# Facilitating the "Elite" in innovation acquisition: an overrated concept or, a necessity?

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## Abstract

Innovation is a term that features in more than 40 000 web searches. Innovation is often confused with other terms such as creativity. Scott (2012) maintains that creativity is only part of the process of innovation. Educating the youth for tomorrows' world requires harnessing innovative measures where theoretical concepts are woven into the practical every-day (Newnham, 2015; Virkkunen, Newnham, Nleya & Engeström, 2012; Miettinen, 2005, 2009) and that of our tomorrow land. Christensen and Overdorf (2000) developed the concept of disruptive innovations. They state that disruptive innovations are derived from disruptive technologies. Disruptive innovations are those that have a new use or exchange value (Ollman, 2003) and eventually disrupt an existing practice and its value network. Whilst developed nation states attempt to contend with the disruption of ICT's use in learning spaces, developing countries attempt to catch up to the international models of education. Morocco's education mission and vision has not produced the desired outcomes and a new coalition with USAID had been drawn up until 2020. New strategies are being designed to overcome existing problems such as levels of illiteracy, dropout rate and student motivation. This text explores the possibilities of innovative models of education and provides concrete suggestions from noted scholars in the field.


Key terms: Innovation; disruptive innovation; knowledge building; schools

# Introduction

Scott Anthony (2012) in his "Little black book" maintains that the definition of innovation needs to contain no more than five words; "something different that has impact" (p. 16) (see Nagel, 2001). Innovation, he states is not synonymous to creativity, which refers rather to a part of the process of innovation. Therefore, someone could be creative, designing a concept that is new but is however premature to its use, and hence not be innovative which alludes to a new design that impacts its socio-cultural environment. Innovation is a process that combines several stages: questioning existing states of affairs such as are to be found in a malfunctioning phenomenon; the creative phase which involves the discovery of a social or theoretical gap (Narsessian, 2008) which is conceptualized by a design phase encapsulating a new mode of functioning, a germ cell (Davydov, 1990); a blueprint (Anthony, 2012) for future practice; and a phase of testing through implementation of the new design and finally making adjustments prior to generalization (Engeström,1987; 2014; Virkkunen & Newnham, 2013). Educating the youth for tomorrows' world requires harnessing innovative measures where theoretical concepts are woven into the practical every-day (Newnham, 2015; Virkkunen, Newnham, Nleya & Engeström, 2012; Miettinen, 2005, 2009) and that of our tomorrow land. Christensen and Overdorf (2000) developed the concept of disruptive innovations. They state that disruptive innovations are derived from disruptive technologies. Disruptive innovations are those that have a new use or exchange value (Ollman, 2003) and eventually disrupt an existing practice and its value network. Educationalist of the 21st century continually refer to an increasing difficulty to transmit learning tools to students of all ages due to disruptive innovations in the form of laptops and cell phones (Engeström, Engeström, & Suntio, 2008) yet developing countries aspire to western models of education where ICT's are an intrinsic part of todays' scholarly activities. This form of literacy, states some, is as well a disruptive innovation to paper and pen literacy skills, a thorn in the foot of both developed and developing nation states, for the former due to its unbridled use and for the later due to its sparsity. This article will address these issues and discuss diverse innovative attempts at finding new designs for those that will blaze the path of our tomorrow land.

## Morocco's quest for an innovative Elite

*"Many significant achievements have been made in the area of education and training… Nevertheless, we still have a long, arduous journey ahead of us if we are to enable this sector*

*to actually play its role as an engine for the achievement of economic and social advancement... We cannot but ask this pressing question: Why is it that so many of our young people cannot fulfil their legitimate professional, material and social aspirations? The education sector is facing many difficulties and problems…due to the adoption of [education practices] that do not [match] the requirements of the job market."*
(King Mohammed VI , *Speech to the Nation, August 2013 in USAID, 2013-2017)*

