

Ideals versus realities of adolescent learning in the 21st century: An examination of the role of cognitive education (coged) in preparing adolescents for 21st century challenges

By

Kingsley Chinaza Nwosu

Department of Educational Foundations, Faculty of Education, Nnamdi Azikiwe University,
Awka

kingsmcjudec@yahoo.co.uk

Mary Grosser, PhD

School of Educational Sciences, North-West University (Vaal Triangle Faculty), Vanderbijlpark,
South Africa.

mary.grosser@nwu.ac.za

And

Victor C. Nwanguma

Department of Educational Psychology and Guidance and Counselling, A. I. F. C. E, Owerri
Vitowns2011@yahoo.com

Abstract

One of the most challenging tasks facing every teacher today is how to prepare his students to be able to adapt to the changing environment with its attendant deluge of information. That task is more daunting when it comes to the education of the adolescents who need skills that will not only help him adjust to the changing society but also help him sieve out useful information from the many in his possession. This can be achieved when their education is functional and meaningful. Cognitive education focuses on making sure the learner is involved in meaningful learning. However, present realities indicate that the classroom is far from the demands of the present day society. With this in mind, this paper x-rayed how cognitive education can help in inculcating in the adolescents the 21st century skills and mindsets. It also explained what 21st century skills are; who the 21st century adolescent is; what classroom can facilitate the acquisition of these skills, what cognitive education is; and the principles of practicing cognitive education. Furthermore, an evaluation of present teaching practices in Nigerian context was elucidated to evaluate the extent they can enable adolescents to acquire 21st century skills and dispositions.

Keywords: 21st century skills and dispositions, adolescents, cognitive education, 21st century challenges, ICT.

Introduction

The contemporary society has experienced dramatic changes in the way things are done. This was precipitated by the permeating influence of sophisticated technological advancement in the 21st century. The 21st century has seen an outburst of information propelled by astronomical advancements in information and technology (ICT), prompting nations of the world to come

under pressure to move at paces that can match the demands of the 21st century (Unachukwu & Nwosu, 2014). This made Barell (2010) to observe that in this age ‘we need all of the skills that have marked human kind as the creators and sustainers of cultures, the innovators of technologies, and the designers of ways of living and governing’. These skills, as he noted, are now more crucial than ever before, and include ‘critical thinking, problem-solving, collaboration, creativity, self-direction, leadership adaptability, responsibility [and] global awareness’ and ‘the skill of inquiry’ (Walser, 2008 as quoted in Barell, 2010; Barell, 2010). In agreement with the above, the Pacific Policy Research Center (2010:1) noted that knowledge has ‘grown ever more specialized and exponentially...[and] success now lies in being able to communicate, share, and use information to solve complex problems, in being able to adapt and innovate in response to new demands and changing circumstances, in being able to command and expand the power of technology to create new knowledge’. Gardner (2010:10) sees the 21st century as an age of:

increasing power of science and technology; the incredible connectivity that results; the enormous amount of information, often of dubious quality, that is at our fingertips; the convergence of cultures in economic, cultural, and social terms; and the incessant circulation, intermingling, and periodic clashing of human beings of diverse backgrounds and aspirations.

For the fact that this century has been found to be different from the 20th century, experts are in agreement that a new sets of skills ought to be acquired by our students for them to be able to handle the challenges of this age (Barell, 2010; Dede, 2010; Gardener, 2010) and that there should be a paradigm shift in the methods with which schools will use to actualize the acquisition of this skills (Barell, 2010). In the 21st Century classroom, teachers facilitate students’ learning and create productive classroom environments in which students can develop the skills they will need in the workplace and with the focus of providing an enriched environment in which students’ experience the environment they will enter as 21st Century workers (<http://www.learningaccount.net>, 2008).The present realities demand ‘developing expert decision-making and metacognitive strategies that indicate how to proceed when no standard approach seems applicable...; building capacities in group interpretation, negotiation of shared meaning, or co-construction of problem resolutions...; the capacity to engage in richly structured interactions that articulate perceptive unfamiliar to the audience’ (Dede, 2010:54).Contemporary developments require ‘that educational systems equip young people with new skills and competencies, which allow them to benefit from the emerging new forms of socialisation and to contribute actively to economic development under a system where the main asset is knowledge’

(Ananiadou & Claro, 2009:6). Partnership for 21st Century Skills (2007) has emphasized that all young people today need to be critical thinkers and good problem solvers, creative, innovative, be able to show aptitude in evolving skill areas, such as information, media and technology skills and also show global awareness as well as knowledge in areas such as finance and civic literacy no matter what life path they choose.

