through curriculum decentralisation to allow schools to customise their curriculum to meet their students’ needs. Certain subjects can be redesigned as a set of learning outcomes to allow schools room to innovate without having to complete a syllabus. This allows schools greater autonomy and flexibility over curriculum time allocation. More time will be free up from curriculum for students to develop skills and attitudes. MOE will allow flexibility of integration of subjects to develop new understanding.

Pedagogy

A diverse range of pedagogies will continue to be promoted to meet diverse student needs, enhance their learning experiences and engage them in learning. There are certain pedagogies such as inquiry-based and experiential learning that will be more actively promoted to enable students to find deeper meaning in their learning. MOE will provide support for schools to use a wider variety of pedagogies through pedagogy packages to support syllabus delivery. Teachers will also be encouraged to share pedagogical expertise through participation in learning communities. At various MOE and external platforms, schools’ efforts and successes in the use of engaging and effective pedagogy will be showcased.
Assessment

The national assessment will be retained to maintain standards and for benchmarking purposes. Assessment modes, formats and items will be reviewed regularly. Greater focus will be placed on the role of assessment in learning through formative assessment. Teachers’ assessment literacy and expertise in the use of assessment strategies will be built up through the provision of guides and exemplars in curriculum documents and teaching packages. Assessment items will be situated in authentic contexts and the greater use of alternative assessment modes to better prepare students to handle complexities and ambiguous problems that they are likely to face in the future.

Professional Development of Teachers

Just as the curriculum evolves to include new learnings that students need for the future, professional development of teachers becomes critical, as teachers have to strive to equip themselves with the necessary competencies to guide and facilitate students’ learning. To meet the needs of distinct groups of students according to their ability and learning styles, teachers will be equipped with skills of differentiated instruction. Teachers will also continue to develop their capacity to leverage technology to enhance students’ learning experiences. Teachers will also develop their abilities to become reflective practitioners, able to enhance their teaching through research and using research findings to improve classroom practices.

Finland: Competence-based curriculum

Despite being ranked as one of the top performing system in the world, Finland is currently ongoing curriculum reform in order to respond changing demands. The significance of education for the entire cohort is high in Finland, as skills are Finland’s most vital capital in a global operating environment that is undergoing a rapid change and development. For this reason, the significance of competence and learning in future society, motivation and teaching were selected as the flagship themes of the project Basic education of the future.

The efforts for curriculum reform were originated by the National Board of Education which wondered why students are less satisfied with their school experience and why test results have been sliding. In 2003, Finnish students had the second highest scores of the 65 countries covered by the PISA testing program run by the Organization of Economic Cooperation and Development, but by 2012 they were in 12th place. So the board came up with the idea of bringing the curriculum closer to phenomena that students are likely to encounter in real life and find ways to make students feel more motivated and enjoy school.

The working groups appointed for this project, which consisted of 45 experts of various fields, produced descriptions of the current status of teaching, the phenomena associated with it, and the reasons for the deteriorating learning outcomes. The working groups put together proposals that will support a society based on education and contribute to updating Finnish competence levels to meet the needs of the 21st century. The efforts of
the working groups were coordinated by a broad-based steering group chaired by Minister of Education and Communications Krista Kiuru. The steering group contained representatives of the eight parliamentary parties, the Trade Union of Education in Finland, the Association of Finnish Principals, the Association of Finnish Independent Education Employers, the Trade Union for the Public and Welfare Sectors, the Association of Finnish Local and Regional Authorities, the Finnish Parents’ League, and the Office of the Ombudsman for Children and secondary level student organisations.

Curriculum reform 2016
The national core curriculum for pre-primary and basic education was renewed by the end of 2014 and new local curricula that are based on this core curriculum should be prepared by the beginning of school year 2016-2017. The process involves all stakeholders, particularly education providers and education personnel. The aim is to encourage also parents and pupils to participate in the process.

Principles of planning the core curriculum
In outlining the national core curriculum, these perspectives are considered for all dimensions (objectives, content and practices):

- Building on strengths
- Sustainable future as an objective
- Equality in all areas of education
- Meeting pupils’ needs and supporting wellbeing and other prerequisites for learning
- Coherence and consistency of basic education, learning continuum
- International aspects and global responsibility
- Awareness of languages and cultures, regarding them as richness
- Technological change, working with knowledge
- Challenges for broad-based, multimodal literacy

Learning and competencies in a changing society
The conception of learning that takes into account the latest research is considered during the process of curriculum development. Specifically:

- Integrating the learning environment, working practices, and teaching, and defining the support for learning and for pupil assessment
- Defining subject goals and content, where the 'how?' aspect is emphasised
- In strengthening objectives and in defining broad-based competence across subject groups
- Objectives of broad-based competence in supporting the efforts to integrate teaching
- Competence is described as challenges set out for school work and teaching, not directly as learning objectives for pupils

Broad-based competence in the draft core curriculum
The curriculum emphasises the importance of competence which can be defined in following way:
- Broad-based competence refers to the total of knowledge, skills, values, attitudes, capacity and will
- Competence supports the identity formation of pupils and creates an ability to lead a more sustainable life
- Competence development requires cooperation across school subjects and dealing with the questions pupils find meaningful
- Descriptions of competence have been derived from the government decree and defined in relation to the changes in the operating environment

Dimensions of broad-based competence include:

The Finnish curriculum reform scheduled for next year doesn’t abolish subjects but it does call on schools to introduce periods in which so called “phenomenon-based” interdisciplinary teaching will be done. Finish system will promote new way of thinking among students when they can use similar skill sets to build widely divergent stocks of knowledge. It is important to underline two fundamental peculiarities of the Finnish education system in order to see the real picture. First, education governance is highly decentralised, giving Finland’s 320 municipalities significant amount of freedom to arrange schooling according to the local circumstances. Central government issues legislation, tops up local funding of schools, and provides a guiding framework for what schools should teach and how. Second, Finland’s National Curriculum Framework is a loose common standard that steers curriculum planning at the level of the municipalities and their schools. It leaves educators freedom to find the best ways to offer good teaching and learning to all children. Therefore, practices vary from school to school and are often customized to local needs and situations. Experimentation can help develop alternatives to the traditional learning system.

