

The Role of Creative Problem Solving Skills among the Youth as a Vehicle for Industrial Transformation in Kenya

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ABSTRACT: *The majority of youth in Kenya are educated and are, therefore, the key drivers of the economy. Moreover, they possess the energy and talents requisite for industrial transformation. Kenyan youth are talented in many areas; this can be seen in socio-cultural, economic, information technology and scientific innovations witnessed in the recent times. Creativity is one of the driving forces in industrialization, but does the Kenyan youth have the creative-problem solving skills? Of late, design skills have not been effectively inculcated in our youth, because the 8-4-4 education syllabus in Kenya does not put emphasis on art and design. Branding of small and medium enterprises for example, is a creative way of adding value to established businesses. The youth should be encouraged to start small and then grow big in their businesses through branding. The place of design is to help the youth focus on creative problem solving skills in different areas of specialization. For instance, design process can be used to solve pragmatic problems in many areas of specialization and vocational training. Creative-problem solving skills will help the youth realize Kenya's Vision 2030 and the millennium development goals as they become more innovative and creative thinkers. With more than 60 per cent of the population comprising of the youth, the Kenya Government and Donors have come up with youth empowering programmes such as Kenya Youth Empowerment and Employment Initiative (KYEEI). The main focus is on training to empower the youth through funding, seminars and workshops. This paper relies on review of literature and focuses on comparative case studies from developed countries. The resultant discussion is a timely addition to the growing corpus on studies aimed towards implementing design strategies for the industrialization process in Kenya.*

Keywords: *Creativity, Youth, Problem Solving, Industrial Transformation, Kenya*

I. INTRODUCTION

1.1 Background

I heard a great story recently -- I love telling it -- of a little girl who was in a drawing lesson. She was six, and she was at the back, drawing, and the teacher said this girl hardly ever paid attention, and in this drawing lesson, she did. The teacher was fascinated. She went over to her, and she said, "What are you drawing?" And the girl said, "I'm drawing a picture of God." And the teacher said, "But nobody knows what God looks like." And the girl said, "They will, in a minute." [1, 2]

Creativity is a familiar yet oddly elusive concept. This paper conceptualizes creativity as the ability to generate fluent and novel ways of tackling problems and of organizational material [3,4]. Most children are born with an innate creative spirit of experimentation, playfulness and a disregard for social convention. This natural creative spirit is often systematically rendered mute by the imposition of structured formal education and societal pressure. The task of educators and mentors is therefore to restore that sense of inquisitiveness, curiosity, playfulness and creative invention. In this fast-paced world of unrelenting change, it should be important to develop a case for the incorporation of creative problem solving skill within the core of every training program not only in design; but within each subject or as a compulsory program of study.

With the industry's persistent expectation for excellent teamwork, clearly communicated concepts, innovative thinking, lifelong learning and reflective practice, creative problem solving is an essential skill for today's professional practitioner. Creativity is at the core of personal and collective evolution, whether as individuals or as teams. Yet creative behaviour is poorly understood and commonly misinterpreted. It is frequently seen as something difficult to define, a mysterious phenomenon and an ability that some people have and others do not. The facts are different. Everyone is capable of creative effort given well-designed training, experiential exercises and reflective practice [5].

Design entails creatively using acquired skills to solve a problem. Acquisition and application of these creative skills all over the world are the important keys in any national development. Countries that have developed creative and technical skills in their youth such as The Netherlands have a bright future, because everything created wears out with time and eventually will need a replacement. The majority of Kenyan youth

are unemployed. This is the main cause of drug addictions, prostitution, and drug abuse among many other social evils. The youth need jobs and businesses that will engage their time, energy and provide a source of livelihood. Developed countries put more emphasis in the acquisition and application of these creative problem solving skills through their education system. For instance, the 'Asian Tigers' have a different approach in the way they have advanced their technology, innovation and design of systems. They have succeeded through research, educating their youth on hands on technology or experience and industrial innovations. The creative problem solving skills are strategically developed in their youth as from a tender age; they grow up having acquired these skills gradually with the vision to use them for the country's future industrial development. When we examine the Asian Tigers and their industrial growth compared to Kenya, one cannot help but ask; where then did we go wrong as a country in that up to now our industrial development is still low when compared to theirs? What can we then do, to regain our speed and make remarkable steps on the country's industrialization process? The answer majorly lies on imparting the youth with or developing their creative problem solving skills. The creative problem solving skills can be successfully acquired and developed through research, teaching and learning practical skills in subjects such as Art and Design, Engineering and other vocational subjects.

