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Projecting the Nature of Education for the Future: Implications for Current Practice

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ABSTRACT

Ensuring that education serves the needs of a rapidly and ever-changing society is one of the defining challenges of education providers. This paper projects future trends in education based on documented evidence predicting shifts in education (teacher education in particular) and how they affect how the academy should prepare its products. The study views education for the future, not in terms of discarding subject content, but in terms of utilising content as a means rather than an end. This transforms the focus of both instruction and assessment from students assimilating content knowledge, to them developing habits that make them adaptable to the changing world and empower them to become change-agents. Accordingly, the teaching environment needs to respond to the dynamics of technological developments, and to changing student profiles. Also requiring change is the authoritative position of the teacher as the repository and dispenser of knowledge, and the learner's passive role as the consumer of knowledge. Knowledge is co-created within the teaching-learning context. The paper recommends further delineation of current trends that define 21st century education, and what they determine for the future.

KEYWORDS

Assessment; education change; habits of mind; learning environment; 21st century competencies.

INTRODUCTION

Our world is increasingly becoming volatile and uncertain. There are many changes occurring impelled by global forces and influences. The outbreak of the Covid-19 pandemic, for instance, necessitates the revamping of the education system even post-Covid, as it cannot be business-as-usual. Covid-19 has intensified discussions of education futures. Since the uncertainty and precariousness of society cannot be arrested, the onus is on the education system, at whatever level, to equip learners for effective adjustment to the volatility of society. The former Secretary of Education in the USA, Richard Riley, as quoted by Trilling and Fadel (2009, p. xxv111), aptly describes the challenge of education: "We are currently preparing students for jobs that don't yet exist . . . using technologies that haven't yet been invented . . . in order to solve problems we don't even know are problems yet". This observation presents a conundrum for educators who are tasked with the monumental responsibility of using the current tools, within the current context, to equip learners with requisite skills, knowledge and dispositions, for a future and a contextual landscape that is, not only unknown, but envisaged to be radically different from the present. Facer (2021, p. 1) opines that "'the future' is both intimately and ubiquitously associated with education and yet this relationship remains poorly conceptualised in mainstream educational thought." The ideal relationship between education and the future is not a one-size-fits-all. One may envision education's role as that of reflecting the future, or that of influencing the future. Another may see education as needing liberation from the future so that it does not chase after the future. In education, the tension between the past and the future is conspicuously manifest.

The pace at which education is moving can best be described as a 'snail's pace' whereas the real-world moves in quantum leaps. Institutions of higher learning continue to churn out graduates who are not readily absorbed and absorbable in the job-market, who are prepared for the world of yesterday and not that of tomorrow. Given these observations, the question to ask is whether education, in its current form, is serving learners' and society's needs. If not, what needs to be changed in the education sector? Education is a futuristic and visionary enterprise, and should not just react to emerging trends, but should be a pacesetter into the multiple possible futures. The onus is on education authorities to create the future rather than wait and see what the future looks like (which then will be the present) and try to react and respond to it. The exponential dynamism of knowledge does not allow for a static future. Education should project the current events, challenges and trends; and proactively equip learners for the future. Sagacity entails having visionary attributes, and if we are astute, discerning, and observant, and attentive to shifts, we will catch glimpses of the future from the present.

Purpose

Education has stubbornly remained conservative while the world has continued to evolve. This is evident in how automation and innovation lag behind in education compared to industry.

While the impact of education on society can be conceived of at the micro-level (classroom instruction level), meso-level (institutional level), and at the macro-level (societal and policy-making level), this paper largely, but not exclusively, focuses on the micro classroom instructional level. The paper seeks to straddle time and interrogate education of the past and the present, to project innovative and visionary education of the future. The purpose is to identify, interrogate, understand, and predict expected changes in education of the future based on current trends and trajectories. The paper is also a call for the radical reimagination and reconfiguration of education, to align with, and prepare for the anticipated future.

A Local Context on a Global Issue

Although the paper raises issues of global relevance, a snippet of the South African context is instructive for an appreciation of the issues it raises. Sakina Kamwendo (a South Africa Broadcasting Corporation (SABC) news anchor) interviewed the Deputy Director General (Zukile Mvalo) responsible for skills development in the Department of Higher Learning and Training on whether tertiary education was teaching the necessary skills for jobs. This followed a statement released by Statistics South Africa (Stats SA) on the overall 8.4% graduate unemployment rate of those who qualified to look for employment. The statistics covered the fourth quarter of 2020 and excluded the then recent graduates. The basis of the question was also the perception that the graduate unemployment problem reflected a deficient education, which produced skills that were not commensurate to the needs of the job market. The Deputy Director acknowledged the mismatch and called on employer involvement in curriculum design. The problem is attributable to education's reactive rather than prospective nature.

