FINLAND FUTURES RESEARCH CENTRE • UNIVERSITY OF TURKU

SHAPING EDUCATION AND 21ST CENTURY SKILLS WITH FUTURES LITERACY

The Futures of Teacher Education in Kenya 2050

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ABOUT THIS REPORT

Finland Futures Research Centre (FFRC) of the University of Turku collaborates with the University of Helsinki, University of Nairobi, and Strathmore University in the Research-based and Future-oriented Curriculum Review and Development for Teacher Education (REFORD) project (2022–2024). The project is co-funded by the Global Innovation Network for Teaching and Learning (GINTL).

The project aims to support Kenyan students to acquire skills needed in 21st century life and the labour market. In Kenya, the Competency Based Curriculum (CBC) was launched for basic education in 2017. The current focus is on rolling out CBC in higher education institutions (HEIs) and teacher education. In addition, the research conducted under REFORD aims to specifically strengthen the design of curricula, improve the quality of delivery of teacher preparation programmes, and thus, strengthen the preparedness of the higher education institutions to implement the CBC.

In this report, authored by the FFRC, the authors examine data uncovered during the project from the perspective of futures studies. The analysis contributes to debates on the needs of students and teachers, 21st century competences, synergies and interruptions in CBC between educational levels, standard of teacher education and university programmes in relation to futures phenomena. The report highlights ways in which the constantly evolving futures horizon is affecting the landscape of Kenyan educational policy and provides information on how education in the Global South can meet aspirations of sustainability.

The outputs of the report support the achievement of Sustainable Development Goal (SDG) 4 to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. To sustain our 21st century lives, educational structures need to provide learners with relevant competences, models, and a mindset that recognizes the various future opportunities and challenges we are facing.

Acknowledgments

Our research team would like to thank all the project partners for their collaboration as well as extend our special thanks to the University of Nairobi colleagues as well as **Cynthia Mkabane** and **David Amiani** for their assistance in organising the futures workshop in Nairobi, Kenya. We would also like to thank **Emilia Soramäki** for assistance in transcribing the workshop results.

FOREWORD

It is my great pleasure to introduce this insightful book on futures and foresight in education. My own journey into this fascinating field began with an immersive experience at the Finland Futures Research Centre at the University of Turku. During the experience, my colleagues and I were introduced to the various activities and applications of futures research in education, energy and climate change. Since then, I have tried to incorporate the various futures tools and methods into envisaging the future competencies and professions in Kenya. This was further strengthened through the REFORD project which aimed at assisting faculty to embed research and future oriented thinking into the new competency-based curriculum (CBC).

The REFORD project incorporated the twin aspects of futures and foresight thinking into streamlining and assisting in the process of curriculum change. Different avenues were provided in which stakeholders in the higher education ecosystem engaged and envisioned the possible futures given the changes happening within the country and globally. The insights developed on the push and pull factors were important in discussing what universities need to do in terms of preparing their institutional structures and processes. Faculty from the University of Nairobi, Strathmore University and University of Helsinki were provided further glimpses into the field of futures research through the Reimagining Teachers and Teacher Education for Our Futures Conference in June 2024. The Faculty from the Finland Futures Research Centre (FFRC) were instrumental in organizing critical workshops and providing an avenue for our involvement in the field of foresight and futures research. I extend my gratitude to the whole FFRC team, especially Joni Karjalainen, Juha Kaskinen, Sari Miettinen and Osku Haapasaari.

Indeed, futures and foresight thinking are vital since they provide an avenue for preparing us for new challenges. Furthermore, incorporating futures thinking not only in curricula but also in policy and strategy enables education institutions to be well equipped to survive in volatile, uncertain, complex and ambiguous (VUCA) environments. It is my belief that the experiences provided in this book will not only shed light on the different activities undertaken by the partners but also inspire a broader adoption of futures thinking – not only as a method but as a way of life.

Enjoy the read!

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1. INTRODUCTION

Research-based and Future-oriented Curriculum Review and Development for Teacher Education (REFORD) project (2022–2024) is about the futures of education. The future of education is of concern to everyone. At the same time, the landscape of futures is constantly changing in front of us.

The role of Finland Futures Research Centre (FFRC) in the project is three-fold (Fig. 1):

1. To introduce futures studies, as an academic discipline, and some of its key principles
2. To pilot participatory futures methods with the partner higher educational institutions (HEIs); and
3. To assist in scanning the futures landscape of education in Kenya.

The principles of futures studies have been applied throughout the foresight part of the project, informing of the way that research activities and the futures workshop in Nairobi, the main event of the project, were organised.

The primary contribution of the Centre in the REFORD project **is to introduce futures studies, and its key principles, to collaborate with Kenyan partner HEIs**, which have limited previous exposure to the field, and assist familiarisation in some of the guiding principles, as "The Foundations of Futures Studies". In fact, these foundations are laid in two books by Wendell Bell (1997a; 1997b), carrying the namesake. As a timeless symbol of the evolution of the field, over two volumes, the scientific principles, in its academic form and richness, are described, allowing anyone to begin to explore the landscape of future(s). Futures studies is an interdisciplinary scientific field, an academic niche, which also assists in opening alternatives.

Secondly, for the Centre, **the project is an opportunity to pilot and practice futures studies, in a participatory manner, as a Finnish-Kenyan partnership**. Futures studies as a field offers an interdisciplinary approach that assists in the systematic study of the evolving landscape of education and learning, which can be applied into multiple contexts. A rich history and a range of examples show how futures studies and foresight can be practiced anywhere in the world (see also: Masini 2006; Kuosa 2011; Son 2015; Hines 2020). Alongside futures studies, foresight offers specific methods and tools, which can be deployed and adapted to study a wide range of futures (Poli 2024; see also: Kuusi et al. 2017).

Thirdly, as a partnership, the Centre **can assist in scanning the futures horizon where, while the Kenyan higher education institutes are key experts and aware of specific limitations and challenges** in the context of a changing educational landscape, as well as trends relevant in East Africa, this can help widen the frame of teacher education in Kenya. There are local, regional and global educational trends, as driving (and hindering) forces that are shaping the future(s) of education (e.g. Karjalainen 2022a). In turn, the role of the two Finnish universities is their dedicated knowledge, as concerns the evolving field of education. When it comes to the role of pioneers for shaping the future (Heinonen 2017; Heinonen & Karjalainen 2019; Heinonen et al. 2022), in light of its high performance in early 2000s OECD PISA tests, Finland has sometimes been considered as a global forerunner in the field of education, even if there should be caution of overtly simplified views (Thrupp et al. 2023)[1].

[1] Interestingly, in futures studies, studying pioneers is one approach of exploring potential transformations. In interpreting and speculating with their early seeds, and of how they could come about, and of the directions that they could take, from a normative stance, one also may generate information what should be done to better gear up to changes that are expected in the horizon (Heinonen & Karjalainen 2019).

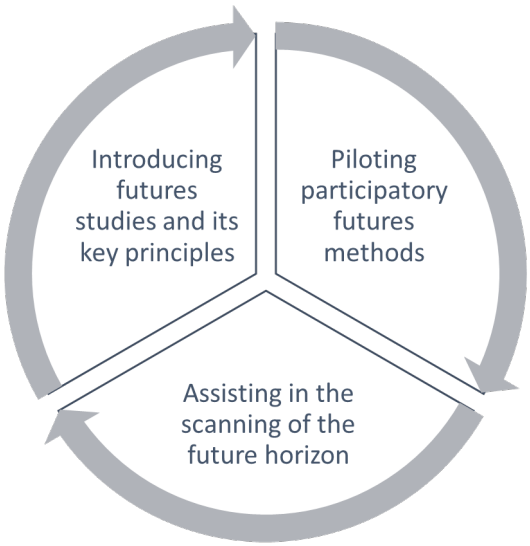

Fig 1. *Role of Finland Futures Research Centre in the Research-based and Future-oriented Curriculum Review and Development for Teacher Education (REFORD) project.*

The aim of this report

The aim of the project, and the documentation offered in this report, is to stimulate on-going curriculum reform, and inform the roll-out of Competence-Based Curriculum (CBC) in Kenyan higher educational institutes. The roll-out of CBC in HEIs, foreseen in the future across educational levels in Kenya, is an effort to enhance the quality of education. At the same time in Kenya, changes in implementing a new curriculum, just like learning, must be seen as a process, occurring amidst wider changes. Generally, the learning paradigm is shifting from teacher-centred to more student-centred, participatory learning. Of late, the digital transformation, which was boosted by the COVID-19 pandemic through the digitisation of classes and materials, has enhanced access to learning. In parallel, it also has brought with it new tasks and work for educators in Kenya, posing new demands on the role of teachers to facilitate learning, affecting teacher education, and related specialists.

In the daily work of educators, teaching plans and curricula express change. For the learners, the virtual, physical, or mental "classroom" reflect the wider society, or alternatively, allow escaping it. In the future, as our societies are changing, what kind of education would we imagine seeing, what kinds of learners will there be, and what kinds of structures we imagine them to be surrounded with? Overall, higher education (UNESCO 2024) as well as knowledge systems in Africa are evolving (e.g. Mwagiru 2016). A key enabler in futures studies is **to offer tools that help us to elevate our agency for the future that we would like to realise**. Through evidence generated in the project, and published in this report, the aim is to provide examples of how research that is oriented at the future (and its alternatives, as "futures") can inform and affect also policy, programmes and practices to be more futures-oriented.

As a reminder, exploring the future is not about prediction ("there is no crystal ball!"), instead, it can be approached as the systematic study of futures. All of us, with our actions, are shaping the future at every moment. **In fact, there are many alternative futures: possible, probable, and preferable**. Often, when we think about the future, and choose a narrow focus, we only think of probable futures. What does this mean in practice? It can mean that ideas about the future can be quite simplistic, straightforward, and even naive (if, for instance, assessed retrospectively in the future that now may still seem far away). One of the detriments in overlooking what is possible (and most importantly, preferable!) is ignorance to change. Given that the stakes are quite high in terms of shaping educational futures that are preferable, how to then stimulate transformative debates, as well as the exchange of cutting-edge ideas? Over the course of this project, with the foresight work, our purpose is to enrich on-going discussions about the changing educational landscape in Kenya through dialogues.

Evolving educational landscapes

To begin with, how and where can we identify change to be taking place? As a starting point, a changing educational landscape in Kenya has been discussed in seminars, by the entire project team, over the course of the REFORD project, as shown in Table 1. An element of orienting to the future is to look around and think of already on-going changes, as drivers, as well as related early signs, as so-called weak signals of change. In fact, some present educational trends already are pointing to potential change, and subsequent impacts, in the Kenyan educational landscape. What do these issues mean when it comes to learners, contents and the wider context, and call for us to do? It is not apparent if, how and when they will affect all higher educational institutions, disciplines, or programmes. As a related note, in this project, our aim has been to expand thinking of such issues beyond the typical short- or medium-term horizon and cultivate a long-term view.

Table 1. *Educational trends that could inform the Kenyan educational landscape.*
Source: REFORD project seminars.

THE LEARNER	THE CONTENT	THE CONTEXT
• Moving away from rote learning • Learning about learning; learning 'how to learn' • Lifelong learning • Students active, engaged • Less hierarchical, more collaborative, student-centred • Learning by making, active learning • Students intuitively know this; they know that the world is changing • They need to be enabled and guided towards new, opening directions, and into professions that do not exist yet • Appreciation and harnessing diversity • Autonomous reasoning; doing by themselves; self-defining, self-determination	• Single disciplines are being challenged by global challenges that pose new, joint thematics • Collaborative, multidisciplinary topics • Co-creation • Co-production; less linear, more networked, more systemic • Shared, joint knowledge-creation, teamwork, team-based learning • Project-type, learning in steps (correct, re-do) • New techniques: blended and hybrid learning, in a global village	• Varied perspectives: how do we make use of all our capacities, in each learning setting? • Multi-stakeholder partnerships • Global challenges, horizontal and cross-cutting themes, wicked problems • Take students to stakeholders (industry, decision-makers, NGOs) • Invite real-life guests to classroom (industry, NGO actors)

As a pilot project, REFORD refers to wider questions, such as the competences that are needed now in the 21st century, and in the future. Therefore, with a view to long-term change (Luukkanen et al. 2015), wider questions related to the themes raised by the REFORD project concern:

- What competences are (and will be) needed in the 21st century, and why?
- How should they be seen in the Global South, and specifically in the East African, and more specifically, Kenyan context?
- What are they, at different educational levels, and programmes?
- Do these need to be reflected in teacher education (e.g. in HEIs), and if so, how?