On the second of April, 1957 US AID signed a coalition of agreement with the Moroccan government at the time. This coalition has been transformed and confirmed by both parties at several intervals concluding in 50 plus years of agreement between the two nation states. USAID benchmarked their involvement in Morocco's economic, political and social growth as being relatively positive (USAID/Morocco Country Development Cooperation Strategy, 2013-2017). Areas of the economy that have not been sustainable are accredited to a youth that is not tailored to existing job markets, non-collaborative efforts on behalf of the private sectors, or non-commitment of primary school teachers. Marocco's efforts of all socio-cultural sectors reform remain at a lag; with a 0.646 indicator for human development Morocco rates 125th out of 177 countries (Tawel, Cerbelle and Alama, UNESCO, 2010). The indicator englobe all sectors and in that of education reveals that 80% of Moroccan citizens are unemployed between the ages of 15 and 34 years of age; that 60% of students remain illiterate and that only 18% of student graduate from high school. This appears to be a far call from an educational vision that proposed to produce an educated elite that is a "catalyste for broad-based growth, civic engagement, and effective democratic process" (USAID/Morocco Country Development Cooperation Strategy, 2013-2017, p.5).

In a rigorous report entitled "Education au Maroc, analyse du Secteur" (Tawil et al., 2010) findings corroborate with the overall unsatisfactory diagnosis of the ambitious educational reform established by the GOM in 1999 as displayed by USAID. The negative outcomes and social tensions that the ensued unrest produced gave way to the adoption of a new reform, the "Charte national de l'education". This reform sets out to provide education for all, an education that bridges the educational and economic sectors, that is to say that will rectify certain of the education malfunctions found with concepts of equity and quality required for the development of social and economic sectors that are collaborative and sustainable (Tawel et al. 2010) Whilst these reports of USAID (2013-2017) and UNESCO (2010) do not align on

statistical representations of the problems, they agree on areas in education that are malfunctioning such as: high dropout rates, illiteracy and motivation of learners.

In Morocco world news, January 2015, Abdellah Taibi affirms that prior to adhering to western powers' initiatives such as ICT's for all, local needs should be addressed. Decision makers need to "put themselves in the shoes of pupils' parents and feel their disappointment" (moroccoworldnews.com/2015/01/). Moreover, the author proclaims that each reform "complicates the issue more as each new generation seems to be less competent than the previous one" (moroccoworldnews.com/2015/01/). Finally, the implementation of the educational reforms has been undertaken at hug financial costs and parents are proclaiming their dissatisfaction with the benefits.

It appears that, as in many areas of the planet, the national educational project in progress in Morocco is raising controversial remarks as to its ability to fulfil its mission and vision for the population of Morocco. Whereas, developed countries began the scramble for competitive educational systems more-or-less in unison, and so could design and transform their learning organizations progressively, those of developing countries are required to make the great leap forward. At the basis this perception of educational transformation or more precisely, development is erroneous. As the PISA rankings (for all the recognized errors) reveal, many nation states are not producing students that can fulfil the requirements set out to increase the productivity of the nation states. Perhaps one of the major reasons is that education, in this way, is conceptualized as a tool for economic and political exchange (cf. UNESCO and USAID documents) instead of a tool for everyday usage and design of innovative concepts that rise out of its inherent socio-cultural context.

The concept of innovation has drawn a great deal of interest and the word innovation appears in a web search in more than forty thousand books (Anthony, 2012). Has the use of the concept itself stood up to its intrinsic test; has this concept changed something in our everyday lives in those of todays and tomorrows scholars? How should the concept be used so that it has an impact on scholars of today and tomorrow? What is the danger of not reacting to a fast changing environment in which, it appears, new forms of knowledge building should be undertaken? How is a nation to build an innovative education system; what are the steps to take?

This article undertakes to address these different questions through the use of various case studies.

## Innovation as a working concept

Scott Anthony (2012) in his "Little black book" maintains that the definition of innovation needs to contain no more than five words; "something different that has impact" (p. 16) (see Nagel, 2001). The difference between creativity and innovation is such. The former does not impact on its environment whereas the later does. Innovation therefore, requires enhancing the gap between perception and reality, which it does. Innovative concepts do not, argues Nersessian (2008), "emerge from the minds of their originators as Athena from the head of Zeus – fully developed and ready to do their intellectual work. Rather, such conceptual innovations, like perfect orchids and flavorful grapes, emerges from lengthy, organic processes, and requires a combination of inherited and environmental conditions to bud and bloom and reach full development" (preface). (cf. Miettinen, 2009). Innovative concepts that have an impact on their environment do so because they draw from the needs of that environment and not from those of others. Innovative processes have their sources in several places: the possibility of the designer to move from the concrete to the abstract and back again (Virkkunen and Newnham, 2013), in other words to create something new out of an analogy (Nersessian, 2008) for example, radar came from "studying the reflected uses of sound waves from bats and the way a clam shell opens suggested the design for aircraft cargo doors" (Adair, p. 12).

