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TECHNOLOGY, CULTURE AND LEARNING IN THE AGE OF DISRUPTIONS AND CREATIVITY

ISPON – NATIONAL SOFTWARE CONFERENCE AND COMPETITION – TINAPA, CALABAR, CROSS-RIVER STATE – FEDERAL REPUBLIC OF NIGERIA 2013, **THEME**: "**Software Strategies for Retooling the Workforce (SORWORK).**"

The terms "information society" and "knowledge society" do not reflect any more the essence of the modern society which through the increasing use of the social media and networking is becoming more and more social and communitarian. This trend is global in nature. The early 21st century has been called the Age of Disruption and Creativity" (Norris 2013). For example, when the knowledge age was characterized by knowledge scarcity, there is now knowledge abundance. Production needs immediacy, groups and communities, and global networking.

The development from the knowledge society to social society is accelerating. We find daily new ways to find and create new or updated information. These new mind expanding methods; tools and ways of collaboration are demanding us to change and develop the educational traditions. The computing is getting more and more part of the daily life outside the school. Social networks, cloud computing and connectivity are the key words of today. The young generation is very familiar to create, collaborate and communicate in the Internet. These are the skills needed also in the industrial and business life.

The major change in approaching the ICT skills acquisition process today is that learning – especially by the utilization of enabling technology – is that instead of separating ICT training to institutions and curriculum it can be seen as permanent part of work and life-long learning. Since the learning and work environment is constantly changing the need of ICT support personnel is vital. The capacity building for the new skills and competences is the objective of media literacy. This was the message of my keynote talk to the ECOWAS countries on "ICT and the Culture of Peace" from Stevens Institute of Technology, New Jersey (April 18,2013).

Current advances in information technologies and propagation of new digital media and learning environments stipulate the increasing importance of media literacy, which is today recognized almost universally as one of the key competences in the educational system. This is well illustrated in the recent UNESCO/IITE monograph "Media Literacy and new Humanism" (2011). The main objective of the study commissioned by the UNESCO Institute for Information Technologies in Education to Tapio Varis (University

of Tampere, Finland) and José Manuel Pérez Tornero (Autonomous University of Barcelona, Spain) was to investigate digital and media literacy in the context of educommunication and new humanism that is *committed to the goal of counteracting the depersonalising effects of mass technology*. The study was initiated to provide a deeper insight into the recent trends in the development of media culture and media literacy movement, and to provide conceptual framework for media literacy, new media literacy curriculum and teacher training. Unesco/IITE has also designed a tutorial text-based handbook for teachers with media and information literacy curriculum as the core source to strengthen teachers own relations to media.

In 2012 I worked with Professor Renato de Oliveira in the State of Rio Grande do Sul of the Federal Republic of Brazil. In our work with 15 regional and community institutions of higher education in the State of Rio Grande do Sul (COMUNG) we found out that better communication, utilization of Open Educational Resources (OER), and the new competences of media literacy are needed.

Entrepreneurship and the Creative Society

Entrepreneurship is a very important factor in both the global and local economies and it is closely connected with ICTs. Entrepreneurship has played an important role in economic growth, innovation, and competitiveness, and it may be the key to poverty alleviation over time. Self-employment is an important mean of earning a living in low-income developing countries, because typically they lack formal-sector jobs in labour markets.

Entrepreneurs who have their own businesses can control what they do in their working life, and they have the opportunity to shape their work environment and make an impact on their community. Entrepreneurs need a wide range of skills – not just for selling their products, but also for developing their expertise, markets, and business. Entrepreneurial skills involve planning, decision-making, problem-solving, creativity, communication skills, among others. These skills are very useful for a working life, whether the worker is self-employed or not. Entrepreneurship is not an inherited personal feature; it encompasses a wide array of competences that include attitudes, knowledge, and skills.

In order to promote entrepreneurship among students, formal vocational education should be organized so that they stay in contact with a culture of entrepreneurship, ideally, in the framework of an educational institute or a school. However, in traditional educational institutes, many teachers lack initiative in terms of business and productivity, and rather work exclusively as academics. Basically, they are not entrepreneurs at heart. This sets a major challenge for technical and vocational education and training on how to equip young people with skills that enable them to build their own future and life as entrepreneurs. The entrepreneurial spirit is crucial in vocational education and training in both developed and developing countries. New and innovative programmes are yielding dividends for the future of students.

