Redesigning the 3R's and Core Academic Subjects to Improve Learning, Teaching and Assessment in the New Learning Paradigm

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Abstract

Pedagogies that made teaching, learning, assessment and curricula of the 20th century the great success that it was were designed and implemented with an emphasis on what are generally referred to as the 3R's of basic education, namely reading, -riting, –rithmetic and related subjects. Those pedagogies produced graduates that were well skilled for the Industrial Age economy. However, mainly due to the ubiquitous penetration of microelectronics and digital technologies into every day living, trades, businesses and occupations, a New Learning Paradigm is needed to equip graduates with the skills they need to succeed in the Knowledge Age economy. The Partnership for 21st Century Skills (P21) (P21, 2009) conceptualises those skills as consisting of not just the traditional core subjects, but also what they characterize as the Learning and Innovations skills, the Career and Life skills, as well as the Digital Literacies skills. They argue that the traditional core skills need to be redesigned as explained in this paper to form part of the New Learning Paradigm.

Keywords: 3R's of basic education, Core academic subjects, Industrial Age economy, Knowledge Age economy, 21st century skills, New Learning Paradigm, Redesigning curriculum, Partnership for 21st Century Skills

1. Introduction

To contextualize the paper, a brief description of what is known as the Partnership for 21st Century Skills is given and the 21st century skills are then outlined. The concept of what is now popularly referred to as the New Learning Paradigm is explained and the skills it comprises are articulated. That is followed by a discussion of how the 3R's and core academic subjects need to be redesigned to improve teaching, learning and assessment in the New Learning Paradigm.

What is the Partnership for 21st Century Skills?

Over the last fifteen years or so, authorities in the USA have been working hard to pioneer and champion "the movement toward a 21st century approach to education" (Trilling & Fadel, 2009, p.168). This movement was spurred on by the realization that in the USA "In 1991, Knowledge Age expenditure exceeded Industrial Age spending by $5 billion ($112 billion versus $107 billion [and] marked a monumental shift from Industrial Age production to the Knowledge Age economy [in] a new age of information, knowledge and Innovation" (Stewart, 1998 in Trilling & Fadel, p. 3). In particular:

As the world has transitioned from the 20th century Industrial Age to the 21st Information Age, there is an increasing awareness that the skills that led to success in the 20th century are no longer sufficient to lead to success and prosperity in the 21st century.

Aware of the need for change in teaching, learning, assessment and work so as to be effective participants in the 21st century conditions,… a movement called the Partnership for 21st Century Skills (P21), … was started in 2002 in the USA with the explicit mission to bring the power of technology to all aspects of teaching and learning. (Kivunja, 2015a, p. 2)

The overriding objective of P21 was "to forge a common vision for education that will prepare our young people for college, work and life" (NEA, 2014, p.2).

Or, as the Chair of the Partnership put it, their goal was to answer "a question of paramount importance to America's educators, employers, parents and the public, [namely] How can we best prepare students to succeed in the 21st century?" (P21, 2014b, p. 2).

As the Partnership (P21, 2014b) explains, "The Partnership for 21st Century Skills is a unique public-private organization formed in 2002 to create a successful model of learning for this millennium that incorporates 21st century skills into our system of education" (p. 1). The public and private organizations in this Partnership include AOLTW Foundation, Apple Computer Inc., Cable in the Classroom, Cisco Systems, Inc., Dell Computer Corporation, Microsoft Corporation, National Education Association, Systems Applications and Programs (SAP), the USA Department of Education, Appalachian Technology in Education Consortium, Consortium for School Networking, the International Society for Technology in Education (ISTE), State Educational Technology Directors Association (SETDA), and Columbus' Tech Corps, dedicated to educating, exciting, and empowering K – 12 students with technology (P21, 2014b,).

Which are the 21st Century Skills?

In what they called the *Framework for 21st Century Learning* the Partnership (P21, 2011a), broadly defined 21st century skills as "the skills, knowledge and expertise, which need to be effectively taught, and which students must master to be well prepared for success in the Digital Economy" (Kivunja, 2014b, p. 40). Following Trilling and Fadel (2009) Kivunja (2014a) refers to them as "the skills that young people need in order to succeed as individuals, citizens and workers in the 21st century" (p. 85). Trilling and Fadel (2009) explain that those skills consist of core academic skills, learning and innovations skills, career and life skills as well as digital literacy skills. The learning and innovations skills include what the Partnership (P21, 2015) call "the 4C's – super skills for 21st century" (p. 1), of critical thinking and problem solving, collaboration, communication as well as creativity and innovation. A detailed discussion of what the learning and innovations skills involve and how they can be taught effectively was given in Kivunja (2014b). The career and life skills include teamwork, leadership and responsibility, initiative and self-direction, flexibility and adaptability, social and cross-cultural interaction, career and learning self-reliance, as well as productivity and accountability. Kivunja (2015a) presented a good account of these skills and how they can be taught. The digital literacy skills include information literacy, media literacy and ICT literacy and were discussed at length in Kivunja (2015c). Considered together, the 21st century skills represent "a vision for 21st century student outcomes (a blending of content knowledge, specific skills, expertise and literacies) and the support systems that are needed to produce these outcomes" (P21, 2015, p. 8) necessary for success at school, college, university, work and life after studies.