Analogy is that process whereby the person or people have become dissatisfied with an existing practice and begin the quest for solutions or new models. In so doing they take something that exists and that has similar possibilities with something that does not exist in order to develop that which does not yet exist, as in the examples given above. The process of defining or designing a model for innovation, argues Miettinen (2009) remains elusive due to "a basic problem of defining a logic of something that by definition does not yet exist" ( p.143). Adair (2007) on the other hand suggest that a gap in innovative reflection can be encouraged through: using the stepping stones of analogy; making the strange familiar and the familiar strange; widening his or her span of relevance; practicing serendipity; being curious; reading to generate ideas; suspending judgment; learning to tolerate ambiguity and thinking creatively about everyday life. Nonetheless, for any model to be implemented with

generalizable consequences (Engeström, 1987/2014; Virkunnen & Newnham, 2013) Miettinen (2009) reasons that certain important domains need to be considered:

1) "The domain specificity of innovation requires the mastery of the specific knowledge and practice of the cultural domain. It requires following up on the scientific, technical and economic developments as well as on the user activities of a domain".

2) Innovation practices "calls for collaborative efforts not only with specialists but essentially with users whose knowledge of use activities and their problems is transmitted to the innovation process".

3) It is necessary to recognize that "the mobilization and hybridization of cultural resources across the boundaries of domains is likely to be realized in horizontal networks that cannot be managed in the ways characteristic of the market and hierarchical organization" (p. 144).

Both Miettinen (2009) and Adair (2007) agree that change is only possible if human minds are prepared to anticipate creativity and innovation. Put in other words, learning, argues Bakhurst (2011) is "*a matter of acquiring the conceptual capacities and qualities of character that enable responsiveness to reasons, and teaching is a matter of facilitating their acquisition and development. Learning is successful to the degree that the learner gains command of the subject-matter or practice, where to have such command is to be able to make up one's mind about what to think or do in the relevant domain in light of what there is most reason to think or do. This involves the development and cultivation of theoretical and practical reasoning, understood not as formal or abstract techniques of thought, but as powers to engage intelligently with concrete subject matter in all its presentness and particularity*" (p.136). Furthermore, these powers are not of "pure intellect but of human beings, finite and embodied, whose manner of responding to reason cannot be understood without appreciating the way their live are informed by sensibility and emotion, personality and mood" (p.136) without which learning and development would have no purpose. "The personal aspect of knowledge – the everyday concepts – is located in the life setting of a person. These personal concepts are the foundation for the child's appropriation of subject matter concepts that qualify the child's personal concept so they can function as theoretical concepts" (Hedegaard, 2003). Such concepts cannot be understood as being universal but rather as local. Universal concepts to not tap into a child's zone of readiness, and without knowledge targeting the learners zone of readiness, known as the Zone of Proximal Development (Vygotsky, 1978), seeds of knowledge will lay barren. The learners Zone of

Proximal Development is defined as " the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (1978, p.86). Tapping into the learners ZPD in todays' world is a complicated task. Children are quick to learn new skills that are trendy and schools are not able to incorporate such novelties into the standard curriculum enough with consequence that the learners' motivation is intercepted by the novelties. Christensen & Overdorf (2000) refer to novelties that disrupt current practices as disruptive innovations.

## Enhancing disruptive innovations

Disruptive innovations are such as ICT's which displace the invention of pen, paper, languages and face to face communication. ICT's have become a continual combat in developed nations schooling. While many teachers struggle to find new ways of enhancing these innovative devises others despair as language use transforms, replaced by illegible signs and learners concentration spans decrease. Certain learning institutions preferred to ignore the relevance of a changing world and in so doing survive but do not thrive.