Theoretical Framework

Mezirow's transformative learning theory is quite instructive to the present paper, in as far as it challenges "our taken-for-granted frames of reference (meaning perspectives, habits of mind, mindsets) to make them more inclusive, discriminating, open, emotionally capable of change, and reflective, so that they may generate beliefs and opinions that will prove truer or justified to guide action" (Mezirow, 2000, p. 8). This paper adapts this theory of adult learning, whose phases coincide with the phases necessary in re-imagining education for the future. The first stage of 'a disorienting dilemma' relates to the realisation of the inadequacy or untenability of a prevailing situation; in our case, the current education offering. That initial phase catalyses the process, and paves way for the 'self-examination' phase that follows next. This is where education providers introspect on their contribution to the disorienting status quo, to get perspectives on the phenomenon. The self-examination stage is followed by the 'critical assessment of assumptions'. This allows stakeholders to rid habitual practices and open up to novel ideas, perspectives and mindsets. Next is the phase of 'planning a course of action' based on the new perspectives developed. This entails the deliberate planning of the kind of content, pedagogy, assessment, interactional patterns, learning environments, etc.

that would allow for the realisation of the novel and imagined and desired state. This would require 'acquisition of knowledge' that allows for actioning the plans. This may require de-skilling and re-skilling. The next stage is one of 'exploring and trying new roles' and in the process, 'building self-efficacy in new roles and relationships.' Mezirow's (2000) stages reflect incremental stage-by-stage transformation, rather than epochal or sudden transformation. Here, autonomy and greater experimentation with ideas and personal beliefs comes into play. Confidence in the beliefs, understandings, and actions adopted is developed. This spurs the transformative cycle of the integration and re-integration into the new situation. The theory finds expression in this paper in as far as it challenges extant cosmologies and frames of reference.

Gleaning the Future from the Present

There is need for strategic foresight to get an informed prospective perspective of the future, despite its fluidity and uncertainty, in order to make effective decisions and changes for today. Although peeping into the future and accessing it with some measure of precision in order to align its needs with today's education is not feasible, trends in the world of work and in our personal lives can direct the needs and shape of the future. The intrusion of the future in the present offers hope and prospects for catching a glimpse of the future in the present.

It is important to consider some of the critical trends impacting the present, which can be predicted with some measure of confidence, and will impact the future. Automation and Artificial intelligence have seen technological machinery rapidly taking over some of the thinking and decision-making previously the preserve of humans; making the human element in most routine tasks obsolete. Jerald (2009) notes that routine digitised tasks are vulnerable to automation since they can be fragmented and follow predictable rules. This observation has implications for the kind of content, thinking and dispositions that should be accorded priority in education. A pre-occupation with the easy-to-automate skills, at the expense of elaborate and complex thinking and communication skills, deprives learners of future functionality or usefulness. In education, it would be a disservice to equip learners with skills that technology may render obsolete, before the graduates even have opportunity to apply them. Education should shift from being a linear process of credentialing of certification, to a fluid and continuous process of developing students who can adapt to their rapidly changing material conditions.

Globalisation is a major factor that has precipitated a new world economy that transcends economic, intellectual, social, or any other national barrier. While tailor-making education to national needs ensures local relevance, education should increasingly speak to a global audience. Education is rapidly becoming internationalised through benchmarking and competing for international standards of excellence. The internationalisation of education can be defended on the need to facilitate the cross-pollination of ideas in a world characterised by the porosity of national borders. The globalisation of knowledge has implications for subject

content, as it is not feasible for all education systems to teach similar content - a discussion we take up later under the role of content in education for the future. The arguments that have been advanced for and against globalisation, are beyond the scope of this paper. Acknowledging the inevitability of the globalisation of knowledge, Moloi et al. (2009, p. 280) recommend the implementation of "a strategy that is geared towards maximising the positive, emancipatory effects of globalisation and reducing the destructive effects of global competitive dominance".

Traditional attributes that served the industrial age are also shifting in the global information world. Draves and Coates (2011) see the factory model as being reflected in: teachers checking and requiring attendance, having all learners on the same chapter of a text, setting homework and coursework due dates, imposing penalties for non- or late-submission, having bells going off to mark time segments, grading and ranking students against each other, and making time spent, and work concluded determinants of one's passing or failing. These are extant features of our education system at almost all levels and across geographical divides.