To achieve the above in the adolescent learner requires a change in the traditional method of imparting straight jacketed information removed from the realities of the present society. Sternberg (2013:5) stressed that ‘we live in a time when education has not kept up with rapidly growing challenges to the world: global warming, wars, poverty, famines, overpopulation, disease, corruption, to name a few’ and regretted the fact that schools are teaching in the ‘mode of the 1800s—whereby students memorize material and spit it back—are not equal to the challenges that face the world today’. Many have stated their dissatisfaction with adolescents’ academic achievement and reading attitudes (Henry, 2004 as cited in Aina et al, 2011; Omole & Laden, 2011; Abimbola & Adeoye, 2013); their level of acquisition of learning strategies (Osa-Edoh & Alutu, 2012); and the way and methods they are taught (Udosen, 2011).

Experts agree that the education of the adolescent is challenging more especially in the 21st century. They have their very uniqueness and are ready to explore their environment and when they are not challenged they fail to learn. They are easily bored by routines. They can become noncompliant to rules in class when their tasks are not challenging. This has deepened with the challenges and the skills required of them in the contemporary society. Adolescents are with ‘well-developed cognitive capacity (high horsepower) but emotional immaturity (poor steering)’ which ‘suggests, with the additional powerful weight of neurological evidence, that the options taken should not take the form of definitively closing doors’ rather a need for ‘stronger differentiation of further learning opportunities (formal and informal) and greater recognition of the trajectories of adolescent maturation’ (*OECD/CERI International Conference, 2008*).

Because of the fact that they are the future labour force every society can boast of, acquisition of the necessary skills to be successful is never to be compromised in any progressive nation. Nwosu and Unachukwu (2014) have observed that adolescence is a stage of diverse challenges in which new experiences are acquired demanding instructional flexibility on the part of the teacher. They need to be involved in the teaching and learning process, actively constructing knowledge and processing the information presented to them metamorphosing into

meaningfully learning. Haywood (2013:28) has emphasized that ‘the discipline of learning depends rather obviously on clear and systematic logical thinking as well as on habits of metacognition and dispositions to seek knowledge and apply effective thinking processes, [and] that cognitive education is a way of pursuing such goals’. Cognitive education ‘is learner and knowledge centered’ suggesting ‘awareness of and accommodation to cultural, social, cognitive, and personal factors that affect learning, learning potential, and the motivation to learn’ (Carlson & Wiedl, 2013). Adolescents, considering the learning disposition, can only successfully acquire the 21st century skills when their education is active and constructive. Hence, this study intends to look into what 21st century skills are; the 21st century adolescent; the nature of the classroom environment that can facilitate the acquisition of the skills; what cognitive education is; the indispensability of cognitive education for adolescent acquisition of the 21st century skills; and will make suggestions for how teachers can adopt cognitive based instruction in their classroom.

21st Century Skills: What are they?

Every century is defined by what happens therein – its culture and cultural tools; its economy and financial policies; its philosophy; its politics and government; its education and educational policies; its religion; and its challenges. These and more determine the competencies and skills needed to keep the age thriving. The 21st century is an age remarkably different from even the closet century (the 20th century) with its own uniqueness and characteristics. It has been marked by a ‘significant shift in advanced economies from manufacturing to emphasizing information and knowledge services’ and ‘information and communication technology is transforming the nature of how work is conducted and the meaning of social relationships’ (the Pacific Policy Research Center, 2010:1). The 21st Century Skills encompasses ‘several inter-related skill sets: life and career skills; learning and innovation skills; information, media, and technology skills; and core-subject mastery and familiarity with interdisciplinary themes’ (Ledward & Hirata, 2011:1). 21st century skills or competences refer to the knowledge, skills and dispositions people need to be able to contribute to the knowledge society (Voogt & Roblin, 2010 as cited in Unachukwu & Nwosu, 2014). Voogt and Roblin summarized the conceptualization of 21st century skills from different frameworks (Partnership for 21st century skills [P21], En Gauge, Assessment and Teaching of 21st Century Skills [ATCS], National Educational Technology Standards [NETS/ISTE], the European Union [EU], OECD) in order to compare them and arrived at three significant conclusions: (a) the frameworks seem to converge

on a common set of 21st century skills (namely: collaboration, communication, ICT literacy, and social and/or cultural competencies including citizenship). Most frameworks also mention creativity, critical thinking and problem solving). However, this consistency is largely obscured by the use of different grouping and categorizing procedures, as well as differences in terminology chosen. This may generate confusion and ambiguity, hindering the implementation of these skills; (b) across the various frameworks it is acknowledged that Information and Communication Technology (ICT) is at the core of 21st century skills making it being regarded as both (i) an argument for the need of 21st century skills, and (ii) a tool that can support the acquisition and assessment of these skills; and (c) the frameworks revealed a large emphasis on the need for and the definition of 21st century skills, whereas only a few frameworks explicitly deal with more practical issues related to its implementation and assessment. He tabulated the comparison thus (also cited in Unachukwu & Nwosu, 2014):