However, Nair (2008) maintains that schools that fight to survive share a perception that failing schools can be fixed by doing more of what has failed. Instead of thriving by engaging students in new practices which co-opt them into learning. Nair (2008) maintains that even learning organizations that have success rates are in danger of maintaining the status quo at all costs and so producing youths that are only able to obey and not to think. Furthermore, he argues that systems that were designed for different times and needs should be bypassed by communities. Communities should recognize roadblocks and develop strategies in order to overcome them. Nair suggests enhancing a changing world and provides in his document "30 strategies for innovation education" step by step strategies for community learning. The following strategies heed advice for innovative learning provided in the section above and have been modified from Nair's 30 strategies:

1)     Personalized learning where children are not defined as having high IQ's but rather where their personal qualities are developed to fulfil the objectives of their own activity, that is to say learning that targets their ZPD and practical needs.

2)      Provided different ages within the same learning space. Children naturally learn from older children in their environment however, at school we place them all in the same age group interrupting a natural process

3)      Small pod groups. In big classrooms a child loses his or her identity becoming one of a mass. In order to intercept this process creating small working pods is conducive to innovative thinking processes.

4)      Provide no boundaries learning spaces where children's' curiosity and innovative skills can be enhanced. This requires open planning so that children can design a project that solves real world problems and move from one teacher (maths, science, biology) to another in order to find the necessary tools to design and implement the project successfully. Such spaces shift learning from the concept of filling an empty recipient to that were a learner is in charge of his or her own knowledge generation. Motivation is far higher in such situations.

5)      Peer tutoring is a valuable in classrooms that are culturally diverse. Meaning where children have been raised in different socio-cultural environments and so have different skills. Peer tutoring therefore works as children spontaneously share their strengths with each other.

6)      Moving school into the community. Children can apply theoretical skills to the real world by moving into the community and applying their knowledge to real situations. For example art and crafts; animal husbandry; vegetable gardens are all domains that can be shared by the local community and in which theoretical and technical knowledge can be shared and distributed.

7)      Spaces need to be provided for technology usage such as laptops and mobile phones. Such spaces are global learning spaces and encourage students to find innovative ways of doing things through analogies, curiosity, open mindedness etc.

8)      Parent involvement has been proven to be of paramount importance in children's learning. As in community spaces exchanges between the school space and that of parents need to be prioritised. Parents in remote areas should be encouraged to develop learning behaviours such as reading, writing and connecting with the global world. Children that come home to parents that do not understand what they are doing all day find it difficult to remain motivated as their two worlds are estranged.

## Learning organization conundrums and innovative solutions

This section shall present several case studies of innovative school transformation:

1)      In autumn 1998, Engestöm, Engestöm and Suntio (2008) conducted an eleven week intervention with a methodology called the Change Laboratory (Engestöm, 1987/2014) in a 6th to 9th grade school in a disadvantaged community in Finland. This methodology is driven by development through and expansive learning cycle. It follows steps of innovation: *questioning existing states of affairs such as are to be found in a malfunctioning phenomenon; the creative phase which involves the discovery of a social or theoretical gap (Narsessian,2008) which is conceptualized by a design phase encapsulating a new mode of functioning, a germ cell (Davydov, 1990); a blueprint (Anthony, 2012) for future practice; and a phase of testing through implementation of the new design and finally making adjustments prior to generalization (Engeström,1987; 2014; Virkkunen & Newnham, 2013).*The school was heavily populated with immigrant families meaning that the children did not share the same environmental learning concepts. The researchers field data indicated three primary weaknesses: teachers' did not have any knowledge of their students homes and backgrounds which meant that they could not tap into their existing knowledge resources; the poor physical school environment and the lack of student awareness as to the objectives of education requirements. However, teachers felt that the problems were elsewhere. They stated that the students were apathetic and used inappropriate language lacking in respectful behaviour. They felt that they needed extra time for peaceful preparation (p. 383). After the seventh work session the teachers chose 6 concrete areas for change: 1) "shared traditions and improvement of student manners, 2) final project and integration of instruction across subjects, 3) the physical environment of the school, 4) self-confidence and individualization of instruction, 5) collaboration between the middle school and the local elementary school, 6) tandem teaching in selected subjects. Work groups were formed to create a design and strategic measures to implement each model. The final project was a cross- subject project that the student chose. The project was designed and realized by the students themselves. The rational was that it would provide the student with the motivation to continue his or her studies and to gain self-worth. In the first year of its implementation 71% of the final graders completed their projects and 54% raised their grades, in the second year 91% completed projects were completed and 65% used them to raise their grades.