In principle, education is expected to transform (Inayatullah 2020). Therefore, eventually, **changes in education, and teacher education, are of interest and serve all of us**. As experience would tell, the work of few occupations is as central as that of teachers, also for the sake of "creating the future" we would aspire to realise. And, as our world, and our societies keep on changing, there are related questions as to whether the necessary competences are universal, or perhaps particular to specific localities, such as the Global South, or like in this case, in the Kenyan context, and how they also vary at different levels. Capabilities and their delivery also vary across educational programmes. This raises several issues of how exactly on-going changes and already identified future needs need to be reflected and carried into teacher education.

If we think about long-term change we would like to see in society, such as achieving **SDG 4 to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all,** as a desirable future, it is important to consider the timespan of change. Let us bear in mind that when we think into the future, for instance, about the year 2050, a period of roughly three decades makes for a long time, during which plenty of change can happen in many fronts, simultaneously! However, in our daily lives, we are often quite cautious in thinking of such possibilities. Thinking backwards, where were you 30 years ago, and what did society look like back then? What has changed since, and why? Accordingly, how have education pathways in your lifetime? And, thinking back, what do you think were some of the reasons behind these changes, and how would you evaluate their impacts?

Another particularity of this project is enabling global dialogue about education and learning based on research and evidence. As the HEI partners come from different educational backgrounds and cultures, in related exchanges, it is important to bear in mind some key issues. Table 2 raises contextualisation, co-creation and educational futures, as three elements, which could be important to remember as assumptions in related collaborative designs.

Table 2. *Our assumptions on Co-creating between African (Kenyan) and European (Finnish) partners for Educational Futures.*

CONTEXTUALISATION	CO-CREATION	EDUCATIONAL FUTURES
In all international benchmarking, contextualisation is important, as educational, societal or cultural structures cannot be transposed as such.	How to conduct international collaboration as a global society to provide the necessary educational structures? In designing better learning environments, how should we promote the learners' agency?	Amidst socio-technical change, it is not necessary to wait until transformations are fully realised, before taking actions that can have an effect on the future. Constructing a sustainable future requires us, as individuals and societies, to have a holistic relation to the future. Development of futures thinking and futures learning increase the capacities of an individual to face different futures and to shape their future.

As concerns teachers as educators at higher education institutions, and associated changes, HEI students are young adults and adult learners with perhaps a specific kind of a motivation to the education that they will gain, and associated curricula. Already equipped with some competences and skills, as a base, previous capabilities inform any assessments of the kinds of knowledge, skills, and access to networks that they could (and should) be equipped with. Finally, given that some higher education teachers could be in working life for (at least) the next 30 years and their students themselves perhaps another 50 or more years, there is real potential for a long-term impact in making changes to teacher education.

2. THE ROLE OF FUTURES IN EDUCATION – INTRODUCING FUTURES LITERACY

Thinking of futures is about an ability to anticipate, think and analyse more systematically of what the future can, could, or should hold. A capacity to look ahead beyond the conventional short-term operational horizon is helpful for challenging the business-as-usual, entrenched beliefs, and in opening to untapped potential. A continuous process of thinking about futures can be particularly beneficial in a more globalised, interconnected world, which can appear as more volatile, uncertain, complex, and ambiguous (VUCA) (Heinonen et al. 2022).

Who owns and knows the future of education?

Discussions about the future of education are guided both nationally and globally by the interests of various stakeholders. On the one hand, education is considered to have a central role in helping individuals grow into human beings and full-fledged members of society. On the other hand, the accelerating pace of change, individualism, and the demands of a market economy dictate why and how individuals should be educated and develop their skills. When considering the futures of education, it is essential to recognize the underlying assumptions, for which education is thought to exist. If the goal is to meet the needs of business and the market economy, needed future skills will appear differently than if the role of education is seen as an essential one to foster and sustain cultural knowledge and, for example, equip people to act within the planet's ecological limits.

Global foresight work related to education policy and the development of education is carried out by organizations such as the OECD and UNESCO, and at the European level by European Commission and for an example by Cedefop (European Centre for the Development of Vocational Training). In recent years, these bodies have produced numerous foresight reports and studies on future educational needs, essential skills, and changes in the educational landscape. (OECD 2024, 2021, 2018; UNESCO 2021; European Commission 2024; Cedefop 2023a, 2023b.) The findings of these reports are reflected at the national level in the curriculum design at different educational levels. In Finland, the forecasting work of educational needs has been conducted since the 1960s by organizations like the Finnish National Agency for Education, ministries, various research institutions, and regional actors. (Djakonoff et al. 2024, 7.) Additionally, different interest groups and organisations also conduct surveys on skills needs in the future. For example, the World Economic Forum, funded by large corporations, regularly publishes its own list of skills needed in the workforce from the perspective of the business world as a *Future of Jobs Report* (World Economic Forum 2024).

From the perspective of futures studies, the future is always unknown and unpredictable. When producing knowledge about the future, it is important to be able to challenge the present understanding of what the future can be. The future is not necessarily a continuation of the present, nor is it built on current conceptions of work, livelihood, or a good life (such as the assumption of the existence of democracy and a market economy). Once different alternatives are outlined, discussions can begin about which direction we hope things will develop in the future – that is, which possible futures we aim to consciously and systematically build.

In anticipating skills needs, the focus should be not only on producing foresight knowledge but also on discussing what we consider possible, probable, and desirable. Traditional skills forecasts emphasize more the probable, rather than possible futures. For example, 21st century skills are based on the idea of relatively steady societal change and development (acceleration of technological advancement and globalization and the skills they demand), rather than alternative pathways or unexpected shifts. Similarly,

skills for the green and digital transitions are based on current understandings of what sustainable development entails and the skills it requires.

The ones who produce knowledge on the futures of education have the power to dictate what kinds of futures are seen as possible, plausible and preferable. Some scholars have called for a greater degree of scrutiny of the kind of epistemic power that intergovernmental organizations (IGOs) such as the OECD wield when they produce statistics and recommendations for national education systems and practitioners (Kallo 2022). Context-bound futures knowledge produced on the grassroots level, in partnership with the practitioners themselves, has the potential to contribute to a more comprehensive and multi-faceted view on the future of education that avoids one-size-fits-all solutions and adapts to the local context. It is to this type of development that REFORD contributes.

One interesting example of utilizing methods and perspectives from futures studies is a research report by the Committee for the Future of the Parliament of Finland, published in 2018, report: “Societal transformation 2018–2037: 100 anticipated radical technologies, 20 regimes, case Finland”. In this report researchers identified 100 most promising technologies, 100 legislative objectives with which the adoption of technologies can be streamlined and 200 new professions of the future in order to be able to prepare for upcoming challenges with the right knowledge and skills. In addition to the forecasts of the development of radical technologies, the researchers also created new images of the possible future professions that are not just a continuum for the current professions but something that might exist in the future. (Linturi & Kuusi 2018, see also: Mäkelä et al. 2022.)

Another example is 'Into the Future with Knowledge' (in Finnish Tiedolla tulevaisuuteen, 2021) report for the The Finnish Union of University Professors that focused on the possible futures for science and research in Finland. In the report, researchers identified eight key themes, and the associated phenomena and drivers related to the future of science. The result is a selection of ideas for future paths of science and research leading in different directions. (Ahvenharju et al. 2021)

In the global context, The Millennium Project (global futures studies and research association), published in 2019 a three-year international study on Work/Technology 2050: Scenarios and Actions -report. The report includes three detailed scenarios to 2050 and assessments of 93 actions about the future impacts of future technology. (Glenn et al. 2019)

In these three examples, the goal has not been to identify and lock down a certain possible development path for the future of education and work, to be followed in the education policy, but identify different possible paths and open the discussion for the alternative possible futures and what would be needed to achieve them.

Re-framing 21st century skills

Entering the 21st century, foresight has increasingly examined skills in relation to the complexity of society and the accelerating pace of change, beyond just the needs of individual sectors.

"21st century skills" has become an established term for the skills and competencies deemed particularly important in today’s and tomorrow’s society and workforce, where technology, globalization, and rapid changes are central features. These skills help individuals succeed in a world where mere academic knowledge or technical skills are no longer sufficient. There is no single entity behind the definition of these skills. Organizations such as Partnership for 21st Century Learning (P21) (Framework for 21st Century Learning), the OECD (Skills for 21st Century Learning & The Future of Education and Skills 2030), and the European Commission (Key Competences for Lifelong Learning) have contributed to defining 21st century skills.

Traditionally the 21st century skills are divided into three main categories:

1. Learning and Innovation Skills
2. Information, Media, and Technology Skills
3. Life and Career Skills

(Partnership for 21st Century Learning (P21), 2019)

These skills emphasize so-called meta-skills and broad-based competencies. The focus is less on mastering one particular skill, and more on combinations and relationships among skills, with a strong emphasis on critical thinking, problem-solving, creativity, and collaboration. In Finland, the perspective of the 21st century skills as a framework for defining future competencies is reflected in the reform of the national curriculum for the basic education (2014) and the upper secondary schools (2021), which introduced transversal competencies as part of their curricula. (Finnish National Agency for Education 2024; 2020.)

From the perspective of futures studies, an interesting question is the "future-orientedness" of the 21st century skills: to what extent do they reflect current needs and our assumptions about possible future skills needs? One challenge in forecasting skills needs is that these assessments often rely on assumptions about a likely future, which in turn are based on past projections or on the currently known needs and views of the industries. Additionally, the current foresight work can be guided by a particular viewpoint on the economy and skill development: skills are evaluated based on their usefulness to business and economic growth. Foresight may also not sufficiently account for the effects of unexpected or alternative changes in the operational environment on future development.

Such forecasts of future skills needs might also produce lists of competencies thought necessary in a particular type of environment. For example, AI skills have emerged as a rapidly growing trend, if not already a megatrend. These skills are needed now or possibly in the near future, but we cannot know if they will be needed 10–20 years from now – will AI still exist, or will it have evolved into something entirely different? Another example is that in the life & career skills section of the 21st century skills, emphasis is placed on an individual's ability to manage their own and others' productivity. This view of the importance of such skills is based on a particular perspective and assumption about the organization of the labour market and work (complex, productivity-driven, reliant on individual competencies), and it does not leave much room for alternative views of the future. (Partnership for 21st Century Learning (P21), 2019.)

Lately, digital and green transition skills and discussions of "eco-competencies" have emerged in the field of defining educational and skills needs. Although the 21st century skills include environmental literacy, sustainability and environmental aspects have not been the starting point for the definition of those skills. Nor has the 21st century skills included Futures literacy, which has been widely discussed as one of the key skills of the future. Briefly, Futures literacy means an individual's capability to use the future in the present. Futures Literacy helps people understand why and how we use the future to prepare, plan, and interact with the complexity and novelty of our societies today. (UNESCO 2024, 2021b; Miller 2018.) UNESCO has a global network for Futures literacy, which has suggested it to be included to the definition of the 21st century skills (UNESCO 2021a; see also Pouru-Mikkola & Wilenius 2021). Also, in the EU's new *GreenComp: the European sustainability competence framework*, futures literacy has been linked as a key competence of building a sustainable future. (Bianchi et al. 2022, 2, 23-24.)