Regarding the information age, Jerald (2009) notes a gravitation towards personal responsibility, autonomy, collaboration, as well as a reduction in bureaucracy and supervision. Siarova et al. (2017, p. 7) note that "a broader range of skills and abilities is needed to navigate a changing landscape characterised by the increasing importance of information and communication technologies (ICTs), the decline of functional skills-based professions, and increasing competition". People increasingly perform cross-functional tasks in project teams to accomplish tasks; hence, teaching and learning should reflect such pulling together of diverse skills for a common enterprise. The measure of unpredictability in the workplace should also prevail in the classroom, to the extent where divergence of thought is encouraged and celebrated. Flexibility and adaptability have emerged as real assets as people increasingly find themselves in non-specialist jobs.

Skills and competences for the future "are no longer associated with certain academic disciplines but are transversal and multi-dimensional in nature" (Siarova et al. 2017, p. 7). The recently qualified educators may not end up in the classroom, and so should be equipped for a broader context than the classroom, including effective citizenship (Rapoport, 2020; Swarts, 2020). Even the changing demographic profile of learners requires the institution of proactive education processes to meet global demands (Estellés et al., 2021; White, 2020).

In sum, this section highlighted the need for a delineation of global trends that we can use as launch pads to confidently project the future, in order to design and provide proactive and meaningful education. This shift from traditional practices has implications for the role of content, for the design of the learning environment, for pedagogy, and for assessment practices (Omodan & Addam, 2022; Osworth, 2022).

The Role of Traditional Content in Education for the Future

The recognition of the attributes for this and the next century demands rethinking the role of content in education provisioning. Labate (2020, p. 2) distinguishes between and among three knowledges: knowledge as theory, as praxis and as poesies. Respectively, the one facilitates naming and understanding the world, the other guides actions, and the other generates concrete effects through technology. We need to acknowledge the reality that "… purely academic knowledge seems not enough to keep with the 21st century challenges" (Labate, 2020, p. 2). Content sits within the knowledge as theory domain when the world we inhabit increasingly draws from and upon all three domains. As the world changes, so does its needs and challenges increasingly evolve and become diverse. A lifetime is not long enough for one to harness the exponential rise in the knowledge that is generated. Exclusive focus on content as 'the knowledge' seems premised on the erroneous assumption that knowledge can be captured, boxed, packaged and administered in large enough instalments for learners' consumption. The good thing is that acquisition of a small measure of the right content suffices to successfully navigate life, provided that content catalyses the development of habits of mind that engender adaptability. Learning content needs to be subservient to, for instance, learning the sources and fluid pathways for knowledge acquisition within the knowledge commons, and how to consume the same. Knowledge production, circulation and distribution (Labate, 2020) has more mileage than knowledge regurgitation.

Education should gravitate more towards developing lifelong adaptable learners, rather than merely equipping them with academic content. Content should be aligned to skills, attitudes and dispositions that learners require to be successful in the future. Skills taught should be linked to curiosity, critical-thinking, creativity, rationality, problem-solving, leadership, and innovativeness. Additionally, effective interaction and conversational skills, and examination and manipulation of information have been identified as key in a rapidly evolving, technology-advancing world (Jerald, 2009). Siarova et al. (2017, p. 15) list seven transversal skills, namely, problem-solving, risk-assessment, initiative, decision-taking, constructive management of feelings, critical-thinking, and creativity. The skills are generally categorised as being:

- transversal (they are not directly linked to a specific field but are relevant across many fields).
- multidimensional (they include knowledge, skills, and attitudes); and
- associated with higher order skills and behaviours that represent the ability to cope with complex problems and unpredictable situations (Siarova et al., 2017, p. 18).

Redecker et al. (2011, p. 42) notes that "the ubiquity and abundance of information will require individuals to improve their metacognitive skills – reflection, critical thinking, problem-solving, managing and organising."

The educator who teaches content in any field of study should drive pedagogical innovations via the development of requisite thinking skills and habits in learners. Content

knowledge is ever-changing, and a disproportionate focus on it will produce graduates who get disoriented every time content changes. Developing habits of mind in students enable them to learn how to learn and will ensure that they can adapt to any new situation. Generic habits of mind should not, however, substitute traditional academic content; learning to learn needs to define the education system.

Education needs to be productive, proactive and future-oriented. A repetition of yesteryear's education for tomorrow renders the education system unresponsive and obsolete - devoid of any contribution to developmental efforts. Requisite non-routine complex skills needed for success in the near future can be infused in diverse traditional subject areas, without displacing the academic content. In fact, a solid grounding in subject matter is advantageous for the demonstration and development of these skills. For instance, one can only be creative and imaginative when one takes what one already knows (content) to dimensions previously unexplored. Education for the future would, therefore, use content as a foundational means for the development and practice of generic complex non-routine thought processes, skills, and attitudes commensurate with the demands of the real-world. The primacy of thinking skills, habits and dispositions, together with the infusion of content, necessitates multiple knowledge-processing that blurs disciplinary boundaries; the boundaries of which are not manifest in the workplace. We need to seriously question whether subject divisions, occasioned by disciplinary content, are for the learners' good or the educators' convenience. As the winds of change necessitate change in the education system, the change should be wholesome and impact the learning environment in a progressive positive sense.