2)      In the same school another project was implemented. Engeström (2009) commenting on this innovative process wrote that the "unquestioned expectations that technology will radically change learning" is misguided (p. 17). The study conducted by the mentioned authors demonstrated that the introduction of new technologies need to be built (as with other teaching concepts) on the "local realities of actual teachers and students" (p.17). Furthermore,

if there is not trust between the teachers and the pupils then technologies as learning tools are doomed to die. In this project the teachers began with a misguided belief that the students would destroy the material and so prohibit their use out of class time. The teachers took action to create a friendly work environment in which computers were left for student use in their recess time. The students were as well allowed to take charge of their space and to decorate their space as they felt fitting. This expansive learning process continued to develop and student increasing student productivity and learning motivation.

3)      In 2011 the educative constitution of a canton in Switzerland stated that business schools were required to incorporate practical content into their curriculum. This put them into direct competition with only vocational schools. The teachers were distressed as student intakes reduced. In 2013 the author of this article facilitated a Change Laboratory with the principal of the school and his teachers. The teachers came up with a new concept for their students, one that would place them aside from those that only had vocational training, "the student entrepreneur". This new type of student would acquire skills that enabled him and her to reflect creatively and to produce innovative designs for organizations and work practices in general. The teachers however were concerned as to how they were going to shift from a school guided by the reproduction of texts by an individual to attain good grades (Dewey, 1906; Freire, 1970; Swindler, 1979; Engeström, 1987/2014; Mietttinen, 2009; Miettinen & Peisa, 2002), and in which students were imposed values of good and bad (Bakhurst, 2011) undermining their autonomy, to one in which autonomy and creativity were key skills to be acquired (Newnham & Birbaum, 2015). In a first cycle of expansion teachers implemented several areas of change: 1) student motivation, 2) rules of conduct, 2) division of labour, 3) the wider school community – parent. Whilst they were working on these areas they came to the realization that they were enforcing rules to the detriment of creating autonomous learning spaces. A second expansive cycle began which was now between the teachers and the pupils. The pupils devised ways and means of appropriating technology as learning tools for local and global learning, creating their own limits. Moreover, they found motivation in being responsible for their own learning; adopted independent working methods; and devised locally useful projects. The principal used expansive concepts to increase community participation by informing lead schools, newspapers and parents about their project. The following intake numbers were higher and student performance, well-being and motivation increased. The school claims to be a school with a "VISION". However, their work is not yet done and if a school wants to keep abreast with changing societies and global concepts the

participants will have to continually negotiates change. Innovative concept building will need to become part of their organizational practice instead of stagnation.

*4)* From 2007 to 2012, the University of Helsinki and that of Botswana drew up an agreement of collaboration destined to implementing ICT's in school in order to improve on pupils' learning. *"the project took place at a time when many African nations are pushing their schools to become vehicles for social and economic progress by using the potential of ICT (Wagner et al. 2005). To overcome the top-down bias and limitations of direct transfer of models and practices from more economically developed countries to developing ones, the BeST project proposed as a working hypothesis that the Developmental Work Research methodology would empower local actors to manage, for themselves, the collective transformation processes involved".* (Engeström, Batane, Hakkarainen, Newnham, Nleya, Sentini and Sinko, 2014, p. 2). Two of the school projects shall be discussed: The first school is located close to the capital of the country. The problem at the heart of the situation was that "*(d)espite the government's determined efforts to develop the educational system and many reforms, the legacy of the colonial period can still be discerned in the curricular tracking system and segregation of students at the senior level on the basis of their marks in the junior school. The high occurrence of HIV/AIDS has created new kinds of social problems in the country as many children have lost both their parents. The increasing numbers of orphan students is a challenge for the school. Previous studies of student categorization have shown its pervasiveness in schools. Student categorization has been studied from many perspectives as a factor in institutional decision making concerning the transfer away from regular classes of students who have problems in school (Mehan, 1993; Mehan, Hertweck, & Meihls, 1986; Säljö & Hjörne, 2009), and as an aspect of teacher–student interaction focusing on how teachers' categorization of students affects their academic progress (Jussim & Harber, 2005; Moulton, Moulton, Housewright, & Bailey, 1998; Rosenthal & Jacobson, 1968, 1992) and the quality of teaching (Daniels, 2006a; Olson, 1999)"* (Virkkunen, Newnham, Nleya & Engeström, 2012).As a result of the expansive learning work the teachers produced three germ cells: student motivation, co-teaching, and policy issues. The student motivation group designed an innovative plan that involved a "combination of collaborative planning of individual students' studies and clustering student to subject groups. However the initial plan took too much of the teachers' time and a second design was devised where small groups of students would support each other in analysing their situation and planned their studies. The themes of discussion were provided by the teachers. The students became familiar with each other's strengths and weaknesses and used these to strengthen their knowledge and skills