Building a Knowledge Equilibrium

How can traditional vocational education institutions foster in their students the entrepreneurial skills needed to succeed? The following examples illustrate how to creatively approach this issue:

Self-Sufficient Schools Self-sufficient schools are the result of an innovative approach that combines entrepreneurship and vocational education. Not only they increase the relevance of learning; they also provide a training ground for students and a means of finance for the school through school-based businesses. While the students work on the production and sale of goods and services, the school develops in them an entrepreneurial culture, as well as emphasizes the tangible benefits of acquiring skills and knowledge and highlights cooperative forms of working. Self-sufficient schools have been implemented successfully in developing countries such as Benin in West Africa.

School Enterprises School enterprises are another similar approach promoted by UNEVOC.12 School enterprises are established with the goal of fostering competences for self-employment as well as wage employment. School enterprises, combining learning with production, develop in students the skills required for launching and managing small-scale businesses, underlining the importance of visibility of future returns.

The world of work is facing similar challenges everywhere on the globe. New possibilities of using ICTs in education and training will improve workers' chances to get vocational qualifications. The development of the educational structure will also bring changes, such as: the need of face-to-face training can be reduced, the training material can be reused numerous times, and it can also be updated easily. Formal vocational education is becoming more integrated into everyday working life. Vocational qualifications are nowadays increasingly measured by competence tests. Also, competence-based qualifications have a great role in the in-service training of employees.

These innovative structures need new development projects for implementation. The infrastructure of vocational education institutes and schools also needs to be updated. New facilities and equipment ought to enable online education, international co-operative education, and also online training and competence testing. Implementation of vocational qualification and competence-testing systems, as well as developing international cooperation in the framework of new educational models, need project funding from international sources. Also, teacher in-service training can be created and developed on project basis.

Small, medium, and micro enterprises (SMME) ought to be connected to this development work of the vocational education system. The need for in-service training of employees is rising. For example, for many licenses given by the government or the international community, one needs to be qualified in a profession. The training required would give ample benefits to SMMEs, so they ought to be willing to pay for it, but updating the employees skills to the level needed could also be part of the cooperation between vocational education and industry.

There is need to emphasize that "Building knowledge equilibrium between theory and Practice (Books and Laboratories) is a fundamental necessity for developing economies "– who are currently overloaded with theory-only education and training

Transforming boundaries

The current transformation also penetrates boundaries that emerged and were shaped by the forces of the previous techno-economic paradigm. One of the most important of these boundaries is the one that separated industrialized countries from developing countries. The global knowledge-based economy slices geographical regions in new ways, where national borders have decreasing relevance. Instead of geographical proximity or local availability of resources, the underlying organizing principle is based on global networks.

The distinction between developing countries and developed countries is therefore becoming increasingly misleading. This change can now readily be seen, for example, in countries such as South Korea, India, and China, where regional hubs connect with global production networks. A similar reorganization can also be seen in the leading industrialized countries, where geographic specialization is now essentially based on diversification in the context of global systems of production.

ICT literacy and numeracy are vital for TVET. "The health and safety of workers often depend upon their ability to read instructions (e.g., on fertilizer bags) and to make accurate calculations (e.g., of mixing ratios and application levels). The wider skills of scientific and social literacy are also important, for example, for equipment maintenance and repair, understanding technological change (scientific literacy), group work, dialogue and negotiation with colleagues and supervisors, gender and ethnic tolerance, and other skills needed to build harmonious relations in the workplace (social literacy). The application of such literacies to the world of work and active citizenship need to become core dimensions of vocational education if it is to respond to the imperatives of social sustainability."

The usage of the terms 'skills' and 'competences' is inconsistent. Skill is sometimes seen as representing only lower-order attributes (e.g. keyboard skills), but most often as including also higher-order attributes (like thinking skills). Competence is often construed as the application of skills in specific contexts, but also as synonymous with skill.

Workers face two overlapping challenges. The first is to acquire the skills necessary to enter an increasingly digital and competitive job market, and the second is to continually improve those skills and learn new ones as a part of their lifelong learning. Many studies suggest that workers around the world are not able to sustain this pace, and it is widely believed that schools are failing to keep providing employees who are adequately prepared to exploit new knowledge and skills. Considering that the first skill to be acquired in the working life is bridging information gaps, there is a wide consensus that all workers should be able to:

- Master appropriate tools to gather information;
- Understand the context of that information;
- Shape and distribute information in ways that make it understandable and useful;
- Exchange ideas, opinions, questions and experiences.