P21	En Gauge	ATCS	NETS/ISTE	EU	OECD
Learning and innovative skills 1.Critical thinking and problem solving; 2.creativity and innovation; 3. communication and collaboration	Inventive thinking 1. Adaptability, managing complexity and self-direction 2. Curiosity, creativity and risk taking; 3. High order thinking and sound reasoning	Ways of Thinking 1. creativity and Innovation; 2. Critical thinking, problem-solving, decision making; 3. Leadership to learn, metacognition	Creativity and innovation Creative thinking, construct knowledge, and develop products and process using technology	Learning to learn	
			Critical thinking, problem solving and decision making		
	Effective communication 1.Teaming, collaboration and interpersonal skills; 2. personal social and civic responsibility; 3. interactive communication	Ways of working 1.communication 2.collaboration (teamwork)	Communication and collaboration Students use digital media and environments to communicate and work collaboratively	Communication 1.communication in mother tongue; 2.communication in foreign languages	Interacting in heterogeneous groups 1.relate well to others; 2.Cooperate, work in teams; 3. manage and resolve conflicts.

<p>Information, media and technology skills 1.information literacy; 2.media literacy; 3.technology literacy</p>	<p>Digital age literacy 1.Basic, scientific, economic and technology literacy; 2.Visual and information literacies; 3.multicultural literacy and global awareness</p>	<p>Tools for working 1.Information literacy; 2.ICT literacy</p>	<p>Technology operations and concepts Sound understanding of technology concepts, systems and operations.</p> <p>Research and information fluency Apply digital tools to gather, evaluate and use information</p>	<p>Digital competence</p>	<p>Using tools interactively 1.Use language, symbols and text interactively; 2. Use knowledge and information interactively; 3. Use technology interactively</p>
<p>Life and career skills 1.flexibility and adaptability 2. initiative and self-direction; 3. social and cross-cultural skills; 4. productivity and accountability; 5. Leadership and responsibility</p>	<p>High productivity 1.prioritizing, planning and managing for results; 2. effective use of real world tools; 3. ability to produce relevant, high quality products.</p>	<p>Living in the world 1.Citizenship-local and global; 2. life and career; 3. personal and social responsibility(<i>including cultural awareness and competence</i>)</p>	<p>Digital Citizenship <i>Understand human, cultural and societal issues related to technology</i></p>	<p>Cultural awareness and expression Social and civic competences Sense of initiative and entrepreneurship</p>	<p>Acting Autonomously 1.Act Within The Big Picture; 2. Form and conduct life plans and Personal projects; 3. Defend and assert rights, interests and needs.</p>
<p>Core Subjects 1.English, Reading Or Language 2. Foreign Languages; 3. Arts; 4. Mathematics 5. Economics 6. Science; 7. Geography; 8. History; 9. Government and civics</p>		<p>Core Curriculum 1.Home Language 2. Mathematics 3. Science 4. History 5. Arts or Humanities</p>		<p>1.Mathematics 2. Basic competence in science 3. basic competence in technology 4. communication in mother tongue 5. communications in foreign languages</p>	
<p>Interdisciplinary Themes 1.Global Awareness; 2. Financial, Economic, Business And Enterprenurial Literacy 3. Civic Literacy; 4. Health literacy and environmental literacy</p>					

The 21st Century Adolescent

Gutgesell and Payne (2004:79) have note that today's 'adolescence is a prolonged developmental stage that lasts approximately 10 years, nominally described as between the ages of 11 and 22 years'. Taffel (nd) referred to 21st century adolescents as not just hormonally hot, but hot with cultural forces that have redefined the nature of their consciousness and experience of selfhood; living in a context that spawns fragmentation, which can be referred to as a "divided-self" experience: cool and often cruel on the surface, they hide surprisingly healthy passions beneath. Taffel went further to vividly describe them as being

buried under a crazy quilt of digital connections every single moment of every single night. A typical evening can be spent on the computer engaging in five online discussions at once, talking on a cell phone while waiting those interminable nanoseconds for a response, listening to a burned CD, with a TV on in the background, and, naturally, focusing on homework at the same time (p.2).

The Nature of Classroom Environment that can Facilitate the Acquisition of 21st Century Skill.