Futures thinking and futures literacy entering the education field

What, then, is the futures research perspective on the future of education and skills needs? What should education take into account, in which direction should it evolve, and what role the futures studies could play in the field of education? Since it is impossible to know the future and future skill needs with certainty, from a futures studies' perspective, education should provide tools to understand change, envision

alternatives, and work toward a desired future. In other words, it should strengthen an individual's relationship with the future and futures literacy. (see Ollila & Hujala 2022; Pouru-Mikkola & Wilenius 2021.) At the Finland Futures Research Centre, numerous research and development projects have long been conducted, addressing the future of education, futures literacy, futures consciousness, futures teaching and guidance. (Finland Futures Research Centre 2024a.) The Centre has also held a Unesco Chair for Futures Literacy and holds now the Unesco Chair in Learning for Transformation and Planetary Futures (https://unescochair.utu.fi/)

Academic futures studies have been available in Finland since the 1990s through a national network program (Finland Futures Academy) and since the 2010s as a master's degree program (Finland Futures Research Centre at the Turku School of Economics). Also, continuing education and courses on futures studies and related to futures of education have been offered by the Centre over 10 years. (Finland Futures Research Centre 2024b.) Additionally, foresight and scenario thinking are taught in several Universities of Applied Sciences in Finland. There is also at least one upper secondary school in Finland, Porkkala High School in Kirkkonummi, where students can study in a futures studies track. (Ollila, Miettinen & Jokinen 2022, 424.)

Alongside academic studies, Finland has long worked to incorporate a futures perspective into education and teaching. The foundations of futures education were developed by Anita Rubin, Pirkko Pitkänen, Pirkko Remes, as well as Anu Haapala (formerly Mikkonen) and Vuokko Jarva. Based on this foundational work, futures competencies or skills have been developed across different educational levels since the 1990s, although primarily through various experiments and individual institutions and teachers. Internationally, futures education has been researched and promoted by scholars such as David Hicks, Eleonora Masini, Richard Slaughter, and Jennifer Gidley. (Ollila & Hujala 2022, 401; Gidley & Hampson 2005.)

Since the 2010s, the Finland Futures Research Centre has been systematically working on developing futures education and guidance, producing educational materials, and providing continuing education for educators and counsellors. Currently, teacher education in Finland does not include studies in futures studies, futures education or futures literacy, even though the national curricula for both comprehensive and upper secondary schools incorporate themes and content from futures studies, particularly in multidisciplinary studies. The need for expertise in futures education is clear: in a complex world with global challenges, it is important for educators to facilitate and structure discussions about the future, articulate ongoing developments, and develop the capacity to envision alternative futures and proactive agency toward a desired future. (Ollila, Miettinen & Jokinen 2022, 422–424.)

The Futures Guidance team (www.futuresguidance.fi) at the Centre has, for example, already trained nearly 500 teachers, counsellors, and organizational developers in futures thinking and guidance and integrating a futures perspective into their work. Also, the Unesco Chair in Learning for Transformation and Planetary Futures has conducted many projects and trainings on Futures Literacy with different stakeholders.

If futures thinking and Futures literacy are considered key skills for building a sustainable future, as proposed by organizations such as UNESCO and the EU, then futures thinking and literacy methods should be incorporated into teacher education and offered as part of continuing education. Currently, as far as we know, these skills have not been included in the curricula design of the teacher education in Finland or elsewhere.

3. METHODOLOGY

Building on the perspectives outlined above, the purpose of this section is to outline the methodology applied in this project to investigate futures of education in Kenya – provided in three phases, the 'why', the 'how', and the 'what', after which a summary is given of each session in the futures process.

Methodological process

The aim and motivation of the futures process (Why?)

The realization of Kenya's vision of a mainstreamed competence-based curriculum that encompasses all educational levels demands concrete action in the present. CBC was launched in Kenyan basic education in 2017, and now the universities are mapping the steps of how to implement it in higher education and teacher education. Many questions remain unresolved, such as how to define and measure competences in non-technical fields, the humanities or social sciences for instance.

The REFORD futures process was designed to draw from the expertise of local and national-level actors in Kenya to map out factors that affect the realization of this vision of a mainstreamed competence-based curriculum. A step-by-step futures process was planned, incorporating the tools with which trends, megatrends, weak signals and other discontinuities related to the vision can be discovered and analyzed. Since we are dealing with a transformation that affects multiple levels and various stakeholders in the educational system, engaging with a wide group of stakeholders beyond the immediate project team was a prerequisite for a successful futures process.

The methodology (How?)

To ensure a shared understanding of the concepts and methodologies used during the REFORD futures process, two futures-focused workshops incorporated presentations on futures research on 10 February 2023 and 24 May 2023. These introductory sessions paved the way for two participatory futures workshops, which were organized on 17 October 2023 and 17 June 2024. The results of the entire futures process are analysed in more detail in Chapters 4 and 5. In order to disseminate the knowledge created during the futures process, it was decided that the results are incorporated into a report which is then made publicly available to all interested parties.

The data and results (What?)

The workshops generated data in the form of notes, tables and diagrams that compiled the results of the collaborative work of each group of participants. Futures methods such as the futures wheel (see p. 17) and futures table (see p. 18) are ways to visualize the ideas each group came up with and their relations to one another. As important as these outputs of the workshop process are the processes that lead to their formulation: how the interaction works in the group collaboration, who talks and who doesn't and how the ideas are formed. This is why in a futures workshop it is important for the facilitator to pay close attention to what is happening during the ideation phase, and to take note of any phenomena that are considered interesting that might not be visible on the final output document.

The 17 October 2023 workshop brought together 42 participants representing educators from two Kenyan HEIs (Strathmore University and Nairobi University) and key Kenyan educational stakeholders: Ministry of Education (MoE), Commission of University Education (CUE), Teachers Service Commission (TSC), Kenya Institute of Curriculum Development (KICD). Building on the results of the previous workshop, the

17 June 2024 workshop had 9 participants from the REFORD project team. The October workshop's outputs include futures wheels and futures tables.

Fig. 2. *Working with sheets and post-it notes in physical form. Alternatively, futures workshops can also be organised in hybrid or fully digital form.*

At the October workshop, the participants worked manually by using pens and post-its into physical sheets (Fig. 2). This work was subsequently digitized i.e. written down by using MS Word, as shown in this report. The full outputs from the first workshop are in Annex 1. At the June 2024 workshop, the project team worked with the help of laptops and noted down their outputs digitally. Working in two groups, their work is presented, as single tables, and as a consolidated vision by the research team at the FFRC.

Futures-focused presentations in REFORD workshops, 10 February 2023 and 24 May 2023

The first presentation on 10 February 2023 was titled Futures Guidance and Capabilities for a Changing Future in the 21st Century. The presentation introduced principles of futures studies, ways futures studies has been applied to investigate transformations in education, key assumptions and uncertainties.

The presentation on 24 May 2023 handled different dimensions of futures thinking, drawing on what was handled during the first workshop. Topics included epistemology of futures studies, attitudes towards futures, anticipation, futures literacy, futures consciousness, futures thinking, futures orientation and futures skills and competences. Participants were asked to complete to an online futures consciousness test, after which its results were discussed.

Futures Workshop 1: Future of education and learning 2050, 17 October 2023

The workshop organised on 17 October 2023 in Nairobi, Kenya, aimed at challenging personal and collective assumptions about learning and education, from the perspective of living in the future. Throughout the workshop, the participants were encouraged to ask "what if" the future is not just a continuation of the past but is also affected by our own assumptions about the future, and how we wish it to be(come).

The aim at the futures workshop "Curriculum and education development for the future" was to explore what the future learner might look like, the context for learning and how it is changing (has changed, is changing, and could change). The specific methods and techniques that were applied were *Futures Workshop*, within which *Immersion*, *Futures Wheel* (an ideational technique to explore future(s)), the *PESTEC analysis* (as a futures table), and the *cross-fertilization* of findings, with presentations from the group's work.

Before starting the actual workshop, **an immersive phase**, a short narrative addressing futures was read out loud, in spoken form, by the organisers. This activity was designed to help the participants to disconnect from their day-to-day reality and whatever might be on their mind at their moment by asking them to "Imagine we are in this same place in the far, far-away future".

Overall, the work at the futures workshop aimed at challenging personal and collective assumptions about learning and education, from the perspective of living in the future. In asking participants *"What if?" questions,* the point was to underscore how the future is not just a continuation of the past but is also affected by our own assumptions about the future, and how we wish it to be(come). And the future, and how it will emerge, in fact results from the interaction of multiple causalities in a complex world.

So, what if we would be able to open our minds to the diverse possibilities of the future? The participants were instructed to leave the present moment to see how some of those issues of today have shaped the future, certain on-going drivers are already shaping the future, and to think of blind spots, of what other issues are shaping the future and unfolding. The groups were asked to depart from the present, to think far ahead, even up to the year 2050, addressing the future of education and learning. Additionally, supportive instructions were provided to the participants.

Futures Wheel

Futures Wheel is a participatory tool intended for joint ideation, and an open exploration of changing landscapes and new, emerging issues or their weak signals (Glenn 1972; van Veen & Orrt 2021). With the help of the futures wheel, we can begin to think about changes (and even necessary changes) already much earlier than they are actualised.

Futures Wheel is a mind map method, where a central theme is placed at the centre and related ideas and causalities grouped around it on concentric wheels. Apart from the central theme, it consists of the inner, the middle and the outer wheels, as three circles (or spheres) (Fig. 3). At this workshop, each of these wheels was adapted and used to address a specific question:

1. What kinds of emerging issues are shaping the future of education and learning in Kenya, or could shape it in the future? *(inner wheel)*
2. What do you think could be their different types of impacts? *(middle wheel)*
3. How do you think educational structures or curriculum design should react to these potential changes? *(outer wheel)*

The participants were divided into five groups, and started discussing within them, by also writing ideas into post-it notes. Groups were instructed to begin from the inner wheel and with the first question, and then to advance to the outer wheels. The groups also could move back and forth between the questions if something came up for a level they had already discussed.

The purpose was to begin thinking in the long term. After all, it is more fruitful to explore a wide range of ideas, for opening futures, with a view to complexity, uncertainty, and non-linearities, rather than aiming to find the “right” answers. As is known, the greater the duration, the longer the uncertainty (van Asselt et al., 2007). In fact, unconventional or even silly views of the future can be really interesting, and participants were encouraged to feel at ease to be creative. The participants were instructed that the futures workshop

was a 'safe space' that lets us ensure that everyone in the group(s) gets their ideas heard, to use all the participants' insights and potential, as wisdom is collective.

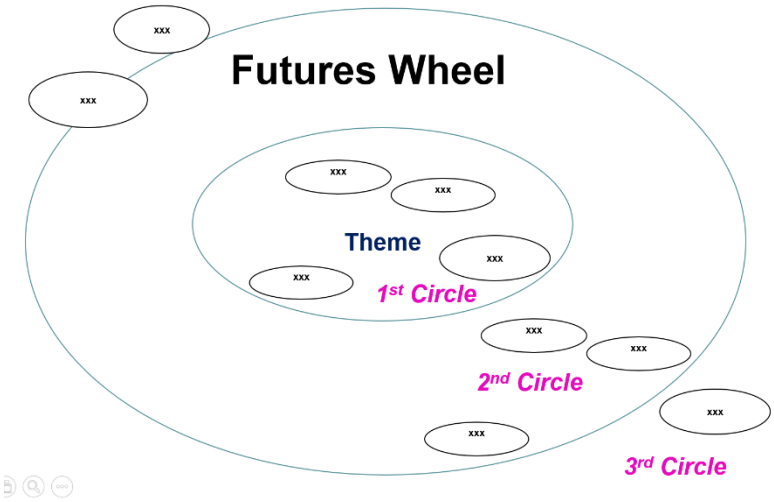

Fig. 3. *Futures Wheel, an ideational tool for opening up futures.*

PESTEC table

The ***PESTEC table*** (Fig. 4), which is one of the variations of the futures table, allows futures states to be explored in a systematic way. PESTEC analysis is a tool of morphological analysis, and in this workshop, was used as to analyse the elements and aspects of a certain topic in more detail. The acronym PESTEC comes from the words *Political, Economic, Social, Technological, Environmental/Ecological*, and *Cultural*. After identifying potential ideas for futures in the first phase of the workshop with the help of the Futures Wheel, PESTEC analysis was deployed to study these issues in more detail, assisting in the identification of forces that affect the future.