What's the New Learning Paradigm?

The New Learning Paradigm is the new philosophical approach to pedagogy which posits that for education to truly meet "the moral purpose of education and help produce citizens who can live and work productively in increasingly dynamically complex societies" (Fullan, 2000, p. 4), learning, teaching, assessment and curricula need to equip graduates with the skills that will enable them to contribute effectively to productive capacities of the 21st century economy. These are the skills demanded by employers across all sectors of modern economies as for instance explained well by Wagner (2010) when he reports:

For our production and crafts staff, the hourly workers, we need self-directed people who either have problem-solving skills or can easily be trained to think on their feet and find creative solutions to some very tough, challenging problems. We no longer have supervisors who take control… and so we look for a different employee than a few years ago: one with critical thinking skills, creativity, mechanical aptitude and a passion to embrace new ideas. That is what we need for our workforce and our business to succeed in today's [Knowledge Age economy]. (p. 19)

Over the years, it has not been easy for educational institutions to introduce this New Learning Paradigm. This is not surprising since we know from the work of Gagne, Wagner, Golas and Keller (2005) that "schools are one of the slowest changing cultural institutions" (p. 210).

The reasons for such slow transition are to a great extent explained by what Kivunja (2015d) calls the "***TTWWADIAH*** syndrome. This is the thinking that we don't need to change because **T** hat's **T** he **W** ay **W** e've **A** lways **D** one **I** t **A** round **H** ere" (p. 421). This is all the more reason why pedagogues in all education sectors need to inform themselves of the urgent need to redesign the traditional 3R's and Core Academic Subjects as part of the New Learning Paradigm.

The redesigning of the 3R's and Core Academic Subjects is the main thrust in the subsequent sections of this paper.

2. The 3R's and Core Academic Subjects and Skills of the New Learning Paradigm

In the *MILE Guide for 21ˢᵗ Century Skills: Milestones for Improving Learning and Education* the Partnership (P21, 2015) categorically asserts, "No 21ˢᵗ century skills implementation can be successful without developing core academic subject knowledge and understanding among all students" (p. 3). The Partnership adds that the success of "… the vision for 21ˢᵗ century skills integration relies upon student mastery of the core subjects… All 21ˢᵗ century skills should be taught in the context of core academic skills" (Ibid, p. 3). So, what are these core academic subjects and skills that students need to be taught in the New Learning Paradigm? According to the Partnership (P21-57, 2014) the traditional core subjects and skills for 21ˢᵗ century learning consist of a core of academic subjects and five interdisciplinary themes as outlined below.

The Traditional Core Subjects

Trilling and Fadel (2009) explain that "the traditional core subject areas that are taught in most schools today usually include reading, writing, language arts (in the native language), world languages (second or third language), mathematics, science, economics, the arts, social studies and geography, government and civics, and history" (p. 45). These core academic subjects are very important because, as well articulated by the Partnership (P21, 2015), "Mastery of these core academic subjects is the base upon which all 21ˢᵗ century learning occurs" (p. 8). However, in preparing students for effective participation in the Knowledge Age economy these core subjects need to be interwoven with five interdisciplinary themes, which P21 (P21, 2015) identify as Global awareness, Financial, economic, business and entrepreneurial literacy, Civic literacy, Health literacy, and Environmental literacy discussed below.

The Five Interdisciplinary Themes of the Core Skills Domain

Although it is conceivable that there are many important and interesting interdisciplinary themes, the Partnership identified these five themes as the areas that are important now and are likely to grow in importance in the future, and yet they are not typically covered in current school curricula (ACOT, 2008), hence the need for the redesign so as to implement the New Learning Paradigm.