The organisation of content is becoming tenuous as the archaic, rigid, crystallised organisational structures, affectionately known as subjects, are under pressure from the move towards inter-multi-trans-and cross-disciplinarity. Content walls are tumbling down and, in our view, the ability to think and innovate is gaining traction. Some of the knowledge has been blocked off as proprietary and governed by intellectual property rights. Habits of mind, however, have no ownership rights or restrictions, and are not characterised by the transience that defines content knowledge. Redecker et al. (2011, p. 10) acknowledges that "…generic and transversal skills are becoming more important." The role of schooling to "select, organize and mass-deliver knowledge to population in a specific range of age…" (Labate, 2020, p. 7) which sacrifices diversity and creativity for uniformity and conformity, has outlived its usefulness. "Not only the curriculum selection of learning "content" has become outdated, but also the "container" -the school classroom-is under pressure to find a new relevance for a new generation (Labate, 2020, p. 13).

The Education Environment in Education for the Future

Technological, demographic, societal and environmental dynamism necessitates a responsive and proactive learning environment. Since students may learn in a wide variety of settings, such as outside-of-school locations and outdoor environments, the term environment is a

more accurate or preferred alternative to the term classroom, which has limited and traditional connotations - a room with rows of desks and a chalkboard, for example.

While the symbiotic, causal, and transactional relations between the learner and the environment is acknowledged, the learning environment should adapt to the profiles of the learners and to the evolving society, rather than the learner adapting to the learning environment. The learning environment itself is the interaction among several variables: the teacher, learner, other learners, the setting, instructional media, among others.

Lippman (2010) posits that the introduction of extant technologies like the computer, tablet and SMARTboard into the classroom has not revolutionised the traditional classroom owing to the lack of full integration into educational programmes and purposeful utilisation. Provision of technological tools is one thing, and their effective utilisation is quite another; and the consonance between the two is generally elusive. Thus, being equipped with modern technology does not equate to being 21st century compliant.

The traditional classroom setting was consistent with the one-size-fits-all mass production and top-down approach characteristic of the industrial age; which is now obsolete within the information age on account of being no longer supportive of innovative pedagogies. Tapscott (2009) contends that the existing design of the school system is not in sync with teaching the Net generation, characterised by the desire for autonomy and the need to customise their learning or working spaces to reflect their individuality. The conventional spatial design of the classroom has remained conservative, characterised by superficial changes like replacing the chalkboard with the SMARTboard. This amounts to modernising a traditional classroom. The onus is on education to appropriate the technological affordances for the advancement of knowledge consumption and generation. In their large-scale study, Redecker et al. (2011) say:

> Comparing experts' findings with those of the teachers, who had been asked to concentrate on school education rather than the whole picture of societal change, what is striking is the degree of coincidence and overlap. Experts and teachers both underline that technological change will be one of the main drivers for change in education and training. (p. 34)

Physical environments should allow for multiple modes of learning, intellectual risk-taking, creativity, problem-solving, interdisciplinary moves, individual and group work, learning to learn, presentation, exploration, interaction, a sense of community, learner agency and initiative, and formal and informal learning - rather than pure content acquisition. The conception of school as a building should change to that of 'schools as communities' for sharing learning experiences, as zoom rooms gradually evolve into metaverses characterised by ultra-connectedness.

Lippman (2010) observes some of the key elements of the 21st century learning environment include its flexibility to be configured and reconfigured in ways that better mediate learning, and its promotion of self-direction and co-operative learning (independence

and interdependence). Woolner, Thomas and Tiplady (2018, p. 225) state that in "schools that consist of cellular classrooms where student desks are organised to face the front, there tends to be a more teacher-centred approach to learning with less student collaboration". Lippman (2010) distinguishes between the constructivist and the practice theory; where the former regards the learning environment as passive, and the latter views it as actively influencing learners. The students we are educating are less likely to follow single career paths, but multiple ones; hence, the need to organise the learning environment for cross-disciplinary learning.