The youth population represent the reservoir of potential labour force of a nation's present and future industrialization. Any country that does not invest in its youth risks a future extinction in terms of social, economic, political and cultural development. According to UNESCO [6], a youth is "persons between the ages of 15 and 24". UNESCO understands that young people are a heterogeneous group in constant evolution and that the experience of 'being young' varies enormously across regions and within countries.

Kenya has a different youth description from the one above. According to the Ministry of Home Affairs, Heritage and Sports [7], in the National youth policy of 2006, the youth is defined as "persons resident in Kenya in the age bracket 15 to 30 years. This takes into account the physical, psychological, cultural, social, biological and political definitions of the term."

Global organizations and international bodies are focusing on the youth all over the World to equip them and prepare them for leadership and development of social, cultural, political and economic platforms, as illustrated by UNESCO. UNESCO's objective is to help empower young people, reaching out to them, responding to their expectations and ideas, fostering useful and long-lasting skills. There are Non-governmental bodies that are ready to cooperate with the government to aid in acquisition of the required creative problem solving skills. For instance UNESCO [6] has for a while been encouraging:

1. Partnerships between UNESCO and young people's networks and organizations, to solicit and integrate their views and priorities and collaborate with them in setting up projects and programmes in the areas of the Organization's competence.
2. The integration of youth concerns and issues into the policy agendas of Member States in education, the sciences, culture and communication, in order to create spaces and opportunities for empowering young people and giving recognition, visibility and credibility to their contributions.

This clearly shows that the stage is actually set for equipping youth with creative skills since this is what the youth need in order for Kenyans to move quickly in the industrialization process.

Commenting on the role of family and community in youth development, the Centre for Youth Development and Policy Research in the United States, established in 1990, opines that:

[Youth is] a process that all young people go through on the way to adulthood...it is a process or journey that automatically involves all of the people around a youth—family and community. A young person will not be able to build essential skills and competencies and be able to feel safe; cared for, valued, useful, and spiritually grounded unless their family and community provide them with the supports and opportunities they need along the way. Thus, youth development is also a process in which family and community must actively participate.

The description above acknowledges an important aspect of youth that includes participation from the family and community. The stakeholders in the community include the government, educationists, industrialists and all the people concerned with helping the upcoming labour reserve in achieving Kenya's industrialization vision. This sentiment is not unique as it stresses that the youth need family support, mentors and essential skills in order to be competent. They also need to acquire godly character, and be actively involved in community development programmes, and only then will they be able to meaningfully contribute at national level as required. Youth development is a process that will involve all stakeholders beginning with their families, educational institutions and nation/s participation at a larger scope. Youth development therefore requires a holistic approach in development.

According to the World Bank [8], industrialization is:

The phase of a country's economic development in which industry grows faster than agriculture and gradually comes to play the leading role in the economy.

Industrialization is therefore a process that entails a country's economic development. Industrial sector grows faster than agriculture. In Kenya, the agricultural sector has always been described as the back-bone of the

nation's development. Tourism has also played a key role in this country's economic development; however it is a very sensitive sector. For Kenya to be competitive, she needs a paradigm shift which will transform the country from dependency on agriculture to industrial exports [9,10].

The phrase "creative problem solving" is a term that is widely used in other fields of study. Different definitions have been given on this phrase. Some of the definitions include:

Creative Problem Solving is a proven method for approaching a problem or a challenge in an imaginative and innovative way. It's a tool that helps people re-define the problems they face, come up with breakthrough ideas and then take action on these new ideas [11].

Creative problem solving skills have countless uses. Often people associate creative problem solving with dealing with crises or difficulties, or think of it as something that's used for games and puzzles or special kinds of jobs. However, creative problem solving skills are required for achieving exceptional performance in most jobs (if not all jobs). The term "problem" simply refers to any discrepancy between the current situation and a desired future situation. So, finding a way to exploit an opportunity is a form of problem solving just as coping with a crisis is. Moreover, any opportunity to improve work processes or products fits that definition of a problem. Creative thinking is not just for certain jobs, like writing, advertising, or designing entertaining training programs. Creativity can help one to progress from a current situation to a desired future situation, whether our jobs are normally thought of as involving "creative work" or not. The creative problem solving process differs from routine problem solving in that with routine problem solving, a pre-established method for solving the problem is used; with creative problems solving, any pre-established method for solving the problem is either unknown or not used. Creative problem solving involves a hunt for new solutions, while routine problem solving uses old solutions [12].