pool. "The process of dialogical study planning deviated from the teachers' traditional ways of acting. They took a less directive role as organizers and guides of the students' group process. They prepared the discussion themes in order for the students to be able to jointly analyse each other's' situation and plan, together, their studies. This was in contrast to their customary role of making students absorb some predetermined ideas or collecting data for the evaluation of students learning" (Virkkunen et al. 2012, p. 190). Such innovative designs and their implementation transformed both the pupils and the teachers.

"*Teacher 4: There is quite a lot that I have learned actually ever since the project started. I am one person who is very strict — or who was very strict [students laugh] (...). I was only talking to the other class yesterday form 4 they were coming from my old school, I was at a junior secondary school and uh the class was very tense, it is supposed to be a triple science class 4D and I was expecting like a very good response, a very lively class because I was in another class 4R which is a double science class the same topic that I was teaching there, which it was very lively and so I was expecting even better results, in the end the other class, but they were very tense. I recognized some faces that I [had taught], that were in the junior secondary school. Why are you so tense today? Why are you so tense? Is it because some people have told you that I am so strict… Yes Mam. God I could have now changed. I have changed, that is the old me, I have learned so much so much, but you see now… change is not so, it is not so fast but I am trying, I'm trying hard*" (Virkkunen et al. 2012, p. 190-191).

The second school was located in a rural area. The author of this paper facilitated the Change Laboratory with the aid of one of the teachers. The area was inhabited by several different populations meaning that the children did not all speak the same language. Young teachers were sent to these regions leaving more experienced teachers in towns. The teachers missed their families and were unhappy at being far way. Certain teachers resorted to canning students despite this being against the law. Students were demotivated and humiliated due to the canning incidents. The literacy level of the students was below average and student dropout rate high. 9 work sessions were held (3 with the school alone and 6 with the school and the community. After engaging in a Change Laboratory which was held in the community the teachers and parents jointly pursued three projects: 1) the construction of an arts and crafts centre which would use knowledge from subjects such as art, maths and physics as well as ICT's. A small tea room was designed were teachers and parents could meet and chat; 2) A bakery that would be run by the domestic science teachers and the

parents 3) a community school vegetable garden where students would practice knowledge acquired in the biology class and exchange skills with the community. 4) Computer skills training for parents in the school. The concept began from a germ cell "school under the tree". As when school was still a source of pride it was held under the tree and parents would listen and at the same time observe their children's behaviour. The new school ostracized the parents creating a barrier between the parents and their children. Teachers blamed parents and parents' teachers. The core outcome as a conceptualization of this new design was the "Integration of community –based human resources for education versus barriers between school and community" (Engeström et al.2014)

A further project held in this community was that of adult literacy. A teacher would hold literacy programs at different places in the shade of a tree for adults in the community. This program was very successful and finally acquired a building in which computers were installed to increase the parents' global knowledge. It is important that parents can connect and support their children's school going process (Newnham, 2005) as this increases children's motivation.

## Conclusion

Hargreaves (1999) maintained that schools need to become knowledge-creating organizations. Furthermore, that "professional knowledge creation (be) not seen as a random, undirected activity of the minority of the individual teachers with a creative talent, but as a whole-school process that has to be managed with the allocation of material and temporal resources, co-ordination of people and activities, regular monitoring and support" as well as "provision of regular opportunities for reflection, dialogue, enquiry and networking in relation to professional knowledge and practice" (Engeström, 2009). A call for innovative forms of knowledge building is of paramount importance in our world of today. An ever changing environment requires adaptable skills.

Within this article several suggestions have been made as a way forward:
Those of Adair (2007) suggest that a gap in innovative reflection can be encouraged through: using the stepping stones of analogy; making the strange familiar and the familiar strange; widening his or her span of relevance; practicing serendipity; being curious; reading to

generate ideas; suspending judgment; learning to tolerate ambiguity and thinking creatively about everyday life.