The participants were asked to pick a specific idea, or a cluster of key ideas from the futures wheel. Then, the group would scrutinize the chosen issue (or theme) systemically and holistically from different perspectives with the aid of the following questions:

- **P**olitical: How would these issues be swayed? What kinds of policies will be necessary
- **E**conomic: How are resources found for this? Who are the economic actors?
- **S**ocial: How do we organise ourselves? How do we work together? Some disruptions?
- **T**echnological: What could this mean technologically?
- **E**nvironmental (=ecological): What is the relationship with environment (including climate change)?
- **C**ultural: Which cultural issues could begin to show here?

The aim of the second part of the workshop was to nurture systemic understanding, and to develop systems literacy, which can be considered elements of futures literacy (Miller et al., 2018), with the intention to further open up futures knowledge of (yet) unrealised alternatives of the future.

PESTEC ANALYSIS

POLITICAL	ECONOMIC	SOCIAL	TECHNOLOGICAL	ENVIRONMENTAL / ECOLOGICAL	CULTURAL

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Fig. 4. *Empty template for PESTEC analysis, as a variation of a Futures Table.*

At the end of this phase, the PESTEC tables addressing the future(s) of education and learning were presented to other groups (Fig. 5). Each group was asked to discuss the key idea that the group analysed, as well as analyse what was most interesting or revealing in their idea. More detailed information about the conversations is captured and summarised on the post-it notes (see Chapter 5 of this report). The results of the group work were transcribed by a research assistant at Finland Futures Research Centre and turned into a digital form (see Annex 1).

Fig. 5. *A group presents the key ideas from their PESTEC table to the fellow participants.*

Futures Workshop 2: Opening and Visioning through Four Futures, 17 June 2024

Building on analysed results from the Nairobi Futures Workshop, described above, the second futures workshop was organized at University of Helsinki with a smaller group of participants than the one organized in Nairobi. The participants consisted of REFORD project team members from Kenya and from Finland who, by now, were familiar with the content and approach of the futures process and the basic principles of futures studies. The aim of this workshop, facilitated by the FFRC, was to map possible changes and identify alternative futures for teacher education in 2050.

Four Futures: Business-as-usual – Best case – Worst case – Surprise

Six factors and drivers (See Chapter 4) had been identified from the 17 June 2024 workshop as interesting dimensions that warranted closer scrutiny in the pursuit of desirable futures. In the first working phase, after a warm-up discussion the participants were asked to add any aspects or themes they considered important to this list of six items. In the second phase, the factors including any additions were placed in a table where alternative futures for each factor could be listed. Each row of the table included the following cells: (1) Business as usual, (2) Best case, (3) Worst case, (4) Surprise.

The ***Four Futures*** methodology was designed to maintain attention to the multiplicity of futures, to explore the space of possible futures available to us and assess which of these futures seem most likely and/or desirable in terms of where we are today. For example, in the present, we could consider it likely that artificial intelligence replaces the teacher to a greater extent in the future, but we might not consider this a desirable scenario.

Table 3. *Sample futures table from the June workshop.*

	Business as usual (BAU)	Worst case	Best case	Surprise
The Learner – individual learning paths?				
The Teacher – reflexive therapist and advisor?				
Creativity – killed by technology?				
Technological change – what about interpersonal, human touch?				
Cultural change, mindset – whose futures are we aiming for?				
The Institutions – including international collaboration				
(Community and parents' engagement)				

To assess the desirability of futures listed in the futures tables, in the third working phase the groups were asked to highlight any cells that would be the most desirable while also promoting competence-based curricula (CBC). Of special interest were rows on which the desirable future could be found in some other

cell than the “best case” column in the table. At the end, the groups presented their findings and their respective tables to other participants. To conclude the workshop, there was an opportunity for open discussion and reflection.

Table 4. *Comparison of the two Futures Workshops – methodological remarks.*

Futures Workshop 17 October 2023	Futures Workshop 17 June 2024
Methodologically, the first Futures Workshop with a range of educational stakeholders in Nairobi, Kenya, acted as *a main event, as a venue for futures dialogue***, which also allowed different actors to come together to discuss on-going change.** **Retrospectively, this was seen as a venue that provides value for the participants.** **The preparation of such a setting takes careful preparation, also** *in terms of Guidance and the flow of the Futures Workshop, and the different sub-methods assumed***, as well as their documentation.** **In this particular case, the documentation** *allowed the material to be discussed by the project personnel* **as well as to be documented for joint research purposes.**	As a methodological remark to the second Futures Workshop in Helsinki, Finland, this time only between the project personnel, again following specific steps, the groups found it quite effortless and intuitive to work around ***Four Futures***. These Four Futures consisted of a distinction between **Business as Usual** (as a continuation of the present trends), **The Best Case** (an optimal scenario), **The Worst Case** (as a pessimistic outlook for the future), and **The Surprise** (as a future, which could be different from the present. What is interesting from these two groups’ work is that after identifying and working with the four different futures, if they also would like to take elements from any of the other ‘futures’ to make the ‘best case’ even more desirable, *the elements of ‘Surprise’ were often found to be conducive and meaningful* also for ***enriching the perception*** of a ‘Best Case’ of Teachers Education.

Methodologically, Table 4 above provides a comparative reflection of the two Futures Workshops, and their main differences. As a key aspect, where the aim of the first Futures Workshop was rather to generate ideas (“Mapping and Scanning”), the second Futures Workshop used already generated ideas, and after an intermediary analytical phase, aimed to build and consolidate this work further (“Opening and Visioning”). These results were combined to form the REFORD vision for teacher education in Kenya 2050 (see p. 29). Vision in this instance meant an image of a long term-goal, an aspiration of a preferable future.

Next, related ingredients from the workshops to the vision are presented.

4. MAPPING AND SCANNING FUTURES: THEMATIC ANALYSIS OF THE OCTOBER 2023 WORKSHOP

What do the following workshop results tell us? The futures workshop is a participatory research activity, intended for empowerment, but from an analytical perspective, also provides a set of ideas that can be analysed further. When applying 'a research mode' into the described discussions, the data generated in such a workshop shows the range of issues already affecting the futures of education (or, are pointing to issues that potentially could be of relevance and should be explored more). Better understanding and reflecting on this data by applying critical views, can enhance our understanding of the perceptions and views about the future, on-going driving and hindering forces to education, as well as also aspirations cast into the future, as key issues to be discussed.

The ideation process of the October 2023 in Nairobi workshop began from an empty table. The groups had the liberty to raise any topic they wanted into the centre of their futures wheel while identifying emerging issues shaping the future of education and learning in Kenya. A preliminary thematic analysis of the ideas generated in the workshop(s), conducted by the research team, results in six themes:

1. The Learner – individual learning paths?
2. The Teacher – reflexive therapist and advisor?
3. The Institutions – including international collaboration
4. Technological change – What about interpersonal, human touch?
5. Cultural change – Whose futures are we aiming for?
6. Creativity – killed by technology?

In looking at them, these themes seem relevant for our project, as they allow us to assume different perspectives to the futures of education, a future skills base, and teacher education (Karjalainen 2023). Specifically, the three first themes (1–3) are more about key actors, agency, and the allocation of roles. The fourth and the fifth theme (4–5) are about aspects of change. Then, the sixth theme (6) seems like a cross-cutting capability. Creativity as an element is interesting also in the sense that it is linked closely with innovation and change.

The Learner – individual learning paths

It was identified that in the future, ***learners*** will need information and skills on a faster basis, as in a VUCA world, the pace of societal transformation accelerates. Social interaction is reduced, and fatigue and stress become more common problems. Technology can improve access to education, but it can also negatively impact the learners' ability to concentrate. In a world where life revolves around technology, learners will require digital literacy and the ability to regulate their learning in order to succeed.

The workshop participants agreed that in the world of the future, the learners will take greater control over their learning. Learners will look for individual learning paths to suit their needs, choosing what to learn and when. An entrepreneurial attitude will be strengthened, and educational paths and the competences they provide will be individualized. However, some express concern that as technology takes over, learning processes are going to become more "robotic" in the future as opposed to social.

The competence-based curriculum (CBC) development has the potential to promote holistic, well-rounded citizens that can perform various tasks. The promotion of action/activity-based learning and assessing learning without a written exam help learners deal with the requirements of future working life. In order for competence-based curricula to succeed, learners are required to be more proactive in learning, to be able to filter out "unnecessary knowledge", to be good with communication and to be able to learn through mistakes, trial and error. Furthermore, educational structures will have to be adapted to support these

types of learning and to encourage them. It was highlighted that the learner population is becoming more diverse, which needs to be reflected in the pedagogies of the future. Utilizing learner-centred pedagogies in an encouraging way will be essential to the success of the reform.

The participants thought that Generation Z is challenging established Kenyan higher education learning designs with new perspectives and more diversity, whether it comes in the form of LGBTIQ+ values, problems will mental health, greater neurodiversity or use of social media. While technology increases access to education to learners with special needs and disabilities, teachers will need to take on the role of therapists as well. The participants advocate for an inter-ministerial team to assess all aspects of mental health.

Transformation of learning into the online mode will require appropriate infrastructure, especially when it comes to internet access. A further concern is the possibility of increased dropout rates from education when it moves online. Participants expressed concern over the motivation of students taking part in online classes.

Overt focus on developing STEM fields in education can potentially lead to negative impact on soft skills.

The Teacher – a reflexive therapist and an advisor?

The teacher is the other individual in a central position in the learning process, whose effort is required for the CBC effort to succeed. The participants consider the role of the teacher to be in turmoil, for they perceive increased pressures for the teachers to act as therapists, agents for socialization and advisors instead of or in addition to being providers of knowledge. This shakes up the structures that have upheld a traditional teacherhood, e.g. the code of conduct. These changing roles and the changing educational landscape put pressures on teachers to develop their skills, including developing one's own teaching through analytical tools, planning, observing, reflecting, educational psychology, managing motivation, classroom management, continuous assessment, human development and cognitive development.

Participants identify a focus in the past being placed on the quantitative measurement, on the academic statistics of learners. The future is seen as an age of inclusivity, technology and holistic education that is in some ways unmeasurable in terms of quantitative outputs. Pedagogical advancement will remain at the centre of the learning process and developing curricula. Educational systems need to recognize prior knowledge of students better and find different ways of assessing knowledge and acquired skills during the age of CBC. Developing the teachers' capacities to implement student-centred pedagogies is a central component in these processes.

In order to promote CBC and thrive in the future teachers will need to be aware of new knowledge and pedagogies being implemented. Knowledge on climate conservation, crises and artificial intelligence, for example, will be of increased importance. Universal Design for Learning (UDL) is seen as another potential answer to the challenges that teachers will face in the future.

There is a great need for support for the professional development of teachers in Kenya, be it in novel pedagogies, 21st century skills, artificial intelligence, managing diversity or crisis management. The proposal of the participants is for this re-tooling and training being funded by government subsidies. They also identify that both in the universities and in the school system there will always be those who will resist the change and strive to maintain the status quo. There should be a plan on how to get these teachers on-board in the promotion of novel competence-based curricula. The participants foresee a gradual attitude change towards CBC.

Already overworked teachers consider returning to lecturing as the easy mode to return to instead of learning something new and pursuing competence-based methodologies. However, increased use of

technology has the potential to reduce teachers' workload, e.g. with machine-assisted assessment. Remuneration needs to be organized for teachers that take part in re-tooling.

Some participants place great emphasis on the way the transformation in education is implemented, whether it is top-down or bottom-up. They seem to agree that the teachers' participation and empowerment to drive the transformation is what can promote it most effectively. The concerns of the teachers need to be taken seriously: their schedule is tight and their well-being at work is not always at an optimal level. If much of education moves online the lack of social interaction can negatively affect them. Furthermore, the practicalities of work including working hours, days, supervision will need to be defined before a greater degree of online teaching can be pursued. Counselling needs to be available for those that require it during the transformation.