Global Awareness Skills

Twenty-first century globalisation has rapidly increased global interdependence of countries. ACOT (2008) put it well when they said:

In a remarkably short period of time, the world and its people, economies, and cultures have become inextricably connected, driven largely by the Internet, innovations in mobile computers and devices, and low-cost telecommunications technology. This global interdependence has profound implications for all aspects of American society—from how we think and work to how we play and learn. (p. 6)

Ted McCain (2007) concurs when he says, "In the last quarter century, the working world has undergone a significant change as a result of the explosion of microelectronics into everyday life. … This rapid proliferation of the use of electronic technology" (p. 7), especially Internet driven technologies, has shrunk the world into a global village. In the global village economy, many people work in international companies that have offices that are connected together by the Internet in different parts across the globe, working on a 24/7 basis, in different time zones of the world. This means that employees in one country can finish their shift and pass work on to other workers in the same company but in a foreign country. This is where the global awareness theme assumes its importance for, "although connecting the computers around the globe is quite easy, getting workers to problem-solve jointly with people they never meet with face to face is a challenge" (McCain, 2007, p. 10). The challenge involves not only communicating across languages but also flexibility to handle whatever issues or problems were initiated by employees in the international office, problem-solving, innovation and creativity to provide solutions to problems that originated in a different country.

Aware of these problems, the Partnership (P21, 2011b) recognises global awareness as one of the key interdisciplinary themes that students need to be taught in addition to the core academic skills in the redesigned curriculum of the New Learning Paradigm.

The Partnership asserts that "Language education and cultural understanding are at the heart of developing global awareness for students" (P21, 2011b, p. 5), and so it advocates the teaching of foreign languages to students to help them appreciate the different perspectives that speakers of other languages have about global issues. Training in global awareness helps students to understand, not only different languages, but also culture, religions, values, beliefs and views on the world that other people might hold, that may be different to their own. Such training can help students develop better interpretive communication skills so they learn to listen, read and interpret the meaning intended by their foreign correspondents, improve their interpersonal communication skills so they can negotiate meaning of messages they share with people in foreign offices, and improve their presentation communication skills so they consider well the impacts of their written or oral messages on their clients in overseas offices. Training students in global awareness also involves dealing with immigration issues to help students understand better international interactions and relations. Using the digital technologies available in the Knowledge Age economy students can be given real-world projects that give them opportunities for genuine engagement with students in other countries. In sum, global awareness involves:

• Using 21st century skills to understand and address global issues
• Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue in personal, work and community contexts
• Understanding other nations and cultures, including the use of non-English languages. (P21, 2009, p.2)

Trilling and Fadel (2009) highlight well the importance of dealing with this theme carefully when they propose that this theme requires an understanding of both global and local 21st century problems which they characterise as the big 5E problems which determine the quality of life locally in any country and globally across nations. They say that these problems call for local and global awareness regarding access to a good education (E1), ability to generate income in a healthy economy (E2), having access to affordable and sustainable energy (E3), looking after a healthy environment (E4) and eliminating poverty and promoting equity (E5) locally and globally. These leaders in the field emphasize:

Harnessing students' passion to solve local versions of these global issues that define our quality of life may be one of the best ways we have to fully engage students in their learning, build 21st century skills, cultivate meaningful and memorable knowledge, and actively apply learning to useful work. (Trilling & Fadel, 2009, p. 156)

The financial, economic, business and entrepreneurial literacy

Just as globalization has created unprecedented interdependence among nations, so also has it created a confluence of hitherto unparalleled interconnectedness and competition among global financial markets, economic activities across national boundaries, and a greater need for business and entrepreneurial literacy at an international level. As a result, the theme of the financial, economic, business and entrepreneurial literacy is closely related to the global awareness theme. This was well articulated by the Committee for Economic Development (CED, 2006) when they asserted:

To compete successfully in the global marketplace, U.S. –based multinationals as well as small businesses must market products to customers around the globe and work effectively with foreign employees and business partners. Our firms increasingly need employees with knowledge of foreign languages and cultures. For example, cultural competence and foreign language skills can prove invaluable when working on global business teams or negotiating with overseas clients. (p. 2)

Thus, foreign language skills and an understanding of global cultures influence the conduct of financial, economic and other business interactions at an international level and should be taught well to students.
The Partnership identifies three areas that students need to be taught in the redesigned curriculum for the New Learning Paradigm to develop skills essential for this theme. They articulate them as (P21, 2009, p2):

• Knowing how to make appropriate personal economic choices
• Understanding the role of the economy in society
• Using entrepreneurial skills to enhance workplace productivity and career options.

As illustrated in Vineland School District (Vineland, 2014) training students for the skills of this theme involves many strategies aimed at achieving different learning outcomes and at different levels of performance.