The learning environment can be a physical infrastructure, and it can be virtual and cloud. It is not limited to time or space, but promotes authentic, rigorous, real-world projects. It can also be blended by combining physical and digital elements. Draves and Coates (2011) observe the work environment as shifting, necessitating concomitant shift in the learning environment. Although people are increasingly working from home, the school environment should facilitate teaching-learning from the learners' comfort location. Learners should "be learning in [places] where they are most creative, innovative and productive" (Draves & Coates, 2011, p. 55). The physical classroom should make way for the virtual classroom, just as the intranet has replaced offices in the world of work. The pyramid organisational structure that is making room for the network organisational structure should also occur in the schooling environment. "In the 21st century school, students are almost certainly to be grouped in-person and online by their 'stage' or level of learning, not the age" (Draves & Coates, 2011, p. 39).

The environment has to be intentionally designed to support 21st century learning, with multi-purpose spaces, flexible timetables, flexible infrastructure, being community-centred, and situated at multiple locations. In a bid to establish what learning would look like in the future, Redecker et al. (2011, p. 16) held "extensive stakeholder consultations, employing different formats (workshops; online consultations; group concept mapping) and including different stakeholder groups (experts and practitioners; teachers; policy makers) for mutual reinforcement and cross validation". One of the key projections is that:

> Education institutions will cease to be exclusive agents of coordination, service provision, quality assurance, performance assessment, or support. They will need to re-create themselves as resilient systems with flexible, open, and adaptive infrastructures, which engage all citizens and re-connect with society; schools will become dynamic, community-wide systems and networks that have the capacity to renew themselves in the context of change (Redecker et al., 2011, p. 30).

The physical environment should allow for a seamless connection of the indoors and the outdoors that make learning more engaging and authentic. The 21st century learning environments should be replicas of the 21st century environment which learners inhabit. The design of the environment should be needs-oriented and learner-centred. Learners spend time in other exciting and engaging spaces, and if the learning environment is not equally user-

friendly, learning will not be optimised. A change in the learning environment will result in a change in practice. It is this flexible space that encourages collaboration, participation, exploration, and experimentation.

Time regulation through the sounding of bells should transform to scheduling that allows for flexibility and spontaneity so that learning is not measured by time, but by learners' demonstration of learning. Learning should be anywhere, anytime; thus, the learning environment should not be over-regulated to the extent that the learners feel constrained and constricted. If, for example, they feel comfortable taking off their shoes during learning, they should have such a liberty because they have it in real-life. Timetables programme learners to rest at particular times and not at other times. Draves and Coates (2011) argue that:

> The notion that a teacher must be present at all times, that the only place where learning occurs is in a classroom, that learners have to be monitored and supervised while being online, that no student should or can be disciplined enough to work on her or his own, simply does not lead to the outcomes demanded by the post-industrial workplace, nor does it utilize the resources now available for learning. (p. 63)

An environment which encourages risk-taking and unconventional solutions is indicative of the kind of education envisaged for the future. Travelling classrooms which bring learners in touch with the real-world may be the virtual reality of the future. The classroom has become anachronistic and disconnected from the potentially 'disruptive' reality the learners inhabit. The modern classroom is nothing more than an upgraded traditional classroom with cosmetic changes. The 'messiness' of the real-world should be allowed to invade the classroom rather than have the learners shielded from it by being offered simplified and contrived tasks whose solutions the teacher already holds (Bolstad et al., 2012). Teachers need to stop teaching at their comfort level; instead, they must promote a dynamic classroom which mirrors the dynamism of the world. "Several emerging technologies, in particular open-source technologies, cloud computing and mobile technology will enable a seamless education continuum that is centred on the student, not the institutions" (Redecker et al. (2011, p.29).

Assessment in Education for the Future

Courtesy of credentialism, assessment will most likely be with us for a long time, albeit in a different form. As society and education evolve, we need to rethink educational assessment foci and reimagine our assessment protocols, a kind of assessment renaissance. Labate (2020) makes an onslaught on the examination thus:

> The time that students need for reflection, dialogue, and critical thinking around social problems to foster the praxis, the action-guiding aspect of knowledge, can easily be colonised by an exam-driven emphasis that encourages an overloaded, theory-laden curriculum, while not paying enough attention to issues such as solidarity, culture, identity, social cohesion and responsibility. (p. 4)

Testing knowledge or mastery of skills at a given time without due regard for the measurement of student growth over time, does not work today and may even be obsolete in the future. Assessment has to shift from being an end to being a means to learning as an end. Standardised tests appeal to educators because of their propensity towards quantification, accountability, and ease of implementation. There is need for a shift from antiquated texts and classroom-based-instruction with its arbitrary assessment methods (in the form of standardised tests rather than creative projects) that do not reflect and measure real learning. Assessment has hitherto largely been driven by the desire to document learning, and less to drive and enhance learning through critical thinking.