In order for learning to remain relevant to the learners, teachers of the future need to be where the students are and engage them through their channels (WhatsApp was mentioned as an example). Social issues should be included in curricula and disabilities and difficulties with learning (e.g. autism) recognized on a lower treshold.

While the roles of teachers are changing, so are the roles of parents of younger learners.

The Institutions – bytes of knowledge with collaboration

Institutions in this instance refers both to educational institutions and governmental and other bodies that have a say in the future of education. Participants saw that in the future curriculum and examination policies will change to focus more on practical skills with greater emphasis on formative assessment rather than summative assessment. Also, STEM teaching and learning receive greater attention in the curriculum to develop solutions to emerging and future challenges.

Participants identify gaps in the mechanisms that the ministry of education uses to recognize prior learning. The burden of defining these mechanisms is placed with the ministry. Some participants say that private education dominates in Kenya, putting under scrutiny how much sway the ministry has on the private education actors.

Furthermore, it is highlighted that universities too are incapable of recognizing prior learning and remain reluctant to inter-university programs and collaborative implementation. This isolation extends beyond the academic sector too, as universities are seen as disconnected from the employment sector and failing to produce courses that meet their demand. On the other hand, participants also highlight the autonomy of universities as an ideal to be protected. As a vision of the future, participants think that academic institutions and universities will perish unless they reform and adapt to the changing times.

Participants identify that extending the scope of secondary education leads to the problem of lacking facilities: how to promote higher learning if the support structures aren't there.

To meet the challenges of the future, participants argue that institutions need to develop new policies and frameworks, and that faculties will need to be reorganized to fit new subjects.

A clear distinction of policy and practice needs to be made when competence-based curricula and teacher professional development are concerned. Participants argue that Teachers' Service Commission and Ministry of Education need to discuss together on this topic. The political system needs to be open and ready for the transformation. It is said that education is politicized to a degree, and that in the future the government will be in greater control of the country's strategic direction in education. However, the relationship between the institutions and the government is not seen as one-way, some participants consider the universities central actors in promoting an open society. Some participants go as far as to offer the idea of abolishing the national education system in order to pursue individualization of education further.

A potential problem is identified in certificates and degrees that are obtained online not being as valuable in the labour market as ones obtained from face-to-face education, leading to two classes of education and increased inequality.

The resourcing of the transformation was discussed, and sponsors, good will, collaboration partners, education start-ups, governments, parents, alumni and donors identified as potential sources of funding. The government support is envisioned in the form of loans or grants, e.g. in the form of subsidization of internet bundles and laptops for schools. Delaying in implementing these grants may affect the quality of programs and the success of the transformation negatively.

Participants think that in the future, institutions can promote an open society, design innovative programs that are offered collaboratively in different universities. Education will be broken down to bytes of knowledge, and apprenticeships replace universities to a degree. Entrepreneurial skills and remote learning methodologies rise to new importance also from the point of view of the institutions.

Internationalization is a development that is displayed in the participants' futures tables mostly as a surprise, something that is not seen as likely to happen very soon. However, while envisioning the future, they envision global education systems not limited by national borders, and the global village effort that reinforces influence of other countries and continents in the Kenyan education system. The role of English is considered, whether the global language of the future will be Chinese or Hindi, and population increase also mentioned as a trend worth paying attention to.

Technological change – what about human touch?

A lot of discussion was centred around the theme of ***technological change***, and technology frequently stood opposed to the idea of "human". Participants were looking for the golden mean between human and machine development. The rapid change of technological landscape was seen to leave education behind, and greater efforts are needed from education and learning to keep up. The smart use of available educational technologies can promote learning, but infrastructure is in many instances lacking. E-books, for example, can promote access to education but the learners need to have access to devices too. Some further points made were that the harmful effects of e-waste on the environment should be considered, and people's attitudes change further to embrace technology.

The participants argue that competence-based curricula and online learning should support one another better. When curricula are being revised, they should embrace technology, and the content that is brought in should align with the skills, values and attitudes of the future.

Regarding the ways of learning, participants were split between promoting remote learning and blended learning approaches. They argued for bite-sized learning that suits the needs of 21st century learners in the form of podcasts, videos and other flexible formats. Some argued that in the future, the physical infrastructure of learning, the classroom, will be entirely replaced by a virtual equivalent.

Participants express concern over the increased cost of learning due to greater degree of technology use. Funding from parents, communities and donors are envisioned to contribute towards the acquisition of the technology required to access education. The lack of electrification and facilities in the rural areas is highlighted as a challenge, but some participants express hope for utilizing local solutions and locally available materials for improvised learning activities. Cheaper locally available technology solutions have the potential to reduce the cost of learning.

Artificial intelligence was discussed as length as an emerging technology that has a potentially significant impact on education and learning of the future. The potential of AI was recognized in increasing the diversity of tools available to teachers and students, and in helping with therapy and outreach to students.

Problems with AI were recognized too: the effect it has on testing and evaluation and all levels of learning. The participants argued for the regulation of AI and developing software that checks the use of AI in education in an effective manner. It was also highlighted that AI also has weaknesses and limitations and it is not perfect.

Cultural change – whose futures are we aiming for?

In addition to technology being a driving force in the transformation of education and learning, the participants considered ***the role of culture*** to be central as well. The participants considered who will be in the driver's seat of the transformation, or whether it will be a collaborative effort.

Society and culture are continuously changing, and educational systems should adapt to these changes too. Encouraging the co-existence of different cultures in the learning programmes of the future is a must. A culturally sensitive approach to education must be able to embrace e.g. LGBTIQ+ people. Participants also saw educators as the mediators between the current generation and the generation of their parents, to be able to increase common understanding and establish common ground. It was thought that the gap between generations will extend into the future.

When asked to envision the year 2050, participants thought generation Z would be working virtually, and teacher/therapists promoting climate strategies and climate activism through the syllabus. Political leaders would be open to the idea of creativity in education, and there would be a shortage of students looking to study essential fields such as agriculture for food security. Female admission to higher education is increased through changes in legislation and incentives. Disinformation runs rampant, and the development of individualization has continued to such a degree that the concept of friendship has changed altogether.

Creativity – killed by technology?

Creativity was seen as opposed to technology. Artificial intelligence makes the task of doing research quicker and information is more readily available. However, it makes students lazier and does not promote creativity. With reduced creativity and increased individualism, participants considered that interpersonal skills of learners will suffer, leading to mental health issues.

It was argued that focus needs to be maintained on creativity in the future, promoting 21st century skills such as problem-solving, digital literacy, innovation and interdisciplinary collaboration. Creativity has the potential to strengthen metacognitive skills, cognitive control and executive function.

How to promote creativity through learning and education? Participants considered multiple methods, such as encouraging mobility that exposes learners to new ideas and skills, self-employed career, new ways of earning income such as content creation, educational start-ups, virtual and physical creative spaces that act as places to meet, discuss and do experiments. Cultural festivals or events at schools and cultural diversity and inclusivity were seen as having a positive reinforcing relationship with creativity and the acquisition of interpersonal skills.

5. OPENING AND VISIONING FUTURES: ANALYSIS OF THE JUNE 2024 WORKSHOP

The second workshop took the above themes (from the results of the first workshop) and continued to delve deeper into these topics with a smaller, more focused group of project participants. Participants from Strathmore University, University of Nairobi and the University of Helsinki, facilitated by the FFRC staff, were asked to envision four different futures for each of the six aspects listed above. Afterwards, they would choose from the tables they had generated a set of ideas that would appear to represent a desirable future. After instructions, two groups worked in parallel. After the workshop, the results from both groups were combined to form the REFORD vision for teacher education in Kenya in 2050 (see Table 7).

Group 1

Table 5. *Group 1 Results from the June 2024 workshop. Desirable futures are highlighted in yellow.*

	Business as usual (BAU)	Worst case	Best case	Surprise
The Learner – individual learning paths?	The pathways start at 9th grade.	No qualified teachers and facilities. Disappointment for learners for not having personal learning paths or when embarking, poor execution.	All resources are available to realise individual learning paths.	Lots of Kenyan student going abroad for benchmarking
The Teacher – reflexive therapist and advisor?	Teachers who keeps on lecturing.	Demotivated teachers.	Professionalised teaching. Becoming a teacher is no more a second choice or "afterthought". Motivated, well trained, employed teachers. Teachers as facilitators.	Fellowship programs for teachers. Teachers' exchanges.
Creativity – killed by technology?	Teachers are just implementers of curriculum	Teachers don't care about teaching.	Teachers are interpreters and creators of curriculum	Students create their curriculums all by themselves
Technological change – what about interpersonal, human touch?	No face to face teaching. Online studies.	AI replaces humans completely.	Technology compliments humans.	100% access to learning resources.
Cultural change, mindset – whose futures are we aiming for?	Values, norms and attitudes don't matter. Teachers see themselves as employees.	Values and norms → Laissez faire attitude	Adults role modeling and mentorship. Teachers adopt an entrepreneurial mindset.	Old fashioned values become fashionable again.
The Institutions – including international collaboration	Lack of facilities.	Teaching and learning is taking place without appropriate facilities.	Government invests (learning) infrastructure.	Having enough equitable learning resources.
(Community and parents' engagement)				

As elements of a best case future, Group 1 aspired individualised learning paths to be supported by motivated, professionalised, well-trained teachers who feel that their competences are highly appreciated. Ideally, teachers would also have a level of autonomy to interpret and create the curriculum, to make it suitable for the learners, and could do so by adopting an entrepreneurial mindset, overall. Their work would be complemented by resources, government investment into learning infrastructure(s), and the meaningful use of technology, which compliments, but does not substitute human beings.

Worryingly, the business as usual pathway (i.e. the present outlook) has many undesirable elements, namely those of the worst case future. It is feared that even in the future, teachers will not really be motivated, but conduct their learning endeavours on a largely routine manner, as employees subjected to conditions they have little control over. In the worst case, online teaching becomes a permanent replacement for face-to-face interactions. As one of the topics of the first Futures Workshop was mental health issues, this could have unexpected side effects and consequences. However, in the absence of conducive learning facilities, there might be pressures for this direction to be taken uncritically. Besides the lack of human touch, the direction could have further unintended effects, if everything was left to Artificial Intelligence (AI). Such hesitations that were voiced reflect socio-technical change, and what it could mean across different scenarios.

It would be seen as a mildly surprising element, if a large number of Kenyan students, much higher than today, were able to gain access to and accumulate international experience, to their benefit. An even more transformative future would be one where students, rather than their teachers or those designing curricula, actually can create their curriculums all by themselves, to meet their individualised learning needs. As another, very different type of surprise, amidst current rapid socio-technical change, a cultural counter-reaction could emerge, bringing with it certain old-fashioned values, contesting present beliefs.

As a final, yet important note, in assessing them, Group 1 identified ***community and parents' engagement as an additional theme***, which should be included into visionary considerations. However, although seen as an important dimension, within the time provided in the second workshop, the group did not have time to explore it in further detail.

Group 2

Table 6. *Group 2 results from the June 2024 Workshop. Desirable futures are highlighted in yellow.*

	Business as usual (BAU)	Worst case	Best case	Surprise
The Learner – individual learning paths?	Rote learning continues. Teachers at the centre.	Rote learning continues. Teachers at the centre.	Motivated learners exhibiting 21st Century Skills.	Competing at the same level with the best globally
The Teacher – reflexive therapist and advisor?	Remains at the centre as a knowledge transmitter.	Lose motivation to upskill and profession loses its status.	Co-teachers and co-learners with skills of a 21st Century teacher.	Teachers are replaced by AI. Teachers are more of consultant
Creativity – killed by technology?	Technology used to deter human creativity.	If technology takes over innovation and problem solving.	Technology promotes widespread creativity	Teachers are replaced by AI.
Technological change – what about interpersonal, human touch?	Human touch is gradually being replaced by technology.	Losing the human touch.	Humans are using technology to increase human interaction in learning.	Go back to social basics in human interaction and relations

Cultural change, mindset – whose futures are we aiming for?	Worlds apart within the same country: the haves and have nots	Social conflict due to in-equalities.	Technology bridges the gap between the haves and have-nots through education	Everyone becomes a global citizen.
The Institutions – including international collaboration	Institutional operating in silos	Institutions remain closed and independent	Institutions collaborate locally and internationally. More COIL.	All universities will be collaborating and offering equal opportunities and inclusive practices.