The paradigm of learning in the corporate setting is rapidly shifting from skills development to capability management. The strongest factors driving this change are the ever-increasing need for faster innovation cycles and for abilities to support a strategic competence renewal. The current learning paradigm can be expressed as the 70-20-10 formula of learning:

- 70% of workers' capabilities is built through on-the-job development and real-life experiences;
- 20% is built through coaching, assessments, and increased self-awareness;
- 10% is acquired through structured learning deliveries, such as instructor-led trainings and e-Learning.

Learners will soon realize that, once they adopt this formula, each day will be a learning day. The need to separately plan times for learning and for work will disappear; learning will be incorporated into the daily work routine. Basically, what this formula requires is developing the right mind set for learning rather than making choices between learning events and modes of delivery. There will always be room for skills-based competency development. Certain enabling skills will continue to be delivered in a classroom, not to mention those that are acquired via interactive leadership development, where discussions and networking play a major role. In a similar fashion, e-Learning is here to stay as an easily scalable and cost-efficient delivery channel for theoretical solutions.

As a new working culture emphasizes the importance of lifelong learning, corporations are beginning to provide workers with means to customize and direct their own learning experiences. There is still a long road to travel in terms of improving employment opportunities for individuals and expanding the innovative capabilities of companies; however, workers, employers and trainers are all becoming more responsible in trying to ensure the continuous development of the knowledge and skills acquired.

The traditional focus of vocational education on skills needed for manual work is being challenged by the mixture of competencies required in the workplace today. Many traditional forms of work are undergoing major changes, and as a result the division between manual and mental work is vanishing. Sustainable vocational education should concern and affect both manual and mental competencies.

New pattern of in service training

The teachers in service training in ICT have been in many cases pumping the info and the skills to teachers' memory. The scope has been to train the teachers to be experts on software skills or methods. The problem has been that the teachers cannot attend the

trainings continually. There can be gaps of years between one teacher's in-service trainings. It's

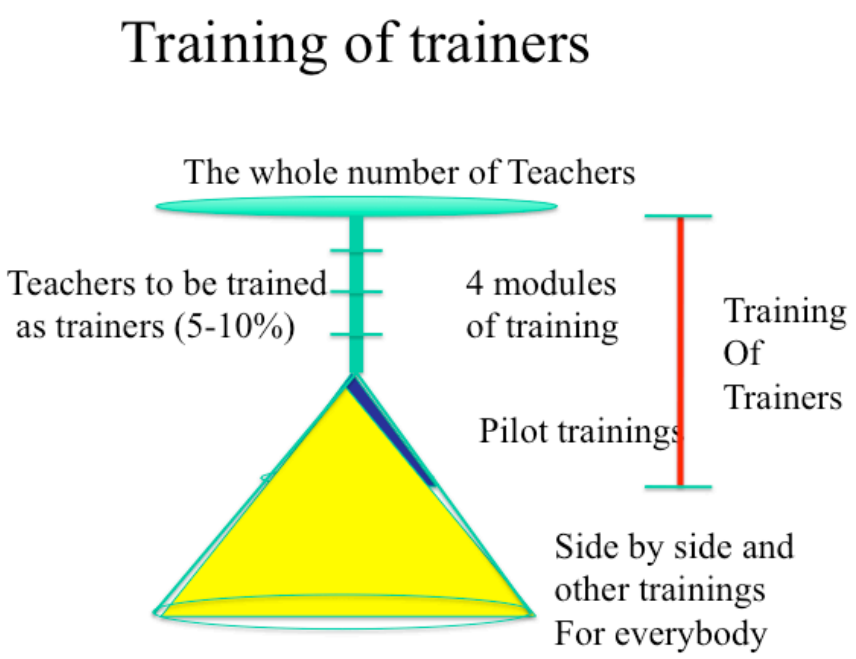
- Traditionally defined courseware is not an effective e-Learning strategy
- E-Learning ware is more related to pedagogy than an actual product
- It emphasizes computer mediated communication and is student-centred
- Teacher's / Trainer's responsibility of the learning process
- Discussion groups, chat, blogs, wikis, webinars
- Tools available through open source
- Demand for students self-directness

Smart training for the Smart society

The problem of teachers' in-service training has always been the shortage of training time. The short training courses are fulfilled content, which the teachers then try to implement to their work. But too much is too much. The paradigm of teachers' in-service training has three main components. Firstly teachers need to learn the virtual learning skills and secondly the training has very small chunks, which the teachers can try out at their work right after the training session.