1.2 Problem Statement

Humans create mostly whenever they are confronted with a problem. Creativity is one of the driving forces in design all over the world, but does the Kenyan youth have sufficient creative-problem solving skills? Developed countries like the United States of America have programmes that train youth on creative problem solving skills, from childhood to tertiary levels. But unlike the developed countries, art and design skills are minimally inculcated in our youth, because the 8-4-4 education syllabus in Kenya put little emphasis on art and design subjects in our schools. Art and design units are optional in most of the public high schools in Kenya, and yet compulsory in the majority of private high cost schools.

Unemployment and poverty levels are rapidly rising in Kenya. This paper avers that this undesirable turn of events can be successfully tackled through acquisition of creative problem solving skills. These skills in turn will be used in creation of job opportunities which will result in alleviating poverty as population masses become economically stable. It is important to note that at one point in time economies and industrialization levels of countries like Singapore, Malaysia, and Korea were at the same level of as that of Kenya during the 1960s. However, decades later, there is a noticeable difference between the mentioned economies and industrialization level with that of Kenya [13]. This therefore begs the question: where did the problem occur such that there was this disparity that brought about Kenya's lagging behind in industrialization? Some suggestions have been made to improve its economic power using:

1. Empower competent technocratic policymakers to manage macroeconomic and development policies with strong political support.
2. Create a climate in which all ethnic groups, especially entrepreneurially talented minorities, can participate in development with low risk.
3. Design strategies that build on existing comparative advantage in agriculture and labour intensive industry while investing in education that will create a more skilled workforce for a gradual transition to new industrial and service exports.
4. Adhere strictly to sound macroeconomic policies including a realistic and flexible exchange rate, small budget deficits or preferably small surpluses and appropriately tight monetary policies; currency convertibility is a credible guarantor of these policies.
5. Keep labour markets flexible, so that market forces determine wages and employers are free to hire and dismiss with a minimum of government regulation.
6. Reform financial markets, permitting market forces to determine credit allocations and interest rates and, along with currency convertibility, creating a welcoming climate for foreign investors.
7. Undertake trade reforms that will open economies increasingly to world markets; while the vestiges of protection remain in place, create mechanisms by which export producers can obtain inputs at world prices, free of duties and free from import controls [13].

One of the reasons for Kenya's lagging behind could be due to our education/training choices or priorities from childhood to youthful ages. In developed countries major focus of their education systems is on impartation of practical skills. These skills include creative problem solving skills while in developing and under developed

countries main focus is on theoretical knowledge acquisition. When compared less of the practical aspect of skill application or acquisition during learning is stressed.

1.3 Scope

Invention, innovation, creation, originality and technology are some of the terms related to creative problem solving skills. Designers and artists are creators in their own different areas of specialization such as web design, graphic design, painting, sculpture, Product design, fashion and textiles, interior design and so on. Graphic designers, for example, create using specialized graphic software in computers to create billboards and posters among many other objects of design. Branding small and medium enterprises, for example, is a creative way of adding value to established businesses. The discussion in this paper is limited to Kenya but comparative studies are done to draw lessons from the developed countries.

II. MATERIALS AND METHODS

This is a qualitative analysis of various author's findings in a bid to comprehend the role of creative problem solving skills among the youth as a vehicle for industrial transformation in Kenya. Research was done through compilation and analysis of existing information and field researches on this particular topic with the support of various ideologies. It is purely desk research that has been used to come up with this body of information. Qualitative analysis of different author's findings has been done to come up with various opinions and conclusions recorded in the paper.

By visiting libraries, archives and the internet, the researchers were in a position to undertake an in-depth analysis reading of the topic under study. The researchers also visited various libraries such as the Africa Nazarene University Library, The Kenya National Library in Nairobi, and The Maseno University Library. From these sources, the authors were able to access and analyse data from documented literary materials where the issues under investigation are discussed. It is from these sources that a review of related literature was undertaken and the research gap identified. The researchers then employed a critical analysis in a bid to explore the role of creative problem solving skills among the youth as a vehicle for industrial transformation in Kenya

III. RESULTS AND DISCUSSION

Problem solving skills are a lifelong learning skill that enables the learner to be creative in many areas of their life. The youth in Kenya lack some of these skills as they grow up because very few schools instil these skills in their students. One of practical observation in this study is made from *Odyssey of the Mind* [14] which illustrates the following concepts:

It teaches students to learn creative problem-solving methods while having fun in the process. For more than twenty five years, this unique program has helped teachers generate excitement in their students. By tapping into creativity, and through encouraging imaginative paths to problem-solving, students learn skills that will provide them with the ability to solve problems -- great and small -- for a lifetime. It also informs students on how to think divergently by providing open-ended problems that appeal to a wide range of interests. Students learn how to identify challenges and to think creatively to solve those problems. They are free to express their ideas and suggestions without fear of criticism. The creative problem-solving process rewards thinking "outside of the box." While conventional thinking has an important place in a well-rounded education, students need to learn how to think creatively and productively.