At the beginning level they include teaching them how to identify how personal financial choices, such as short term budgets, and economic choices, such as utilization of scarce resources, can affect them and the wider community. Secondly, at the emerging level students should be able to describe the impacts of personal financial choices and economic choices impacts on them personally and on the wider community. Thirdly, at the proficiency level students should be able to analyze the impacts of their personal financial choices as well as impacts of economic choices on the community. Fourthly, at the advanced level students should be able to apply decision-making processes so as to effectively analyze the impacts of personal financial choices as well as the impacts of economic choices on the wider community.

Global interconnectedness requires that graduates learn about financial, economic and entrepreneurial business issues involving their country and other countries, not only the trading partners, but also those in which they can study, develop acquaintances or visit for exposure to different languages and other cultural attributes. As globalization has advanced, it has increased the need of people to be able to talk with and to deal with others that do not speak their language. The Partnership proposes that "Those who are able to communicate with others in their native language will naturally feel more empowered to negotiate with those around the world as they engage in entrepreneurial activities" (P21, 2011a, p. 5).

Civic Literacy Skills

Henry Milner (2002) takes a rather narrow view of civic literacy and focusing mainly on the political dimensions of this theme defines it in terms of being able to understand and to take interest in politics, and using civic skills as the stimulus for engaging in political activities. However, in *Literacies for the Digital Age* Stambler (2013) takes a broader view and defines civic literacy as: "the knowledge of how to actively participate and initiate change in your community and the greater society. It is the foundation by which a democratic society functions: Citizen Power as a check and as a means to create avenues for peaceful change" (p. 2).

In the redesigned curriculum for the New Learning Paradigm teaching students civic literacies involves educating them in core civic content knowledge about their civic responsibilities and how to apply that knowledge to different circumstances and settings. In the globalised economy of the 21st century this includes an understanding of the judicial, legislative and government functions of overseas countries and ability to compare and contract those with the civil liberties and responsibilities in one's own country. It involves, for example, the ability to communicate well at home and overseas, ability to reach out to others that need help, ability to develop tactics for dealing with and conducting business with others, ability to negotiate bargain and persuade others, ability to set what Peter Drucker (1954) calls SMART goals (that are Simple, Measurable, Achievable, Realistic and Timely) and pursuing them to implement them, and ability to plan and assess capacities for institutional attainment (Stambler, 2013).

The Partnership delineates three sets of skills that should be taught to help learners acquire the abilities and capacities of this theme (P21, 2009, p. 2):

• Participating effectively in civic life through knowing how to stay informed and understanding governmental processes
• Exercising the rights and obligations of citizenship at local, state, national and global levels
• Understanding the local and global implications of civic decisions

Vineland (2014) gives some examples of how the skills of this theme can be taught and the levels of achievement that can be expected from students who have been taught civic literacy skills. At the beginning level students can be expected to demonstrate minimal awareness of civic issues and how those issues impact on the community; with little or no cognisance of other peoples' impacts in the local community. At the emerging level students should be able to demonstrate some awareness of civic issues, but they are not able to recognise the impacts of those issues on their local community. However, students are aware of their presence and that of others in their local community. At the proficient level students should be able to demonstrate awareness of their personal role in their school community by adhering to the school rules and meeting school expectations. They should also take responsibility for their actions and respect the rights of others in the local school community.

When students have attained civic literacy skills at the advanced level they should be able not only to demonstrate awareness of their personal roles in the school community, but to also play leadership roles as examples to other students. They should also act responsibly and respect themselves and other members in the local community.

Health Literacy Skills

The World Health Organization (WHO, 2009) defines health literacy "as the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" (p. 1). They explain that defined in this rather broad sense:

Health Literacy goes beyond a narrow concept of health education and individual behavior-oriented communication, and addresses the environmental, political and social factors that determine health. Health education, in this more comprehensive understanding, aims to influence not only individual lifestyle decisions, but also raises awareness of the determinants of health, and encourages individual and collective actions which may lead to a modification of these determinants. (Ibid, p. 1)

The Partnership for 21st Century Skills (P21, 2009) identifies five sets of skills that students need to be taught in the redesigned curriculum of the New Learning Paradigm to help them gain abilities and capacities of this theme. They specify them as:

- Obtaining, interpreting and understanding basic health information and services and using such information and services in ways that enhance health
- Understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance and stress reduction
- Using available information to make appropriate health-related decisions
- Establishing and monitoring personal and family health goals
- Understanding national and international public health and safety issues. (p. 3)