Group 2 discussed how, in an ideal future, motivated learners would be able to exhibit a wide range of 21st Century skills, supported by well-equipped teachers with competences that are necessary for the cultivation of these needs. Like the first group, this group aspires for an ideal pathway where technology will be harnessed in a purposeful manner. In fact, if present, emergent hurdles are overcome, technology could assist in increasing human interaction yet again, as supportive engagements in learning endeavours. Even more so, one of the fundamental reasons to make use of technology in education is to level inequalities, as of late has been the case with digital environments, with improved access to learning materials. Such enhancements were seen as desirable also in the future.

As a baseline, however, the starting point of deeply rooted inequalities in society means that whereas a few lucky, privileged ones have access to quality education, this is largely impossible for the rest of potential learners in society. Adding to that, it may be that without upgraded competences for teachers and in facilities (in whichever form they take), rote learning, which struggles to make the most of learning situations, within educational settings will persist. As one of the hurdles for catalysing change in the educational environment, institutional siloes as a lack of a networked or ecosystemic approach could prohibit the diffusion of innovative ideas. If all external influences, such as rapid technological change, are endorsed in overtly simplistic fashion, it could be that educational environments become highly technologized, without critical reflection of their true influence, as an inability to make the most of them.

Artificial Intelligence (AI) puzzled also this group, and was seen to have a potential impact in replacing duties that teachers traditionally have assumed. Collaboration across universities also was not seen as automatic, but it was seen as a desirable element of the future. All in all, it would be a positive surprise, if the local learners would be able to compete on a par with their peers globally, also assisting them in assuming a mindset of becoming global citizens.

Despite all available technologies, it would be a real surprise, if as a counterreaction, pedagogy would go back to basics, and begin to cherish “true” human interaction and interpersonal relations anew.

Using Four Futures for Visioning

Based on the results, it is possible to sketch a vision, as elements for teacher education for 2050, as summarized next. Where the results of the first Futures Workshop are much richer, and described in much detail, the second Futures Workshop served to consolidate these ideas, and after an analysis, as different types of futures that could open, are identified. According to the groups, community and parents' engagement is missing from the following vision (Table 7). Also, further elements could still be identified.

Table 7. *REFORD Vision for Teacher Education 2050.*

ASPECT	VISION
The Learner	• Motivated learners exhibiting 21st century skills. • All resources available to realise individual learning paths
The Teacher	• Professional, motivated, well-trained teachers. Teachers as facilitators. • Co-teachers and co-learners with skills of a 21st century teacher. • Community of learning.
The Institutions	• Institutions collaborate both locally and internationally. • More Collaborative Online International Learning (COIL). • All universities collaborating and offering equal opportunities and inclusive practices. • Government invests in learning infrastructure. • Equitable access to adequate learning resources.
Technological Change	• Using technology to enhance human interaction in learning. • Technology complements humans. • Going back to social basics in human interaction and relations, moving away from technology. • 100% access to learning resources.
Cultural Change	• Technology helps bridge the gap between social classes. • Everyone becomes a global citizen. • Adults act as role models and mentors. • Teachers adopt an entrepreneurial mindset.
Creativity	• Technology promotes widespread creativity. • Teachers as interpreters and creators of curriculum.
Other	• Community and parents engaged to support learning and achievement of competences.

As a note, technology penetrated both the best and the worst-case scenario. The business-as-usual and worst case often shared characteristics – which could be interpreted to refer to pessimism about the future. Surprises, on the other hand, emphasized internationality and global citizenship. As questions to be discussed further are what to you strike as particularly important from the analysis? Is something missing, and if so, why?

6. ROADMAP AND ACTION PLAN FOR TRANSFORMATIVE EDUCATIONAL FUTURES

In the previous chapters we have outlined the approach of the REFORD futures process, showcased the tools drawn from the toolbox of futures studies methods, and the results from the futures workshops organized during the project. Possible, preferable and non-preferable futures have been surveyed, and their implications for the CBC process in Kenya discussed in detail. Chapters 6 and 7 provide the summary of results and recommendations to conclude the report.

Addressing future challenges in teacher education

As the discussion shows, keeping the learner in the centre will remain crucial because of technological pressures. At the same time, as values are changing, educational systems, and teachers, will be asked to keep up with the changing times. As a reported tension, educators face pressures of technological change, as evidenced by the rapid penetration of digital and communication technologies, and the ways in which they are being interwoven into education, as well as our everyday lives. This also informs the capabilities that will be required in the future. For example, if coding, as a technical skill, allows digital systems to be constructed, even more profound skills will be required to familiarise with the underlying, complex algorithms that make up for artificial intelligence (AI), and its applications, as well as challenge them, as an ecosystem that is swiftly widening.

As a comment from Kenyan HEI partners, information is already flowing extremely fast and is affecting how learners and educators are geared to handle different issues they face in life. One of the downsides of digital technologies and the associated pace of change is that social interaction can be reduced, and fatigue/stress is rampant. Contrary to their original purpose, lives suddenly revolve around technology. As another downside, the ability of learners to concentrate is undermined, if not entirely lacking, asking for new competences and coping mechanisms. To address the fact that mobile devices take a toll on students' ability to concentrate, there is a major worry how that shapes the future. On the other hand, recent developments do allow for roomless learning and digital literacy. It is felt that making further gains on this front is important, and there is a big need to react now.

Yet technology is merely one facet of futures. Realising preferred futures is a call for everyone to be involved (Karjalainen 2022b) and to think openly and critically of the kinds of changes that will be necessary in the future (Jae 2023). As teachers have a critical role in educating for the future (Bateman 2012), in teacher education, it may be necessary to actively raise these topics, as challenges to be consciously addressed. As concerns assumptions of capabilities or competences needed for the future, such views also illustrate the context of today from which assumptions about futures are framed.

Roadmapping and strategic planning for transformative futures

Underpinned by the Four Futures ('BAU – Best case – Worst case – Surprise'), the REFORD vision (see Table 7), reveals what could happen if such issues are (or are not) acted upon to transform.

A conducive proposal is to use these Four Futures, akin to elements of scenarios, as a starting point to think of changes ahead. To take foresight into action, they can be taken into roadmapping and strategic planning, as a stimulus to further discussions on learning, and the future of teacher education in Kenya. Here, two distinct elements should be identified: thinking of alternatives widens our big picture to ensure that important elements are not omitted ("opening up futures"). Then, the benefit of visioning is alignment for a common understanding of the direction ("pointing to a preferred future") that we are going to, in this case, as potentially important for the coherence of teacher planning programmes. Another important

element of visioning is inclusivity. A conducive vision-building process cherishes inclusivity and participatory aspects. Doing it alone is insufficient. Overall, for the purposes of visioning, it is beneficial to merge foresight, roadmapping, strategic planning and decision-making together.

In concrete terms, in actual university planning, this means that there are several possibilities how to use these generated future(s) insights. As potential moments when they could be used by educators and decision-makers to interactively engage, share and develop aims together, it is possible to sketch a process that can assist in having a common vision and support it, with the following elements:

- Roadmapping
- Strategic planning
- Making an action plan
- Other policy-level actions
- Different types of supportive initiatives or pilots

In such processes and related activities, one assessment criterion is to ask how transformative these initiatives are. Any type of futures work, according to Kuusi et al. (2015), produces a futures map. Equally, the REFORD vision for teacher education for 2050 in Kenya also can be assessed from different perspectives. In fact, it is imperative to ask, also when looking at the results presented, where they are pointing to, and what more still is needed? Are there elements that have been ignored or missed? And, if so, what might this tell about the assumptions and the participatory process that we have conducted to learn about educational futures?

Fig. 6. *A Big Picture for Future Opportunities. Source: Sitra (2023, p. 65).*

It is useful to assess generated results from a future process against other frameworks. For instance, Sitra – the Finnish Funding Agency for Innovation (2023, p. 65) proposes a framework of 'Future Opportunities' consisting of five elements: holistic well-being, strong trust and participation, restorative and regenerative economy, and a fair digital world, to assist in an ecological reconstruction (Fig. 6)[2]. As concerns our theme, to take an example, a fair digital world could be an interpretive lens used to critically think of the issue of opportunities of technology and digitalisation, to be discussed further. To address well-being in a holistic manner, discussions in the futures workshops raised the aspects of mental health as an element, which could be incorporated more seriously in the future as part of the work of educational institutions. Finally, as an important objective, ecological reconstruction, and related skills that enable a climate-compatible and environmentally sustainable future, were not at the heart of this project. However, as hinted by Droubi et al. (2023), a range of teachers and educators have a key role in nurturing such capabilities and competences through different programmes, related curricula, and their collaboration. Such elements of Future Opportunities can offer a complementary and evaluative lens on our REFORD vision of education, and teacher requirements.

Towards futures consciousness

In this project, we introduced the idea of why to think about futures. As a distinction, 21st century skills do not, by definition, include future-orientation. The change is under its way, and UNESCO has already suggested for Futures Literacy to be included to the definition of the 21st century skills (UNESCO 2021a; see also Pouru-Mikkola & Wilenius 2021). Furthermore, it is seen also as a key competence of building a sustainable future. (Bianchi et al. 2022, 2, 23–24.)

Becoming futures literate i.e. literate of alternative futures has been suggested as a necessary capacity that can make us more innovative (Pouru-Mikkola 2022) and could assist us to cope in a changing world, and to promote the kinds of futures we wish to realise. Potentially, it could also play a role in the upbringing of increasingly globally minded citizens (Lianaki-Dedouli & Plouin 2017). Evidence from recent crises also suggest that coping with a rapidly changing landscape is an important skill for the 21st century (Heinonen et al. 2022). All in all, thinking far ahead, as literate of futures can be considered as the first step in orienting to the future. In case of a growing futures literacy that eventually were to widen in society, one may conceive a growing ability of individuals, groups, organisations or entire sectors making the most of such competences. In the field of education, once the key actors are actively mindful of the time perspective, identify their agency in order to shape the future, remain open to alternatives, possess an ability to think systemically, and at the same time, and carry a concern for others, then a learner, a teacher, an educational institution or a policymaker could become 'truly' futures conscious (Ahvenharju et al. 2018; Ahvenharju 2022).

[2] In an analysis of megatrends, mounting environmental pressures require attention. Additionally, the world on average could be heading towards a +2.7 C warmer world or even more by 2100, which calls for a range of changes at many levels of society. As one response to such wicked problems, changes in education could assist new organisational models as well as related opportunities to be explored.

7. CONCLUSIONS

The “Research-based and future-oriented curriculum review and development for teacher education” (REFORD) is a partnership and a pilot project of four higher education institutions: University of Helsinki and Finland Futures Research Centre of the University of Turku from Finland in the Global North, and the University of Nairobi and Strathmore University from Nairobi, Kenya in the Global South.

As illustrated in this report, futures studies and foresight, with methods and tools can stimulate futures literacy, our ability to be more oriented, and become literate of futures that are already emerging. In this specific case, literacy of how higher education institutions can gear towards the future is argued to enhance the design of educational systems, structures, associated curricula, and teacher education, on the whole. In becoming more oriented to the future, students can be supported to acquire skills that are needed and relevant in the 21st century. Like our societies, as education is changing, so are educational models, their contents and delivery. To an extent, the project discussions also reflect a concern about an overtly market-driven definition of such skills. As learners and teachers, we are called to critically think how we can build and leave a better world for future generations – to sustain our livelihoods and planet. As concerns **further questions opened by this project**, it could be useful to interrogate the specific types of capabilities teachers will need in the future, how those could change (e.g. by the proposed year 2050), and why?