The extract from *Odyssey* clearly illustrates that students are able to solve many problems easily and at the same time have fun. It is also important to notice that developing these skills is a process which takes time.

3.1 Creative Problem Solving Skill

Creative problem solving skill is intentionally developing one's mental process with the aim of acquiring skills in creating a unique solution to a problem. It is a special form of problem solving in which the solution is independently created rather than learned with assistance. To qualify as creative problem solving the solution must either have value, clearly solve the stated problem, or be appreciated by someone for whom the situation improves.

Essentially, this is what happens when a person solves a problem or produces behaviour that moves the individual from the given state to the goal state; or at least tries to achieve this change [15]. Creativity is characterized by ideas or concepts that show originality and have value. These concepts could be relevant to an individual, a situation or a cultural context. When the products of creative thinking are completely original, they are characterized by distinguishing or emergent features that are clearly identifiable as breaking entirely new ground. This is therefore a good ground for industrialization to develop since solutions that fully satisfy a problem is what the world needs at the moment.

Creative problem solving demands two sets of complementary skills – convergent thinking and divergent thinking. The former is necessary for analyzing problems and situations as well as selecting, evaluating and implementing ideas. Divergent thinking is necessary for exploring, investigating and generating new concepts

by finding ways to associate ideas that are generally not connected [5]. If the public education system in Kenya is encouraged to inculcate both divergent and convergent methods of thinking when solving problems in any subject, we would have had our level of industrialization escalate to new heights. The reason why Kenya is still lagging behind is because this is not encouraged, if there is an already established way of doing things or a formula used that is what the 8-4-4 education system stresses on. The instructors are afraid of encouraging exploration and curiosity which on most cases has given birth to inventions and innovations.

So the question remains, how do we guide Kenyan youth to develop creative problem solving skills and how do we integrate this into the curriculum and training? It's a major challenge and central to the impending transformation from the information to the conceptual age. However, some of the core ideas applied to the process of integrating creative problem solving in the present 8-4-4 curriculum would include:

1. Providing more of hands-on experience exercises and which do not over emphasize theoretical instruction since creative behaviour is best acquired through experience and practice.
2. Instructors and mentors to ensure that learners are provided with a safe and non-judgmental psychological environment. This will encourage exploration and creativity - the spring board for industrialization.
3. Learning exercises must be designed to demonstrate core principles and to challenge the mind but be within achievable goals.
4. Different programs at elementary up to tertiary levels should be structured in a way so as to include analytical, critical thinking as well as development of creative ideas.
5. Conceptual diversity must be encouraged if possible even demanded from the learners.
6. Mentors and instructors will be required to lead by demonstration and example. This will act a source of inspiration and models that the learners who will spearhead industrialization can ape [5].

Creativity is also thought to be about breaking boundaries and making connections between things that are not normally associated together. It may mean encouraging the Kenyan youth to find new ways of seeing and solving problems. Fortunately in Kenya there is incredible access to the widest variety of information and resources with which the youth can work and create through the Internet connections to diversify perspectives and opinions. For instance the first part of a youth course could use visual problem solving and design to identify, analyze and communicate concepts and ideas. This would involve an introductory exercise in the use of mind maps and concept maps to organize and document information in a primarily visual form. This usually serves to strengthen youth's analytical and convergent thinking patterns and reinforce the importance of building connections and interconnected ideas. The result of this would be that the youth acquire a range of visual design skills, individual expression and development of personal perspectives about the perception of the world around them. It also reinforces the importance of drawing and systematic design. All this would contribute systematically to the kind of skills that speed the industrialization process.

The second part of the proposed creative problem solving skill course would be devoted to idea generation techniques for both individual and group applications. This course would emphasize methods by which learners would force connections among typically unrelated ideas. The exercises would be designed to be both pragmatic and playful; this is so as to encourage the students to experiment with wild ideas and unusual solutions. It would involve combining visual and verbal brainstorming techniques of teaching creative problem solving skills that support teamwork in time-sensitive tasks and problem-solving activities. If this is practiced over time in Kenya's education system, we shall have a labour force equipped with skills essential for industrialization.