**Phenomenon-based learning**

The next big reform taking place in Finland is the introduction of a new National Curriculum Framework (NCF), due to come into effect in August 2016. It is a binding document that sets
the overall goals of schooling, describes the principles of teaching and learning, and provides the guidelines for special education, well-being, support services and student assessment in schools. The concept of “phenomenon-based” teaching – a move away from “subjects” and towards inter-disciplinary topics – will have a central place in the new NCF. Integration of subjects and a holistic approach to teaching and learning are not new in Finland. Since the 1980s, Finnish schools have experimented with this approach and it has been part of the culture of teaching in many Finnish schools since then. This new reform will bring more changes to Finnish middle-school subject teachers who have traditionally worked more on their own subjects than together with their peers in school.

Schools decide the programme
What will change in 2016 is that all basic schools for 7- to 16-year-olds must have at least one extended period of multi-disciplinary, phenomenon-based teaching and learning in their curricula. The length of this period is to be decided by schools themselves. Helsinki, the nation’s capital and largest local school system, has decided to require two such yearly periods that must include all subjects and all students in every school in town. In most basic schools in other parts of Finland students will probably have one “project” when they study some of their traditional subjects in a holistic manner. Finland’s education authorities now insist that all schools must spend time on integration and phenomenon-based teaching despite the fact that Finnish students’ test scores have been declining in the most recent international tests. Educators in Finland think, rightly so, that schools should teach what young people need in their lives rather than try to bring national test scores back to where they were. What Finnish youth need more than before are more integrated knowledge and skills about real world issues. An integrated approach enhances teacher collaboration in schools and makes learning more meaningful to students.

Students involved in lesson design
One of the most surprising aspect of the reforms is that students must be involved in the planning of phenomenon-based study periods and that they must have voice in assessing what they have learned from it. Some teachers in Finland see this current reform as a threat and the wrong way to improve teaching and learning in schools. Other teachers think that breaking down the dominance of traditional subjects and isolation of teaching is an opportunity to more fundamental change in schools. While some schools will seize the opportunity to redesign teaching and learning with non-traditional forms using the NCF 2016 as a guide, others will choose more moderate ways. In any case, teaching subjects will continue in one way or the other in most Finland’s basic schools for now. In grades 1-9, pupil’s minimum amount of lessons is 222 redesigned in the following way:

- More lesson hours to:
  - Social studies (+2)
  - Physical education (+2)
  - Music and visual arts (+1+1)

- Integrated environmental studies in grades 1-6, including:
  - Biology, Geography, Physics, Chemistry, Health studies
• More varied language program:
  • State supports financially municipalities in providing extra language studies

**Key learnings**

In a summary, all the curriculum reforms above originated from an understanding that world is changing and the education system needs to respond in order to meet current demands. The process of curriculum redesign usually involved broad range of stakeholders from various areas of expertise to ensure objective and well-versed process. The main idea for redesigning the curriculum was to develop students holistically, equip them with core skills for 21st century and make learning more relevant, engaging and joyful in order to develop them into lifelong learners. This is reflected in a shifted emphasis towards development of social-emotional skills and competencies rather than merely focusing on knowledge and assessments. Another common theme among reviewed education systems is their transition towards more decentralized systems. For example, Scotland and Finland are providing broad national framework which gives guidelines on key outcomes but provides more autonomy to schools and teachers on how to accomplish them. They have increased freedom to innovate and develop effective teaching practices in order to achieve learning outcomes outlined in the framework. However, striking a proper balance between authoritative, accessible advice and allowing teachers capacity to grow and flourish is an important issue. The pedagogy is shifting towards interdisciplinary-approach with ‘concepts’ at its core. Therefore, professional development of teachers is essential part of the curriculum reform. Teachers need to learn how to personalize and differentiate their teaching based on the student needs as well how to effectively integrate concepts from various subjects and use technology in the classroom. Assessment is another important component of curriculum reform. It is essential to place assessment as part of learning and teaching, and recognize that exams are driven by system requirement and not the other way around. The aim should be to place more emphasis on teachers’ assessment judgments for senior student outcomes rather than just external exams.
Conclusion

The world that is significantly more unpredictable requires an increased capability for people to engage with complex challenges. To prepare students for a rapidly changing society, education systems must respond. Redesign of the curriculum, which lies at the core of the education system, is an effective way to accomplish that. Adapting to 21st century needs means redesigning the curriculum for all the dimensions of an education: knowledge, skills, character and metacognition. It is necessary to revisit each dimension and their interplay in order to develop students holistically and equip them with relevant competencies needed for the labour market, societal and personal development outcomes. Curriculum design principles as well as learning sciences principles should serve as guidelines while developing the curriculum. The pedagogic model should also contribute to teaching of 21st century competencies using approaches that enhance innovative learning environment.
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