When it comes to lessons learned from this pilot project, prototyping is one means for challenging current practices, exploring the underlying solution, and to make proposals for wider and deeper, more structural observations – in this case related to competency-based education. Individuals, learners, institutions, technological, cultural change, and creativity, as well as community and parental engagement all inform learning. After this pilot project, it is possible to explore and make further use of the findings of the project on different fronts. As concerns the foresight elements, one potential gain could be to **use the results from the two futures workshops**. **In the first workshop, emerging issues, drivers, and weak signals affecting education were collectively mapped**. **In the second workshop, project participants worked around Four Futures – business-as-usual, worst-case, best-case, and surprise, as elements of a REFORD Vision for Teacher Education.** These ingredients of a vision could assist Kenyan HEIs in the strategic planning of their future avenues, and as a basis for further visioning across Kenyan educational institutions.

To conclude, imagining sustainable futures can be taken first up at the higher education institutes and also in other educational levels. In case of such efforts, at least three issues are useful to keep in mind. First, as their elements are based on a limited material from a pilot project, they could be enrichened and deepened. Secondly, it would be useful to interrogate what more is still needed the make them truly transformative. And, thirdly, as transformational outcomes in education require long-term engagement, also visions should be allowed to live in time, and to be further updated. When **good educational models and futures-orientation are provided at one level, they also have a potential to diffuse**. In the long run, educational systems should serve all learners, also to serve children and young people with easy access to quality education, as a widening access for learning opportunities.

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ANNEX 1. DATA OF NAIROBI FUTURES WORKSHOP (17.10.2023) WITH ILLUSTRATED GROUP WORK

In their futures wheels, the groups generated a range of ideas, and then in their PESTECs, the groups addressed and focused on five themes:

1. Educational system encouraging creativity
2. Teachers as therapists
3. Technology
4. Change of learning environment
5. Nature of future learners

Within the groups, they also identified several further themes, with numerous ideas generated.

Group 1: Educational System Encouraging Creativity

Fig. 7. *The participants of Group 1 at work in the Nairobi futures workshop.*

Futures wheel

As **the main points** in the futures wheel, Group 1 raised:

- Creativity
- Whose futures are we aiming for?
- International collaboration
- Individual learning paths
- Technology issues

Inner circle (closest to the center):

- Human-machine interaction: best of both worlds?
- The future of education seems to be a very candid topic at a sector that all institutions are eyeing on. Currently when education is looked at in all levels, it seems to be going on the basis of 21st century competency: Where learners need to be good at communication. Learners are able to be holistic that as in social cognition and academic and also are able to unlock different skills through the trend taken by different education organizations in future education. Basically, it will help learners to have fast information on how you handle different issues in life. Also, teachers are well versed with different technologies.
- Education for the future needs to be:
    - Focused on natural solutions to problems
    - Innovation
    - Collaborations
    - Action/activity-based learning
- Individualized education. Programs/Learners will have individualized competencies
- Education is innovative with the use of technology.
- Emergence of global education systems, less importance on national borders
- Education curriculum will focus on education technologies
- INCREASING STUPIDITY? Knowledge management
- The focus on the wellbeing of the human person will be the greatest priority in education

Middle wheel:

- Worry: Who controls AI?
- No degrees, just tests to show your skills and competencies
- Creativity based curriculum: Learn by using different skills and competencies that are interdisciplinary and individual skills
- Majority of traditional academic institutions and universities will close down, unless they cope with changes and reform
- Private education dominates education system
- Good anticipatory governance
- Leadership will be key to drive future in education
- What if the main language to learn is Chinese or Hindi?
- Clean environment as a goal
- Who is driving the future agenda?

Outer wheel:

- People as producers of knowledge
- No national education system, international education collaboration

PESTEC analysis: Educational system encouraging creativity

Political:

- 1) Regulation that allows innovation by being flexible
- 2) Greater autonomy to universities
- 3) Government in greater control of the countries strategic director (Education)
- A system that is not rigid and allows development of policies that will enhance creative thinking and questioning the status quo. Leadership is key
- Political leaders must buy into the idea of creativity to be able to support it through relevant policy, strategic and legal frameworks for it to succeed.
- Students' leadership like currently the student's council but for different positions in school. This enables them to think politically.
- OPEN POLITICAL SYSTEM!

Economic:

- Investment in technology, funding of universities (infrastructure), Resourcing universities (staff)
- Creative spaces, places to meet, discuss and do experiments, physical and virtual
- Encouragement and skills-based strategy
- The economic environment should be able to support the ed'l system that encourages creativity.
    - Adequate resources
    - Viability
    - Sustainability
- Use of local resources to make educational system affordable

Social:

- Open society promotion, collaborative leasing
- Encourage mobility so that the student can learn new ideas and skills
- Planned tours with objectives
- The community and other stakeholders would have to be enlightened on the importance of creativity letting the learners be parents encouraging potential abilities
- Social environment to support educational system
- Change of goals setting room for mistakes, trial and errors

Technological:

- Encourage adoption of energizing technologies
- Adapt the available technologies
- Encourage the teachers to develop solutions with available knowledge
- Sustainable technologies to be adopted and supported
- Room for individual and collective thinking with help of learning technology

Environmental / ecological:

- Promote local solutions for local problems. Use resources immediately available in the environment
- Educ has guided the learners on how to recycle and utilize the materials that could be harmful to the environment
- Preservation of biodiversity
- Be conscious of hazardous and destructive ideas
- SAFE, CLEAN AND SUSTAINABLE ENVIROMENT

Cultural:

- Question the dualism between collectivism and individualism
- Educ to encourage different cultures to be incorporated into the learning programs to encourage diversity
- Creating awareness on different cultures which are impactful
- Culturally sensitive approach to education
- Preserve, understand and appreciate each other's differences
- Cultural practices should be supportive of the education system

Group 2: Teachers as Therapists

Fig. 8. *The participants of Group 2 elaborating their ideas into the futures wheel.*

Futures wheel

Inner wheel (closest to the center):

- Emerging issues shaping the future of education in Kenya

1. Technology, mode of learning integral to ICT in tech and learning
2. Climate change – Severe draughts, flooding, need to include in curriculum
3. Change to CBC
4. Unemployment crisis
5. Environmental degradation
6. Financing education

- Mental health challenges for students and teachers
- Employment challenges for certain degrees
- Emerging issues:
  - Cultural diversity
  - Economic trends
  - Political dynamics
  - Global education trends
  - Tech advancement
  - Pedagogical advancement
  - Teachers' education
  - Globalization
  - Cultural changes, e.g. gay movement
  - AI
- Chancing role of mothers/parents
- Inequalities in access and resources
- Changes of values, Gen Z
- Political instability in the region

Middle wheel:

- Improve the infrastructure in all levels of education
- Education has become expensive due to high costs of living
- Impacts of politics to sustain?
- Political instability: Conflict near of schools, the marginalized in public schools don't access basic education, poverty rise
- Change from using textbooks to e-books
- Dysfunctional society
- Impacts of globalization from social dynamics
- Need to get careers that can help students be self employed
- Economic depression – impact of political dynamics
- Paradigm shift on assessment, by practiced assignments
- Brain drain as an impact for the country but good for the world
- Practices could be political rather than sustainable development
- Drought leads to displacement
    - Dropouts as students are forced to work to earn income for their families
- Diseases due to poor sanitation and climate impact

Outer wheel:

- Teachers as coaches / therapists
- CBC and online should support one another better
- Teachers in many courses to fit into the future
- 2050 → obsolete programmers, generation Z working virtually
- Let courses be broad, then they are specialized!
- More links between academic and industry to design effective curriculum
- Courses of agriculture for food security not attractive yet very important for students
- Restructure the universities and the courses being offered

PESTEC analysis: Teachers as therapists

Political:

- Policies:
    - Empower the teachers
    - Associations on professional and national level
    - Appointments, e.g. AS/PS(?) as professional level teachers
- Policy on a mental course in the university
- Policy on curriculum of teachers' counselors in their university
- All educators' policy to have an aspect of mental health and neurodiversity
- Politicians to put in place policies through the MoE that are research based for teacher training
- The policies should be made to address the issues that affect teachers in their line of duty such as code of conduct
- Decision making
    - Teachers should be making decisions that affect our education and learning progress
- Form interministerial team to look at all aspects of mental health

Economic:

- Economically, the teacher should be empowered in terms of renumeration(?) and supported continuously to further their studies
- Consider further education for all levels, align salary structure for all levels
- Have the courses for teachers who have not done it at their training to have courses in modules for free subsidized by the government

Social:

- Teachers as agents for socialization, engaged in social groupings as advisors
- Courses on therapy incorporated in modules for students as well as parents for a wholistic approach
- Set up avenues for teacher/therapist to capacity build so that they can navigate well as a social therapist
- Awareness creation for the system to be owned by society including churches who would be very concerned
- Continuous support for teachers on mental health, healing the teachers first. The wellness of teaches in their social life will determine their ability to support students

Technological:

- TPD (Teacher professional development)
  - Equip teachers with ICT skills
- Courses in therapy incorporated in online modules
- Digital literacy in teacher training
- Rise of therapy chatbots
- Teachers to be trained in AI so that they can utilize AI for therapy and reach out to many learners
- Integrate technology in learning, use blended learning approaches

Environmental / ecological

- Setup of environmental resources to accommodate neurodiversity (UNIVERSAL DESIGN PRINCIPLES IN ENVIROMENT!)
- Teacher training in universal design and environmental principles
- Due to climate change the teacher/therapist ought to be a climate activist and use the syllabus to advocate for climate strategies
- Teachers have to be made aware and informed about climate conservation, and mitigations on dealing with crisis such as flooding, for the safety of the learners.
- Power sanitation, to maintain clean environment to avoid illness in schools
- Use locally available materials to improvise learning materials

Cultural:

- Changing norms about neurodiversity. Align jobs and school resources to accommodate
- School based cultural festivals/symposiums
- The teacher as a therapist should be able to deal with cultural diversity and inclusivity
- Ensure the teachers learn about different cultures as they do therapies for parents and students as there may be underlying issues
- Address issues that influence community participation in education

Group 3: Technology

Group 3 had many post-it notes with identical sentiments expressed. Instead of writing them again, a number, for example [2] is shown at the end of the idea, to indicate it was mentioned almost identically more than once. This group had a large number of post-its with just a few keywords.

Fig. 9. *The participants of Group 3 sharing their contributions and generating new ideas.*

Futures wheel

Inner wheel (closest to the center):

- Teachers' role – this is likely to change a great deal [3]
- Urbanization – limiting space but reducing proximity
- Globalization
- Teachers conduct and performance
- Emerging issue: Labor management skills
- Assessment without a written exam, use of technology to assess students
- Artificial intelligence in education, more AI tools, the increasing diversity of tools available to students and teachers [5]
- A future without classroom, technology to replace physical structures [3]
- Integration of communication and technology
- Global village effort – Learning influenced by other countries and continents
- Politicization of education – Government policies chancing education systems [2]
- Overload in information
- Disinformation
- Teaching resources will be varying
- Recognition of disabilities, for example autism
- Funding – How will we continue to fund education?
- Social media platforms
- Changes in hardware available to learners
- Shortage of teachers
- Dysfunctional families
- Mental health challenges
- Socioeconomic challenges and equalities
- New ways of earning income like online content creation
- The role of the parent will likely change to be one of the educator

Middle wheel:

- Curriculum change to accommodate social media
- Difficult to manage social issues, such as hunger and poverty
  - “A sick nation”
- AI: Makes research quicker, more information available, but makes students lazier
  - Students will lack creativity
- Impressive technology for future education
  - Teachers need more training towards AI-technologies
- Lack of social interaction
  - Teachers will be negatively impacted
- Cost of learning will increase due to the increasing focus on technology
  - Socioeconomic issues increase due to the inequalities
- E-waste increases environmental impact, rise in environmental issues
- Technology increases availability for students with special needs and disabilities
- Self-driven education and home-schooling increases
  - Self-education outside of the country (brain-drain)
- Challenges on teachers' subjective knowledge
- Diverse learning-spaces to be created
  - Social values will have to be redefined
- Teachers may need to be retrained
- Working will have to be redefined:
  - Working hours
  - Working days
  - Supervision of workers
- Learners will have to be more proactive in learning to deal with too much knowledge available
- Teachers training and curriculum will have to change to accommodate the future
- Will we need learning spaces anymore?