Because of the global interconnectedness of countries in the digital age, it is important that our graduates are aware of health issues on a global level and are able to discuss matters relating to health, the environment, and public healthy issues across international borders. Trilling and Fadel (2009) describe an excellent example of how students were taught these skills in "The SARS Project – SARS as in Severe Acute Respiratory Syndrome" (Trilling and Fadel, 2009, p. 45). Following the outbreak of the deadly SARS virus in late 2002 and early 2003 in southern China, six students from high schools across the globe, Kian Huat in Malaysia, Ming Huan from Singapore, Barthe and Jorrit from the Netherlands, Ahmed from Egypt, and Van from the USA, formed a global team which worked together to create an online, Web site that contained information each student collected from experts that they interviewed in their countries and around the world (Trilling & Fadel, 2009). To reiterate the definition of health literacy skills given at the start of this section, here was a great illustration of the acquisition and utilisation of "the cognitive and social skills, which determine the motivation and ability of individuals to gain access to, understand and use information in ways that promote and maintain good health" (WHO, 2009, p. 1).

This example also illustrates the learning outcomes that Vineland (2014) prescribe for their students taught the skills of this theme. At the beginning level, they expect students to struggle as they try to identify situations that contribute to healthy decision-making, as well as identifying principles of personal well-being and developing emotional and situational perspectives of others. At the emerging skills level, they expect students to be able to identify situations that contribute to healthy decision-making, identify principles of personal well being and begin to develop emotional and situational perspectives of self and others. For students that have achieved proficiency in the skills of this theme, Vineland expect that they should be able to analyze situations that contribute to healthy decision-making, analyze principles of personal well-being and be able to develop emotional and situational perspectives of self and others. Those students who achieve the outcomes of this theme at the advanced level should be able to evaluate situations that contribute to healthy decision-making, evaluate the principles of personal well-being, and apply emotional and situational perspectives of self and others to influence change. It would appear that the six students that participated in the SARS Project set up a global structure that facilitated an identification of situations that could contribute to health decisions about the SARS virus, were engaged in analyzing those situations and principles that people could follow to maintain personal well-being in spite of the SARS epidemic, and created opportunities for evaluating situations that could contribute to healthy decision-making in consideration of the SARS global emergence.

Their Project showed that they could apply emotional and situational perspectives of self and others across the world to influence proactive change that could mitigate the incidence and spread of the SARS virus.

Environmental Literacy Skills

The Victoria Association for Environmental Education (VAEE, 2015) in Australia defines environmental literacy "as the capacity to perceive and interpret the relative health of environmental systems and to take appropriate action to maintain, restore or improve the health of those systems" (p. 1). As concern for the sustainability of the environment has steadily grown over the past four decades, there is an increasing realisation that educational institutions, particularly higher education institutions, have an important contribution to make to the training of graduates that are well informed about the health of the environment and how it can be sustained (Orr, 1992, 2004; Tilbury, Podger & Reid, 2004). Environmental sustainability is extremely important for mankind because, as pointed out by Sterling (2004) it "means working to understand and realize sustainability values in ways where economic, social and ecological dimensions are as far as possible mutually enhancing. It's about creating the conditions of survival, security and wellbeing for all" (p. 88). The teaching of environmental literacy skills in the redesigned curriculum is thus essential not only for the well-being of humans but more so for their very existence, by enabling graduates to be aware of the potential of humans to destroy the environment and to take measures that promote ecological equilibria.

The Partnership (P21, 2009) outlines four areas that need to be developed to teach students the skills of this theme in the redesigned curriculum. They state them as the ability to:

- Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as it relates to air, climate, land, food, energy, water and ecosystems
- Demonstrate knowledge and understanding of society's impact on the natural world (e.g., population growth, population development, resource consumption rate, etc.)
- Investigate and analyze environmental issues, and make accurate conclusions about effective solutions
- Take individual and collective action towards addressing environmental challenges (e.g., participating in global actions, designing solutions that inspire action on environmental issues). (p. 3)

The VAEE (2015) gives a very good account of the types of skills and abilities which graduates that have been well educated in the abilities and capacities of the environmental literacy skills should be expected to demonstrate. These are summarised below.