The complex world which learners inhabit should be reflected in educational assessment by accommodating the broad spectrum of, not only the cognitive abilities, but also the values, attitudes, dispositions, and metacognitive abilities associated with an evolving, reform-ready, and inclined-to-innovate society. The focus of assessment determines the focus of instruction; and a change in one necessitates a shift in the other. Assessment needs to better support the teaching and learning of the future. "Assessing key competences and transversal skills is a challenging task, as they refer to complex constructs that are not easily measurable" (Siarova et al., 2017, p. 16). The focus of assessment should shift from high-stakes standardised assessment to individualised low-stake assessment, from highly formal to increasingly less formal assessment, and from summative to formative assessments.

Where subject matter is acquired, assessment should focus on its application in the real- world. While we leverage the merits of the different assessment protocols, we need not lose sight of their inherent limitations. Accordingly, this makes a compelling case for the use of multiple complementary, performance-dependent instruments reflecting deeper authentic learning. "Research demonstrates that there is no single method that would fully measure key competences" (Siarova et al., 2017, p. 8). Multiple instruments come in handy for triangulating multiple-learning-evidence sources. There is need for the development of comprehensive assessment frameworks that synergise assessment protocols, approaches, and instruments in assessing key competences. Game based assessment can leverage and capitalise on the net generation's forms of learning.

Learner responses on assessments are proxies for their learning, and educators should accurately determine the proxies' most reflective of requisite skills or competencies and ensure use of the proxies can make the skills, competencies and dispositions apparent and explicit. Effective assessments are those involving "multiple steps requiring a chain of reasoning and a range of competences; and a range of formats allowing responses that require different competences" (Siarova et al. 2017, p. 10). These need not be assessed in isolation as they overlap and intersect. Key competences need to be operationalised to provide a basis for sound and consistent assessment.

Students and learners should be entitled to the opportunity to be innovative and assessed on this. It is vital, in celebrating divergence of opinion, to acknowledge that

sometimes, there are no clear-cut answers to questions but that there are more often "paradoxical, dichotomous, enigmatic, confusing, ambiguous, discrepant…" ways of looking at things (Costa & Kallick, 2009, p. 121). We must not impose our meanings on learners, but rather let the process of co-construction of meaning unfold even to the extent that learners end up constructing meanings radically different from the ones we hold. Non-routine thinking, solid oral and written communication skills, and related competences would merit assessment priority than the regurgitation of content.

Are we educating students for a life of tests or for the tests of life? This is a critical question education needs to consider (Costa & Kallick, 2009). As we move into the future, self-assessment becomes a crucial and practical aspect in learning. Learners should not depend on the assessment of others in real-life. They should be able to determine when they have done adequate, good, incomplete or shoddy work, without anyone affirming or censuring their performance. The evaluation responsibility needs to be shifted to learners.

Costa (2008) bemoans an education system that encourages certainty over suspicion, regurgitation of answers over inquiry, singularity of thought rather that exploration of alternatives. Education should develop rather than stifle human inclination to inquire, experience, question, and diverge in thought. All the interventions emanate from dissatisfaction with the current state of affairs, out of questioning what has always been known and believed and looking at alternatives for remediation. Costa (2008) observes how infants and toddlers are constantly exploring all that they can interact with by using their senses, and their fascination with mystery and discrepancy which excites their curiosity and imagination, spurs them on to further discovery. They get their feedback from their explorations such that their minds are enriched in the process. This happens until the school system takes over and socialises them into docility and passivity, curbing their natural inclination for exploration. The end of schooling suddenly becomes a period of passing standardised tests. Learning becomes merely mental exercises unrelated to real-life, and this is what perplexes the learners. Hence, learning becomes an unpleasant experience and assessment of learning is almost punitive rather than something to look forward to.

Assessment should be individualised. Draves and Coates (2011, p. 76) bemoan that "the current system is oriented towards the concept that [one-size-fits-all], with the same test administered to all students in a given class at the same time with no choice in test delivery options". This is exacerbated by assessments being timed as if all learners learn and perform at the same pace; and the teacher giving grades that encourage competition.

Pedagogy in Education for the Future

John Dewey states that "if we teach today's students as we taught yesterday's, we rob them of tomorrow" (Draves & Coates, 2011, p. 41). The future requires a pedagogy that is bold, innovative and aligned to the development of 21st century skills, knowledge and dispositions. Learning, teaching, and how education is structured and delivered, are transformed as a result

of the epochal transition from the Industrial Age to the Internet Age (Draves & Coates, 2011, p. 18). Pedagogies that effectively served the Industrial Age will not develop the kind of learning relevant for the future. Of the traditional pedagogies, Whitby (2007, p. 2) maintains that "the hallmarks of these pedagogies are found in teacher-controlled learning where deconstructed and reconstructed information is presented to same-age cohorts of students in standardized classroom settings". Whitby (2007) advocates for a humanising and socialising pedagogy that is enhancing and respectful, while conscientising the need for responsible community and global citizenship. Such pedagogy should be, among others, facilitative of lifelong learning characterised by problem-solving, collaboration, and sound communication.