3.2 Techniques and Tools

Many of the techniques and tools for creating an effective solution to a problem are described in creativity techniques and problem solving. Creative-problem-solving techniques can be categorized as follows [16]:

1. Creativity techniques designed to shift a person's mental state into one that fosters creativity. These techniques are described in creativity techniques. One such popular technique is to take a break and relax or sleep after intensively trying to think of a solution.
2. Creativity techniques designed to reframe the problem. For example, reconsidering one's goals by asking "What am I really trying to accomplish?" can lead to useful insights.
3. Creativity techniques designed to increase the quantity of fresh ideas. This approach is based on the belief that a larger number of ideas increase the chances that one of them has value. Some of these techniques involve randomly selecting an idea (such as choosing a word from a list), thinking about similarities with the undesired situation, and hopefully inspiring a related idea that leads to a solution. Such techniques are described in creativity techniques.
4. Creative-problem-solving techniques designed to efficiently lead to a fresh perspective that causes a solution to become obvious. This category is useful for solving especially challenging problems. Some of these techniques involve identifying independent dimensions that differentiate (or separate) closely associated concepts. Such techniques can overcome the mind's instinctive tendency to use "oversimplified

associative thinking" in which two related concepts are so closely associated that their differences, and independence from one another, are overlooked.

Listed below are some of the commonly used creative and creative problems solving techniques that are used in many parts of the World:

1. TRIZ, which is also known as Theory of Inventive Problem Solving (TIPS), was developed by Genrich Altshuller and his colleagues based on examining more than 200,000 patents. This method is designed to foster the creation and development of patentable inventions, but is also useful for creating non-product solutions.
2. Mind mapping is a creativity technique that both reframes the situation and fosters creativity.
3. Brainstorming is a group activity designed to increase the quantity of fresh ideas. Getting other people involved can help increase knowledge and understanding of the problem and help participants reframe the problem.
4. Edward de Bono has published numerous books that promote an approach to creative problem solving and creative thinking called lateral thinking.
5. The Creative Problem Solving Process (CPS) is a six-step method developed by Alex Osborn and Sid Parnes that alternates convergent and divergent thinking phases.

Some of these skills should be applied when training the youth of this country to find out their effectiveness.

Critical thinking is also one way of creatively solving problems.

3.3 Challenges

One of the greatest challenges of design education has been the attitude that stakeholders hold against design. Wagah et al. [17] illustrate this in their analysis on "Attitudes of Teachers and Students towards Art and Design Curriculum":

The findings of the study revealed that students who had dropped Art and Design Curriculum and Teachers of Art and Design Curriculum had negative attitudes towards the curriculum. Although students taking Art and Design liked the subject their reasons for this were not fully in line with the objectives of the curriculum. Some of the students were taking the subject for merely boosting their Kenya Certificate of Secondary Examination (K. C. S. E) result. Based on these findings, it is recommended that students be given proper career guidance on Art and Design Curriculum. The subject should also be made compulsory in Forms 1 and 2 to give early opportunity to students to identify their talents.

According to Mwiria [18], there are more challenges facing vocational subjects training these are:

The biggest obstacle to the successful implementation of the new curriculum was its limited acceptance by most education stakeholders outside of government not only because they were not consulted on its introduction but also because it turned out to be an expensive system to implement for parents already burdened with other educational responsibilities with the onset of cost-sharing. In addition, the vocational curriculum has been criticized for overlaps in coverage between subjects, poor sequencing of teaching topics within individual subjects and for the limited time allocated for some subjects. Time constraints, lack of or inadequate infrastructure, facilities and books has resulted in a situation where the teaching of theoretical knowledge has dominated over practical content. Also problematic is the failure of the curriculum to impart new ideas focusing instead on the old and obsolete knowledge most teachers know best, as they have virtually no opportunities to update their knowledge. Moreover, school inspectors rarely visit vocational education teachers. A combination of all these factors means that graduates of vocational courses are not necessarily advantaged over their academic education counterparts with regard to entry into a fiercely competitive labour market and post-secondary training institutions.

IV. CONCLUSION AND RECOMMENDATION

4.1 Conclusion

Creative-problem solving skills will help the youth realize Kenya's Vision 2030 and the millennium development goals as they become more innovative and creative thinkers. Creative problem solving enhances analytical skills which are necessary for pragmatic solutions. These skills should be encouraged at all levels of our lives. However, for the youth to benefit more, they should be imparted at a tender age of human educational development. This is because children are born with an innate creative spirit of experimentation, playfulness and a disregard for social convention; however this natural creative spirit is often systematically rendered mute by the imposition of structured formal education and societal pressure.

4.2 Recommendations

1. In this fast-paced world of unrelenting change, it is important that we develop a case for the incorporation of creative problem solving skill within the core of every training program not only in design; but within each subject or as a compulsory program of study.

2. The instructors should encourage students in exploration and curiosity which on most cases has given birth to inventions and innovations.
3. As a country we can emulate the countries which have succeeded using problem solving skills, by doing some relevant case studies.

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