1. Ability to think in terms of systems; e,g., the ability to analyze and understand how our actions impact the life systems of the planet.
2. Ability to think ahead; e.g., the ability to project the long term results of behaviors and actions taken now and in the future.
3. Ability to think critically about issues which involve personal values and beliefs; e.g., the ability to respect, consider and evaluate all aspects of an issue and to clarify what we value.
4. Ability to move from awareness to understanding to positive action.e.g., the ability to convert awareness into positive action.
5. Ability to distinguish reality from the projected; e.g., the ability to distinguish visionary images from the reality of the relative health of the planet.
6. Ability to learn new concepts and unlearn old ones; e.g., the ability to be life long learners who are able to interpret new knowledge and replace old knowledge.
7. Ability to communicate; e.g.; the ability to articulate thoughts and ideas and to offer persuasive and informed arguments.
8. Ability to value the aesthetic as well as the conceptual; e.g., the ability to recognize the value of such things as beauty, harmony, connectedness and balance and include these in decision making processes.
9. Ability to make a long-term commitment to work cooperatively on issues of concern; e.g., the ability to solve environmental problems cooperatively.
10. Ability to critically evaluate the effects of change before influencing change; e.g., the ability to ensure that change will result is a positive effect, in terms of the long-term health of the environment.
11. Ability to offer leadership that supports meaningful change; e.g., the ability to demonstrate personal conviction and dedication to ecological stewardship.
12. Ability to attain a balanced lifestyle that includes quality immersion experiences in the natural world; e.g., the ability to adopt a balanced lifestyle that includes quality experiences interacting with natural landscapes.

3. How do we Support and Assess These Skills?

Kivunja (2015d) argues that in a well-integrated pedagogy, assessment should not be treated as a separate entity but as part of an "inextricably interconnected and intricate trilogy of a holistic education" (p. xvii) involving learning, teaching and assessment. He asserts that "teaching, learning, and assessment all need to be treated as the three pillars of curriculum in an integrated pedagogy" (Kivunja, 2015d, p. 3) and so having discussed what the core academic subjects and skills are and how they can be taught, it is important to consider how we can assess and support the learning and teaching of those core academic skills in the redesigned curriculum of the New learning Paradigm. The *Framework for 21st Century Skills* stipulates that the core academic subjects and the five interdisciplinary themes discussed above need to be assessed and supported by four systems that the Partnership (P21, 2011a) calls 21st Century Standards and Assessment, Curriculum and Instruction, Professional Development and Learning Environments. The Partnership emphasizes that these are "the support systems necessary to ensure student mastery of 21st century skills" (P21, 2015, p. 10). This section discusses how the assessment and support should be provided to improve learning, teaching and assessment in the New Learning Paradigm.

Standards and Assessment

The redesigned core academic subjects require that to achieve rigor and the high standards expected, assessment be predominantly formative (Irons, 2007; Sadler, 1998) rather than summative (Eberly Center, 2014; Harlen, W. & Deakin-Crick, R. (2002), use strategies that fully capture the varied dimensions of 21st century learning (ACOT, 2008), and seek to encourage students to engage in higher order thinking, critical thinking and problem solving rather than low order cognitive processing involving mere memorization and recall (Bloom, (1956).

The Partnership (P21, 2015) suggests a number of ways in which high standards can be attained and assessed in the redesigned curriculum of the New Learning Paradigm. Firstly, student progress in mastering core subjects should be assessed over time rather than at one instance. This assessment should be comprehensive and balanced so that it uses both formative and summative measurements of student achievement. However, summative assessment should be used sparing because "the work of Harlen and Deakin-Crick (2002) has shown that summative assessment can have negative impacts on learners including a lowering of the self-esteem of less successful students which can reduce their effort and their image, a shift towards performance goals (e.g. cramming to pass an exam) rather than learning goals, the creation of test anxiety, judgments of value being made about students, by themselves and others; the restriction of their learning opportunities by teaching that which is focused on what is assessed" (Kivunja, 2015d, p. 77).

Secondly, students should be given opportunity to play an active part in the recording and interpretation of their classroom performance. This should help them gain an understanding of their performance so that they can use this feedback to inform and improve their class work. This means that you should "design the assessment tasks such that they will provide feedback which will enable you and the students to recognise where they are on the journey of achieving the learning outcomes and to recognise the next steps and how to take them" (Kivunja, 2015d, p. 80). Thirdly, a large majority (75%) of student work should be assessed at the classroom level for mastery of the academic core subjects and 21st century skills. Fourthly, to cater for the diversity of abilities among students (Kivunja, 2015d), a wide variety of classroom-based assessment strategies should be used. Fifthly, the large number of stakeholders in educational standards and assessment should be given information about the assessment of core subjects and 21st century skills. For example, in *Understanding Assessment,* the Centre for Applied Linguistics (CAL, 2014) in Washington, DC, summarizes most of the stakeholders involved in assessment in the USA to include 'test-takers, administrators, parents, teachers, instructors and many more' (CAL, 2014, p. 1). All these should be treated as partners whose understanding can facilitate the implementation of standards and assessment in the New Learning Paradigm. Finally, the Partnership recommends that in the New Learning Paradigm all assessment data should be shared by all stakeholders and used as part of a transparent process whose major purpose is to support improvement in student, teaching and assessment.