With the information explosion rampant in this day and age, rather than mere recall of information, pedagogies should develop relevant skills for accessing, processing, evaluating and handling information, negotiation, and creating and managing knowledge. The ability to handle paradox, controversy and complexity is increasingly becoming critical. Students need to be empowered to generate knowledge, and teacher-education should concern itself with how to infuse knowledge-generation activities in imparting the requisite content. There is a tendency for teachers to teach and believe what they were taught. Teacher educators should cease being lecturers but evolve into organisers of meaningful teaching-learning experiences. They may even require a new designation or new labels reflective of their changing roles. Not all textual content is authentic, and the learner has to unpack the possible bias of the writer who may have an agenda, as in Eurocentrism versus Afrocentrism. The 'new' teacher should partner learners to co-create knowledge. The power dynamics as they exist in the traditional context are seriously challenged. An acknowledgment of learning as co-creation of knowledge and collaborative problem-solving capitalises on the principles of sharing, researching, and evaluating that define learning in this century that will influence the future.

The age of a uniform size for all in education is come to pass and learning needs to be more personalised to ensure that education fits the learner, rather than the learner fitting into education. The future accords opportunities to customise learning to student needs. All available requirements such as technology, human resources, space, and time should be utilised to address learner needs. A redefinition of the role of the teacher is imperative to the personalisation of instruction. Labate (2020) characterises the traditional role of the teacher thus:

> Schools are structurally teacher-centred organizations: the teacher is the central figure as a mediator between knowledge (content) and the student, especially by making professional decisions on how to dispense neat knowledge packages by means of learning activities (be them learner-driven or teacher-driven). (p. 7)

With the proliferation of information, courtesy of the new technologies, the teacher ceases to be the repository of knowledge or the all-knowing authoritative source who can claim monopoly over knowledge and ideas. In fact, some students may be more adept with the new technologies than the teacher, and the latter may have to consult with the former.

"As much as possible, the teacher moves from pedagogy to andragogy. The teacher's role shifts from teaching to assisting each student to learn" (Draves & Coates, 2011, p. 41). A useful strategy is to develop intellectual curiosity through effective problem-posing, and the creation of favourable conditions for learners to succeed in their problem-solving. Teachers should be able to determine what information and tools are necessary for learners to solve problems, and then provide them with these. Problems should drive learning, and knowledge should be acquired and developed in the process of solving problems. Teachers need to assume the role of highly knowledgeable and skilled 'learners' who are as curious to discover solutions to given problems as their students should be. Teachers need a new conceptualisation of their roles in terms of their relationship with learners. In accordance, research-based educational innovations supported by technology, are compulsory for the future. Learning should take precedence over teaching such that learning projects should dominate our teaching.

The authors further posit that the real work, the real challenge, the real make-or-break aspect of teaching, is in the andragogy - the area of helping students to learn. The learners should cease to be passive or reactive participants. Draves and Coates (2011, p. 51) observe, "In the 21st century, students do not just learn content, they also create content". They can also be given opportunities to explain new content to others which allows them to customise it to the recipients. In the pedagogy of the future, failure should not be unduly censured; rather the courage to attempt, fail and learn from failure should be celebrated. While teaching students how to find information in the maze of information 'banks' is imperative, it is not adequate. The possibility is that learners of the present and future already know where such information is found, and how it can be obtained. The teacher needs to justify his or her presence by guiding learners in the voyage, not only of discovery, but more importantly, of creation. The transition has to be from knowledge-absorption (from an authoritative source) to knowledge-critiquing, and then to knowledge-creation. We assume that there has been a marginal shift from the mere absorption of facts to the critical adaptation of information, but the generative component is still lacking. It is our opinion that teacher-education largely operates at the accumulation-of-information level and has barely moved towards the processing and analysing of information when the ultimate goal should be the generation and dissection of knowledge to solve real challenges. Even research students are 'made' to conduct procedures (which is supposed to be quite generative) as part of their requirements for graduation. This is largely contrived and only meant to develop research skills rather than to generate new, real, and useful knowledge. Passive acquisition and reproduction of current information should give way to using knowledge to better the human condition, and to generate more knowledge. Useful pedagogy is one where knowledge will be acquired, critiqued, manipulated, generated and transformed to serve ends, other than itself.