The 21st century skills are life surviving skills that can help learners adapt to their changing environment, and as well contribute their own quota to the development and peaceful coexistence in the global society. The classroom that must facilitate this must put into consideration the realities of the day. It must be a thinking 'community' geared towards providing an enriched environment in which students' experience the environment they will enter as 21st Century workers, and will be able to function independently and interdependently in their world (<http://www.learningaccount.net>, 2008; Moonsamy, 2014). Specifically, the 21st century classroom should:

- be student centred giving students adequate opportunity to interact with their environment and relate what they learn to what they will experience in the outside world;
- encourage inquiry, creative thinking and problem-solving skills;
- explicitly teach self-regulated learning; emphasizing the teaching of cognitive and metacognitive skills;
- teach effective communication skills and human relations;
- teach digital literacy based on empirically verifiable cognitive research and as well be equipped with relevant technological devices;

- through cooperative and collaborative learning encourage social interaction, team spirit and global awareness;
- encourage open-mindedness and democratic principles;
- encourage the teaching of emotional regulation geared towards improving students' emotional intelligence; and
- encourage inclusiveness, tolerance and cultural diversity.

Cognitive Education Defined

Cognitive orientation to learning focuses on the fact that people construct, process, organize their own information and are actively involved in their learning and try to make sense of their environment by imposing order and meaning on their experiences. Teaching and learning that is geared towards making learners active in processing information to the point that they see meaning in what they are learning is referred to as *cognitive education*. To Green (2014) cognitive education is the broad general name given by psychologists to the explicit teaching and mediation of cognitive and metacognitive skills geared towards making learners become better thinkers and learners. Cognitive education may be defined broadly as ‘a teaching and learning strategy whose major goal is the development and encouragement of systematic processes of perceiving, thinking, learning, and problem solving’ (Haywood, 2013). Carlson and Wiedl (2013) stated that:

Cognitive education is inquiry based and constructivist, facilitating the development of cognitive and metacognitive processes that guide further learning and deepen contextual knowledge that facilitates recall and applications of the acquired knowledge. Cognitive education provides the learner with the opportunity to be aware of his or her learning and develop insights that guide self-motivated and self-aware learning. Cognitive education uses assessment as a tool, a part of instruction, not a final “scorecard.” It assesses the quality of thinking in response to instructional goals.

Cognitive education involves teaching **FOR**, **OF** and **ABOUT** thinking. Teaching **FOR** thinking involves the creation of school-wide and classroom conditions that support thinking development; teaching **OF** thinking focuses on the explicit teaching and modeling of thinking skills/strategies and dispositions to learners while teaching **ABOUT** thinking helps learners become aware of their own and others' thinking process (meta-cognitive processes). It aims at teaching learners the various dimensions of thinking such as logical and systematic thinking; critical and analytical thinking; lateral, divergent and convergent thinking; hypothesizing; problem-solving, etc. Hessels and Hessels-Schlatter (2013:108) have noted that many authors

consider that the general aim of cognitive education is *'learning to learn or learning to think, that is, developing the cognitive and metacognitive processes as well as motivational aspects implied in thinking and learning'*.

The Role of Cognitive Education for Adolescent Acquisition of the 21st Century Skills

The need to 'turn to cognitive theories as the wellsprings for programs capable of training children for a reality where new digital platforms appear daily... [and] the cognitive theories that may provide appropriate foundations for educational programs promoting self-regulated learning (SRL) in the digital age' have been discussed by Shamir (2013:96). Shamir has noted that a 'plethora of opportunities for the innovative concatenation of different types of stimuli directed at obtaining information as well as stimulating motivation are constantly appearing, and at a very rapid pace, with the help of multimedia platforms' and 'the classroom, by submission as well as by design, has accepted the appearance of calculators, then computers, smart phones, and iPads (and who knows what next)—the tools that mark our entry into the digital age in the most fundamental areas of everyday life'. The greatest challenge of the century lies on the numerous information inundating the world daily leaving the learner to battle with how to sieve out the grain from the chaff. The internet has brought about overwhelming amounts of information which deluge the individual around the clock (Gardner, 2010). This cognitive horizon demands that learners are provided with skills for self-regulation. Teachers therefore need to cultivate in the adolescent learners, among others, what Gardner (2010:10) refers to the cognitive minds made up of the 'disciplined mind, the synthesizing mind, and the creating mind'.

The disciplined mind. This has to do with mastery of a way of thinking leading to expert knowledge in human endeavour.

The synthesizing mind. This has to do with the mind that can 'survey a wide range of sources; decide what is important and worth paying attention to; and then put this information together in ways that make sense to oneself and, ultimately, to other persons as well (Gardener, 2010:12).