Curriculum and Instruction

In the redesigned curriculum and instruction "in the 21st century classroom or lecture theatre, teachers can no longer teach effectively through the application of the traditional individualistic or competitive learning models (Johnson & Johnson, 1978). Rather, what is needed is collaboration among students as well as between students and teachers" (Kivunja, 2014c, pp. 551 – 552).

To be effective in enabling learners to master the content of core academic subjects the redesigned curriculum and instruction need to offer learners opportunities for active learning (Piaget, 1923) and social construction of knowledge (Vygotsky, 1978). Teaching should maximise student participation in mastering content and skills through implementation of Bruner's (1966) 5E Instructional model involving student engagement, exploration, explaining, elaborating and evaluating. Instructional strategies should be student-centred, rather than teacher-centred, and should explicitly teach students how to engage in critical thinking, self-regulated learning and problem-solving.

Many leaders in pedagogy, including Johnson and Johnson (1994), Kagan (194), Slavin (1988) and Stahl (1997) argue that when students are given opportunities to learn together in non-individualistic, non-competitive collaborative structures, they learn better because they are able to exercise positive interdependence, individual accountability, equal participation, group processing and simultaneous interaction. These five principles of cooperative learning should form part of the instructional strategies redesigned to help learners gain mastery of the academic core skills in the New Learning Paradigm.

The Partnership (P21, 2015) recommends that to facilitate mastery of the core academic content, curricula should be designed with a "primary focus on core academic content knowledge. [Additionally], between 25 – 75% of core academic content curricula [should] explicitly integrate 21st century skills along with global awareness, civic literacy, financial literacy, healthy literacy and environmental literacy" (p. 15). The Partnership also recommends that students should be actively involved in the planning and implementation of teaching and learning activities.

Learning in the digital age occurs in contexts in which the most permanent feature is change. It is therefore essential that curricula programs and decisions are reviewed regularly and redesigned as needed to promote the efficacy of curriculum and instruction in the New Learning Paradigm. Furthermore, curricula and instruction should be redesigned for understanding, applying the knowledge and skills learnt to real-life situations that have significance in the students' lives, analysing, evaluating and creating new ideas and concepts with provide for deep mastery of core subject knowledge rather than surface learning (Aharony, 2006; Chin & Brown, 2000).

Professional Development

Given the complexity and novelty of the New Learning Paradigm, all those involved in the teaching of the core academic subjects need to be given professional development primarily designed to improve their capacity to teach the core academic subjects and skills and to align them well with the skills of the other three domains of 21st century skills. The Partnership (P21, 2015) recommends that "over 75% of professional development [should] focus on improving educator capacity to teach core academic content for understanding, in ways that enhance 21st century skills mastery" (p. 15).

Because of the high profile that technology plays in teaching, learning and assessment today, it is vital for the success of the redesigned curriculum to ensure that all pedagogues have opportunities for easy access to self-paced, technology-enabled professional development. All participants should be encouraged to engage in what the Partnership (P21, 2015) calls "technology-infused professional development" (p. 15) so as to improve their digital fluency.

It is highly likely that pedagogues, even in one institution, will be at different levels of mastering instructional strategies for the New Learning Paradigm. It is therefore important that professional development opportunities and programs be tailored to the individual needs of teachers and lecturers so as to maximise their effectiveness and utility. Furthermore, as the redesigning of the core academic skills is new, a significant feature of professional development for pedagogues is that they need to be given exemplars of what good pedagogical practice looks like, when implementing the New Learning Paradigm.

The Partnership (P21, 2015) also recommends, that "All educators [should] have access to and use capacity-building learning communities, professional coaches, technology infrastructure and instructional tools that enhance student mastery of 21st century skills [and] teaching standards, teacher preparation and teacher certification processes [should] integrate 21st century skills" (p. 15).

Learning Environment

Kivunja (2015d) says "that learning is an active process that needs to be contextualised in the learner's real life situation and reinforced by hands-on experiences.

Informed by this understanding, an effective way to facilitate learning is by creating a learning environment which gives learners opportunities to be actively engaged in real-life hands-on activities" (p. 8). In line with Vygotsky (1981) we also learn from Kivunja (2015d): that the social-cultural-technological environment within which a child is immersed has a profound influence on their cognitive development. Second, learners can extend their Zone of Proximal Development with the assistance of anyone who recognises their current learning need and is capable of lending the needed support. That person does not have to be a qualified classroom teacher or academic pedagogue. It could be another child, another learning adult or peer, or a parent. (p. 15)

This theoretical perspective informs our understanding of the importance of creating a learning environment that supports learning and one in which students can interact with each other and provide support for their peers.