Instructional materials need to become increasingly digital. Brain science shows today's youths' intellectual affinity to digital learning which renders them disengaged with traditional forms of instruction. Teachers and teacher-educators need technological fluency. Social media

needs to be harnessed to bring about learning, and flexibility that allows for learning at any time and in any space. Collaborative learning, mobile learning opportunities, on-line learning, blended learning, and virtual schools will be pervasive in the future. Cooperation becomes instrumental in solving real problems. There is a shift in the traditional pedagogical paradigm precipitated by digital technologies which have little respect for constraints presented by classroom relevance or test accountability. Digital technologies have made it possible for information to get directly to the learners, bypassing the teachers, thus revolutionising teaching and learning. Game designers enable learners to engage in challenging activities for lengthy durations; hence, teacher education and teaching should be aligned to students' and learners' learning propensities so that content, skills and dispositions are developed in an interactive manner.

An education system that equips learners with only intellectual knowledge with no application skills, is bound to fail. Learners need to be equipped with critical-thinking tools of the time. An intelligent, 'unethical' worker may not succeed in his or her career because professionalism and work ethic is increasingly becoming an imperative applied skill in the workplace. While the education system extols the value of individualism and competition, teamwork, collaboration and working in diverse teams are what the workplace celebrates more. There is much need to create a learning context that is more authentic and fits the requirements for the real-world. Flexibility and adaptability are indispensable components in the face of technological change which compels us to adapt to novel ways of communicating, learning, working, and living. Such skills are best developed through complex project-work rather than through traditional pedagogies. Hence, pedagogies for the future should invoke learners' creative capacities to enhance their propensity for thinking in unconventional unique ways.

Costa (2008) laments the obsolescent legacy of Renee Descartes (1593-1650) who classified knowledge into discrete static compartments, which still lives on, only because of the convenience it gives to time-allocation, employing and training teachers, testing, and other such 'conveniences'. The education of learners has progressed more on the basis of conveniences than on what really benefits the learner. This has led to some bodies of knowledge being privileged over others such that teachers remain in compartments occasioned by their specialisations while missing out on collaborative ventures. "Cross-curricular competences and transversal skills are harder to associate with individual subjects and to reflect in specific learning outcomes. Knowledge is generally interdependent" (Siarova et al. 2017, p. 7). The future is gravitating towards trans-disciplinary bodies of knowledge to solve real-life challenges. Professions need diverse knowledges for realising success; and this facilitates and promotes the transfer of knowledge rather than what Costa and Kallick (2014, p. 129) call "episodic, compartmentalized and encapsulated thinking in students".

Contribution to Social Change

There are many schools of thoughts regarding what social change is and how education can bring social change. We submit, in this paper, that the role education should play in society is neither that of societal preservation as functionalism advocates (Durkheim, 1895), or of merely reflecting the nature of society, but that of leading the change in society. While the direction society will take in future cannot be attributed to a single factor, espousing the idea of education influencing that trajectory provides prospects of proactively instituting in the present, measures and systems that would best ensure the realisation of the ideals. A preservation, reactive, reactionary and reflection or reproduction role of education in relation to society means presuppose that education waits to establish the nature of societal change and then responds to it. Considering the speed and scope of societal change, by the time education attempts to react to document the nature of social change, society would have changed. Little wonder then how present-day curriculum still mirrors the bygone industrial age. The accumulation of grades, extrinsic motivations, competitive ranking of learners, the semblance of meritocracy, standardardised instruction and assessment, as well as censure of failure evident in schooling today are relics of the traditional schooling paradigm.

CONCLUSION

There is an urgency to relook at the totality of the education system (e.g., pedagogical practices, assessment regimes, worthwhile knowledge selection, the learning environment etc.) to be in line with ever-evolving learner profiles, technological advances, and social developments. While it is acknowledged that society is a rapidly moving target, education has regrettably been shooting where the target used to be. Educating yesteryear students today, using yesterday's teaching methods and assessments practices, within a modernised traditional classroom, and expecting them to function in the future, will be like batting in the dark. The fact that we cannot determine with precision ascendant knowledges and technologies in the future, today's education should develop adaptable and versatile students, who will be able to function in an ever-evolving global landscape. Adaptable and versatile students can only be a product of an adaptable system. Adaptation and versatility in one area would not suffice. A wholesale transformation in what is taught (content, skills, dispositions, attitudes), how it is taught (pedagogy), how learning is guaranteed (assessment), where learning takes place (environment), the tools used (media and technology), and the roles of the key stakeholders (teachers, learners, administrators) is needed. Education for the future comes with novel skills (initiative, resilience, risk-taking, metacognition, etc), new technology trends, new ways of learning that are active and constructive, and new platforms of learning (virtual). Even learning patterns and trajectories will continue to be volatile as they accommodate classroom diversity and heterogeneity.

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