Outer wheel:

- Tailor made curriculum to address specific needs and students
- Review of curriculum to embrace tech, content to be taught should align to the skills, values and attitudes required in the future
- Pedagogy-teaching styles to fit the changing times – more student-centered methodologies
- Adopt the curriculum and education policies to the present diverse job market
- Develop comprehensive and continuous assessment of both teachers and students
- Improve on training and retooling of educators
- Adopt the curriculum design to AI
- Short courses will be preferred more to reflect e-competencies
- Revise the year for every level to acceptable times
- Curriculum to reflect the needs of the society
- Attitudes of teachers may change
- Depoliticize education
- Reduce the cost of learning by providing cheaper tech solutions
- Certification requirements may change
- Allow for different ways of assessing knowledge and acquired skills

PESTEC analysis: Technology

Political:

- Legislation – laws that regulate use of technology
  - Regulation of AI
  - Put boundaries
  - Policies to create equal platforms of learning by government provided connectivity for all educational institutions
- Regulation of recycling of e-materials
- Curriculum change

Economic:

- Embrace of subsidies on educational recourses to be used in learning institutions
- Parents, community, donors, etc. all contribute to the acquisition of technological gadgets.
- Recycling of e-materials which can be refurbished. This will cut costs.

Social:

- Social interaction is reduced, fatigue/stress is rampant
- Mental health issues
- Creativity is reduced
- Promotes individualism
- Encourage blended learning

Technological:

- Improvement of infrastructure
- Capacity training for teachers to promote use of technology
- Change of attitude for people to embrace technology
- Continuous development of software that checks the use of AI in education (AI-checker and Anti-AI).

Environmental / ecological

- Use of green energy/alternative sources of energy
- Disposal of electronic waste, e.g. computers and accessories
- Infusion of climate change in the curriculum
- Set centers where e-materials can be recycled in learning institutions
- Sensitization of learners and teachers on how to handle e-waste

Cultural:

- Respect/relationship between teachers and the learner is poor.
- Appreciation of other people's cultures is limited
- Creation of a global village

Group 4: Change of Learning Environment

Fig. 10. *The participants of Group 4 engaged in a futures dialogue, facilitated by with their moderator.*

Futures wheel

Inner wheel (closest to the center):

- Valves, population increase.
- Recognizing prior knowledge – Learn to recognize immerse knowledge that many Kenyan populations have with knowledge on paper acquisition.
- The 21st century skills: Problem solving skills, digital literacy, innovation, collaboration

Middle wheel:

- The effect of online learning. This is a hard hit in the sense that many learners do not take online classes with the seriousness it deserves. The certificates and degrees may not carry as much weight as the physical courses. Many colleges and universities are offering online classes though.
- What kinds of emerging issues are shaping the future of education and learning in Kenya?

    1. Artificial intelligence. ChatGPT affects testing and evaluation in all levels of learning. The learner is able to get access to responses and answers on ChatGPT and even put antiplagiarism measures so that they are not caught by the teachers and examiners. So many learners are not thinking about coming up with answers but are getting the answers from AI.
    2. Schedule and staff wellbeing. During Covid-19 many students and teachers dropped out of employment or learning institutions
    3. Vocational training has been scaled up but the number of student vs the learning facilities – facilities are overstretched so lecturers are going back to lecturing as opposed to the hands-on skill-impacting (editor's note: on the outer circle)
    4. 100% transition after the Covid-19 – No facilities and infrastructure to take in the huge numbers from the primary schools into secondary school and thus affects service delivery and the quality of education
    5. More female students admitted to higher learning institutions because of the 30% affirmative action. This is felt to be a good move since women are the backbone of every economy so they should learn and become learners

Outer wheel:

- Strategy: Clear lineage(?) between policy and practice, especially where CBC/TPD are concerned. A Discussion between TSC and Ministry of education is very necessary.
- The 21st century skills: Entrepreneurial skills TSC created RLM remote learning methodology – Kahoot challenge is electrification in the rural areas to be able to reach as many possible and government to subsidize internet bundles and laptops in schools
- Mixed schools/learning institutions encouraged because acquisition of interpersonal skills is better in mixed environments
- Population increase is an emerging issue. That has a bearing on facilities available and service delivery.
    - Infrastructure congestion and manpower
- Emerging issue: LGBTQ+ Values.
    - Strategy: A national commission to be harnessed(?) to all curriculum studies and research levels, that should be informative(?).
- ECB Training
- Digital literacy
- Rural electrification programs / automatic energy by solar
- National commission(?) centre to harness recommendations related to curriculum students/research.

PESTEC analysis: Change of learning environment

Political:

- Public participation in designing and renewing curriculum reviews in higher education by stakeholders

Economic:

- Allocation of funds and resources in support of curriculum implementation design and review.
- Educational technology start-ups
- Requirements of the labour market
- Funding from sponsors, good will, collaboration partners, support from educational tech start-ups

Social:

- Centralizing higher education on the basis of specialization

Technological:

- Remote learning methodology so that when physical learning meeting is challenged learning is not disrupted
- Roomless learning- learning does not need to happen in the 4 walls of the classroom
- Appreciate artificial intelligence in teaching and disseminating knowledge but also realize that it has weaknesses and limitations. E.g. it affects formation of interpersonal skills, play time and thus may lead to mental health issues

Environmental / ecological

- Quality solar electricity which is centralized rather than electric power
- Recycling of e-waste: curriculum needs to be designed in such a way that it trains on recycling and manages e-waste and other forms of waste

Cultural:

- Social responsibility to entrench community service in the higher learning curriculum
- Cultural infiltration from some communities in Kenya

Group 5: The Nature of Future Learners

Fig. 11. *The participants of Group 5 discussing and together deepening their views.*

Futures wheel

Inner wheel (closest to the center):

- Competency based learning, a focus towards encouraging the development of wholistic education as opposed to only academic statistics of learners.
- Students will choose what to learn, unlike today where students are told what to learn, self-paced curriculum.
- STEM-Learning: There is great momentum towards STEM – teaching and learning in the curriculum to develop solutions to emerging and future challenges.
- What icebergs of emergency issues are shaping the future of learning research and innovation?
    - New models of learning:
        - Learner centered pedagogies.
        - competence based curriculum → demonstrating the ability to do.
- Emerging issues shaping the education and learning:

1. Technology
    - Emerging technologies like the use of online learning in high institutions.
    - Availability of infrastructure and internet has made this possible
    - Social media platforms are good for media and communications.
    - Ability to concentrate is lacking. Mobile devices take too much out of students' ability to concentrate. A big worry how that shapes future → a big need to react to that now.
2. Emerging issues shaping the future educations in KENYA:
    - Revolutionized technologies: the technological landscape is changing so fast and requires education and learning to go along with it.
3. Targeted audiences: Learning is so specific to the intended group. The modern audience (learners) characteristic in designing learning environments and institutions(?).
    - Generation Z, X etc. are producing a challenge to learning designs.

Middle wheel:

- Competency based learning will create all rounded(?) citizens who can perform various tasks.
- The stability in working life changes. People change their jobs often. In some jobs it might even be good, but I believe there are still jobs that need continuality (e.g. primary school teachers).
- Job market: Need to focus on future jobs that are a moving target. Many jobs will be taken by robots. Need to focus on education on this topic.
- The impact of technology on education:

- Use of e-learning materials instead of physical textbooks, no need of publishing firms but use of digital content.
- Encourage students to learn at their own pace
- Use of assigned(?) learning

- Target audience:
  - The need to have programs offered in different universities
  - Need new programs that cuts across different universities
- The technological revolution is going to create more robotic learners than social learners. Technology has limited human contact; social media is human contact that is not real.
- The role of universities in offering degree programs will change. Education will be broken down to bytes of knowledge. Apprenticeships will also replace universities.
- What do you think could be the impact of research and innovation on education?
  - Need to retrain (retro) teachers/trainees
  - Adaptation of inclusivity(?) based technology and learning methods-
  - Renewal of curriculum
- Development of the country's scientific capacity due to enhanced Stem uptake. However, too much focus on STEM while neglecting humanities and social sciences will negatively impact SOTT-skills among learners.

Outer wheel:

- Because future is unpredictable, what is needed is teachers' skills to produce and analyze data from their own work and develop one's own teaching continually → research skills, no need to publish, but to understand, plan, observe, reflect
- The educational curriculum and structure should put in place measures that ensure development of STEM courses does not overshadow humanities and soft skills acquisition in schools. Appropriate funds to facilitate STEM courses should be budgeted for due to the expensive interests in motivating STEM courses.
- How do you think education structures and curriculums should react to the potential changes in research and innovation?
  - New policies and frameworks to be developed
  - Reorganization of faculties to fit new subjects
  - Curriculum:
    - Design innovative programs
    - resources to both infrastructure and materials
- The role of assessment: Formal(?) assessment vs summarized assessment, especially when it comes to CBC-skills
- The role of educational psychology, motivation, classroom management, human development, cognitive development
  - Bloom's taxonomy → how to create creativity, has to strengthen metacognitive skills, cognitive control, executive function
- Universities need to adjust their curriculums and make it self-paced- Students will be allowed to learn what they want at a given time as they complete the required modules. The role of teachers will change teaching to content creation
- Education structure:

1. Aim to renew curriculum frequently to incorporate these emerging changes (new knowledge/pedagogies)
2. Must avoid spreading misinformation to the public
3. MOE(?) to put up mechanisms that recognize prior learning.

- University policies on curriculum should be renewed → most of the universities policies are so closed they don't recognize prior learning. They are also closed to inter-university programs and implementations.
- Universities:
  - need to collaborate more with industries in offering courses
  - There is also a need to change curriculum and examination policies to focus more on practical skills
- More capacity building focusing on future learning. A number of university lecturers are still focused on the status quo.

PESTEC analysis: Nature of future learners

Political:

- What kind of politics will be necessary?
  - Disinterested in live participation
- Review of policy / legal legislation to focus on the learner
- Review of the policies, legal legislation to align to the nature of the learner – talent identification issues.
- Provision of appropriate learner inclusive infrastructure, especially with internet access

Economic:

- How are the resources brought?
  - Sources: 1) Government or through loans or grants 2) Parents 3) Alumni/donors
- Government financing education through grants
  - Challenges: Delays in releasing the grants affecting quality of programs
- Parents financing, challenges due to poverty
- Alumni's financing: The students will be by nature entrepreneurial – this needs to be tapped on. Innovations can spur economic growth.

Social:

- Students will be independent, individual.
  - The changing concept of friendship
  - Group work becomes individual work
- Mental issues might be prevalent.
  - Mentors' help/support
  - Sensitize parents about the nature of their children / current generation
- Include social issues into the curriculum
  - Mecr studies offer behavioral flexibility

Technological:

- Lives will revolve around technology.
  - Develop new technology that captures new technology
- Have content that suits their needs in small bytes that suit their concentration spans.
  Have content in different forms, podcasts, brief videos, flexibility
- Produce(?) technology support system
  - Device new communication systems (e.g. WhatsApp)
  - Be where they are
  - Do not discourage AI/technology
- Revamp the existing technology, continue to train staff

Environmental / ecological

- Less brick and mortar, less political, less travel, e-waste management issues
- New approaches are dealing with environmental problems
  - The learners have new perspectives

Cultural:

- Globalization / cross-culture encounters
- Exposure to different cultures, there might be conflicts.
- Retrogressing cultural practices might be reduced due to

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