We also know from Siemen's (2004) connectivist paradigm of learning in the new technological society that students learn in interconnected, collaborative environments that are open-ended and in which computer mediation, driven by internet technologies, facilitates and enhances learning. Students therefore need to be given every opportunity to use these technologies and to use them to share core academic knowledge in the New Learning Paradigm. But much as giving students access to modern technologies can facilitate learning, it is important to realize all students learn differently (Cassidy, 2004; Dunn & Dunn, 1978; Gardner, 1999) and therefore for you to create an optimal learning environment for your students, you should endeavor to use instructional strategies that match each learner's individual learning style. Those strategies should be supported with the creation of a classroom environment in which students' behaviors are goal-oriented and on-task, and with high expectations that every student can achieve the outcomes of the academic core subjects.

In the efforts to create an effective learning environment for the teaching of core academic subject content in the New Learning Paradigm, it is important to realize that no conditions of the classroom can be set as a permanent optimal learning environment. For example, in the New South Wales (Australia) Quality Teaching Model (NSW DET, 2003), the Department of Education recognizes the dynamic nature of the processes that contribute to an effective learning and teaching environment and identifies them as a quality-learning environment that plans and facilitates three dimensions, namely *intellectual quality learning* in which children are engaged in the construction of *deep knowledge* and understanding of ideas, concepts, issues and skills that have *significance* in their lives at school and beyond school (the italics emphasize the three dimensions of the NSW Quality Teaching Model). Achieving these three dimensions is not easy, but learning-teaching environments in which they exist create learning contexts which, in the words of Carnes (2011), active learning takes place and children "attend classes that set their minds on fire" (p. 72).

As already said, it is not easy to create a learning environment that is ideal for every learner. In trying to create an optimal learning environment for the redesigned curriculum the Partnership (P21, 2015) recommends that efforts should be made to provide every student with a personal learning plan that indicates how the student can be supported by the school to master the core academic content and 21st century skills. Additionally, the Partnership advocates the provision of flexible and adaptable physical and technology structures, which create a learning environment in which students can engage in collaborative group work. In an experiment in which undergraduate students at a university in Australia were given opportunities to complete their learning and assessment tasks using digital technologies that provided for collaboration Kivunja's research (2015b) found a fourfold increase in student participation in their discussions and engagement with the learning resources and that students felt they were working in a user-friendly and supportive learning environment. This is a good example of how the social media technologies that the students used created a learning environment which gave them opportunities to develop core academic subjects and skills while practising 21st century skills.

4. Conclusion

For our graduates to be able to effectively compete and win in the 21st Knowledge Age economy they need to be equipped with the skills of the 21st century. An effective integration of these skills requires that students be given a strong foundation in the core academic subjects and skills. Mastery of these subjects and skills is the basis for becoming an educated person in the digital economy.

Redesigning the 3R's and core academic subjects is not just tinkering with minor pedagogical changes but by involves major restructuring and making significant changes to the way education is delivered in educational institutions from K – 12 and particularly in higher education.

As this represents significant and complex changes, successful implementation should heed Fullan's (2001a) advice that "the only way to get substantial improvement is to work through the complexities of change [with all stakeholders concerned] until we get shared meaning and commitment" (p. 272). This means that all stakeholders, including students, parents, teachers, principals and education leaders need to understand the need for redesigning this new way of teaching so that they share this vision of the New Learning Paradigm, support its implementation and get committed to its success. What is required in the words of Denzin and Lincoln (2000) is "the avowed humanistic commitment [to the implementation of the redesign] from the perspectives of the interacting individuals" (p. xvi) so that there is broad support for the redesigned curriculum.

All stakeholders need to appreciate that TTWWDIAH is no longer an option to prevent redesigning pedagogical practice. Instead, they should work in partnerships to embrace the New Learning Paradigm and prioritise the teaching of the new core academic subjects, assessment and support systems. What is urgently needed, to use Fullan's (2001b) language, is to "mobilise people's commitment to putting their energy into actions designed to improve things" (p. 9). Such commitment is needed to harness the collaborative efforts of all the stakeholders involved so as to equip students with the skills they will need to graduate with in order to succeed in work and life in the 21st century digital economy. The redesigning of curricula and instruction should be the start of a process of continuos improvement to learning, teaching and assessment so as to implement the New Learning Paradigm.

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