The creating mind. This is the mind that think outside the box; attempting new ways of doing thing and challenging existing status quo (Gardener, 2010).

He noted that the cultivation of these minds assumes particular urgency at the present age. To raise 'good thinkers, good citizens, and productive people, greater stress should be

placed on teaching children how to synthesize their skills for the purpose of gathering information, analyzing their ideas, and creating new ideas' (Sternberg, 2010 in Shamir, 2013).

Summarizing the views of authors such as Sternberg (2013), Haywood (2013); Shamir (2013) Tzuriel (2013) and Carlson and Wiedl (2013), Hessels and Hessels-Schlatter (2013:109) concluded that the aim of CE is:

- (a) to foster the cognitive (mental) skills, which are thinking creatively, analytically, practically, wisely, and ethically;
- (b) to foster processes of systematic logical thinking
- (c) to foster self-regulated learning;
- (d) to foster cognitive modifiability and mediated learning experience (MLE) strategies; and
- (e) to rehabilitate cognitive functioning.

From the above, one can see the indispensability of cognitive education in equipping today's adolescents with the kind of knowledge they need in order to survive. Cognitive education will strengthen their thinking capacity, involve them in the learning process, making it possible for them to exercise their developed cognitive capacities, cultivate in them the cognitive minds, etc.

How to Adopt Cognitive-Based Instruction

Carlson and Wiedl (2013:14) listed the following principles for adopting a cognitive-based education as it has to do with the school, instruction and learner; and clinical aspects.

- Educational practices should be based on sound theory and empirically supported evidence. This does not mean that there is or can be one model of cognitive education. It does mean that a framework for a coherent but not static model of cognitive education is necessary for systematic developments and revisions in the field.
- The learner should be aware of his or her prior knowledge and understandings. Reciprocal teaching and other interactive strategies are useful to help provide these insights.
- In learning-centered environments, emphasize mastery over performance goal learning.
- Emphasize instructional approaches such as reciprocal teaching that support self-monitoring, metacognition, and self-assessment and emphasize "think-aloud" and the self-guidance function of overt and covert verbalization.

- Support learning through assessment. This includes formative as well as dynamic assessment.
- The match between cognitive level and task requirements has to be conceived based on these cognitive functions that hinder matching.
- Implementing strategies that foster the cognitive potential of adolescents such as: enquiry learning, problem-based learning and cooperative learning

An evaluation of present Nigerian classroom practices

Classroom practices that can foster the 21st century learning should be able to place the adolescent at the center of learning in which the learner is encouraged to construct meaning from his environment. Teachers should serve as mediators scaffolding learning through the staircase of problem-solving and inquiry-based instructions. And the Nigerian education system has this in its goals going by the fact that it aims at making the learner relevant and a problem-solver in the diversified, multi-ethnic and plural cultural environment he finds himself. However, the present classroom practices in Nigeria cannot take the adolescents to where they need to. The traditional method of teaching is predominant in which the teacher assumes the sole transmitter of knowledge perhaps seeing the learner as coming to the classroom with little or no knowledge (Ejide, 2006; Dede, 2010; Udosen, 2011). Obanya (2012) found in the National Strategy for Secondary Education in Nigeria (NASEIN) studies in four states of Enugu, Kaduna, Lagos and Lagos that classroom interaction is teacher dominated with over 70% ‘teacher talk’ supporting the fact that the quality of pedagogical preparation teachers receive during training needs to be improved upon (Adeyanju, 2006 in Adeyanju, 2009). These practices are not ideal for the adolescent who has diverse challenges in which new experiences are acquired. They can only end up being bored and disinterested in what goes on in the classroom.

Recommendations for the way forward

- In-depth workshop training of educators/teachers in the principles of cognitive education, the importance of cognitive education and the strategies that could be used during teaching to optimize the cognitive potential of adolescents.
- Joining organisations that promote the development of cognitive education, such as IACEP. These organizations provide access to material and conferences that can equip educators/teachers with information regarding the practice of cognitive education.
- Adopting a cognitive approach to teaching as early as pre-school level in Nigeria.

- Starting a cogenerated branch of IACEP in Nigeria with the aim to pursue the implementation of cogenerated across all levels of schooling rigorously, with the assistance of IACEP and IACESA in South Africa.

Conclusion

For societies and schools to make any headway in fostering the 21st century skills in adolescents, efforts should be made to make the instruction cognitive-based and the classroom environment suitable for the acquisition of such skills. Passive classroom environment should be avoided; rather adolescents should be made to construct their own meaning. Contents and methods of achieving these should reflect the need of the society.

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