Miettinen (2009) proposes that "(t)he domain specificity of innovation requires the mastery of the specific knowledge and practice of the cultural domain. It requires following up on the scientific, technical and economic developments as well as on the user activities of a domain". That, innovation practices "calls for collaborative efforts not only with specialists but essentially with users whose knowledge of use activities and their problems is transmitted to the innovation process". Furthermore, it is necessary to recognize that "the mobilization and hybridization of cultural resources across the boundaries of domains is likely to be realized in horizontal networks that cannot be managed in the ways characteristic of the market and hierarchical organization" (p. 144) and so new ways have to be devised such as was demonstrated in the case studies above.

On the basis of Nair's (2008) 30 propositions, Newnham suggests that the following considerations are as well necessary:

1)      Personalized learning where children are not defined as having high IQ's but rather where their personal qualities are developed to fulfil the objectives of their own activity, that is to say learning that targets their ZPD and practical needs.

2)      Provided different ages within the same learning space. Children naturally learn from older children in their environment however, at school we place them all in the same age group interrupting a natural process

3)      Small pod groups. In big classrooms a child loses his or her identity becoming one of a mass. In order to intercept this process creating small working pods is conducive to innovative thinking processes.

4)      Provide no boundaries learning spaces where children's' curiosity and innovative skills can be enhanced. This requires open planning so that children can design a project that solves real world problems and move from one teacher (maths, science, biology) to another in order to find the necessary tools to design and implement the project successfully. Such spaces shift learning from the concept of filling an empty recipient to that were a learner is in charge of his or her own knowledge generation. Motivation is far higher in such situations.

5)      Peer tutoring is a valuable in classrooms that are culturally diverse. Meaning where children have been raised in different socio-cultural environments and so have different

skills. Peer tutoring therefore works as children spontaneously share their strengths with each other.

6)  Moving school into the community. Children can apply theoretical skills to the real world by moving into the community and applying their knowledge to real situations. For example art and crafts; animal husbandry; vegetable gardens are all domains that can be shared by the local community and in which theoretical and technical knowledge can be shared and distributed.

7)  Spaces need to be provided for technology usage such as laptops and mobile phones. Such spaces are global learning spaces and encourage students to find innovative ways of doing things through analogies, curiosity, open mindedness etc.

8)  Parent involvement has been proven to be of paramount importance in children's learning. As in community spaces exchanges between the school space and that of parents need to be prioritised. Parents in remote areas should be encouraged to develop learning behaviours such as reading, writing and connecting with the global world. Children that come home to parents that do not understand what they are doing all day find it difficult to remain motivated as their two worlds are estranged.

All of these measures are required in the making of an innovative knowledge-creating organization. The steps to be taken with students through all subject matters is to encourage questioning; analysis of real life problems; finding the problems; designing new ways and implementing, testing and finalizing concepts and projects. Such a method will generate expansive innovative learning, a necessity for today scholars and our tomorrow land.

Our schools must teach how to think claimed Ilyenkov (2009). "*I wonder if innovators everywhere coundn't get some inspiration from the grassroots entrepreneurial efforts of Mohammed Bah Abba, a teacher with a business degree in impoverished northern Nigeria. Bah Abba wanted to help keep food from spoiling so quickly in the intense African heat, but he knew that a standard refrigerator was out of the question for many of his neighbours. Bah Abba cross-pollinated from the past to help make a better future. Descended from a family of potters, he began adapting traditional clay pots and hit upon something remarkable. When he placed one pot within another, filling the space between with wet sand, the water in the sand evaporated toward the outer shell of the inner pot, cooling the vegetables inside. He spent two years perfecting his clay "fridge", learning to cover the pot with a damp cloth. His cooler required no energy, just periodic wetting of the sand to maintain the cycle of*

*evaporation. Eggplants that once spoiled in a few days lasted four times as long. African spinach was edible for almost a week instead of going bad in a day. Bah Abba put unemployed potters to work turning out thousands of his clay pots, at a cost of 30 cents per cooler. Today, the lives of thousands of Nigerian villagers have been improved by this brilliantly simple innovation*" (Kelley, 2008, p. 77).

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