The third component is to share the experience by teachers instructions, narrative stories of the processes or by cross evaluations of the results of the experiences. The training model contains six training sessions. The first three 2 -4 hours sessions are face to face sessions. On these sessions the basic skills of new pedagogies, the new learning environments and Social media skills are trained. Each face to face (f2) training has three components;

- Basic training of the skills
- Ideas how to use learned skills to teachers own curriculum (daily work)
- Personal implementation plan of one new learning method



Each f2f training session has cross evaluation and experience sharing part, when all the good and bad experiences of the try-outs will be shared. This is a powerful method because humans learn from mistakes, so to make a mistake is a gift.

On the first phase of the training the virtual meeting room is presented, practised and learned. The second phase of the training jumps in the Internet. That means no travelling any more but participating to the trainings in the virtual meeting room. The next three sessions will contain and concentrate on the activation models of the learners and the concrete outcomes of the learners, which the teachers then can use in their evaluation process. These sessions are kept in the virtual meeting room and will be recorded. The recordings can then be used afterwards for example like hands on manuals. The trainees are also encouraged to create short instructions to learners and colleagues.

During the second phase of training the trainees will also plan a peer training plan for their 5 -10 colleagues. These plans are cross evaluated by the trainees and then executed by each trainee in their own school. These experiences will also been documented to support the training processes.

The third phase of the training process is to train the colleagues. For each trained trainer there will be one group of 5-10 trainees. The training it self contains three sessions. The sessions are short 2-4 hours.

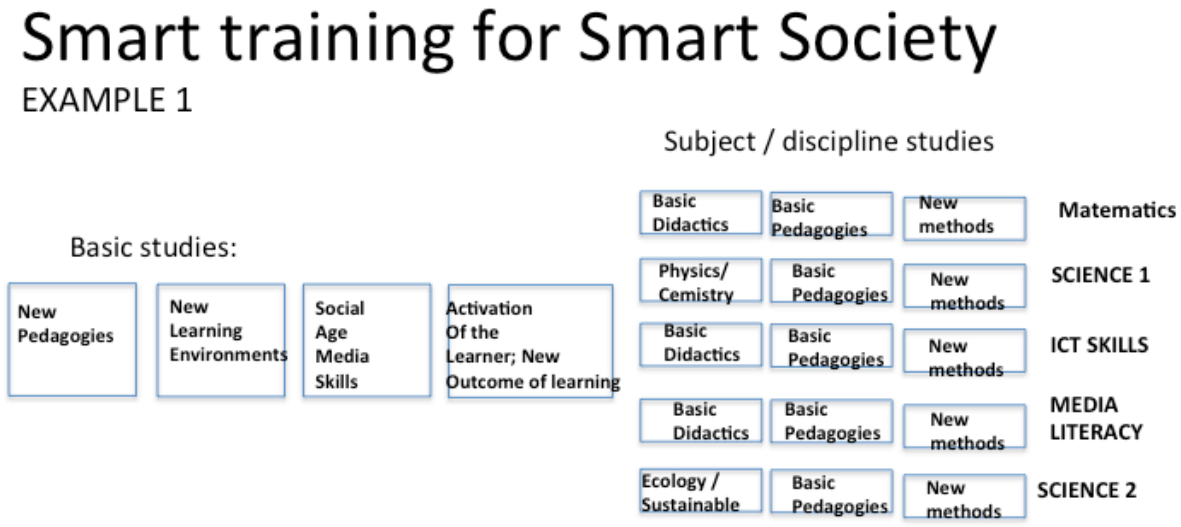
In the first session the trainer presents her/his case study, which were done in the training. With this example of practical experience the trainees will then start to plan how to implement similar skills to their own class or personal curriculum. Also the virtual meeting room is presented and explored

The second session is for cross evaluation of the plans. In the session all the trainees will present their plans and discuss and develop them for the practical experience. The virtual meeting room skills are strengthened. After the second session the trainees will execute a pilot of their plan in the real classroom work. After the pilot the trainees will write a short report as teachers' guide for colleagues.

The third session will happen in the virtual meeting room, where all the trainees will participate and present their experiences from the pilot. Sharing the experiences and good practices the training will continue. The key idea is that the trainees will commit them selves to the training process for alt least two years or for example in four training sessions.

After the basic training the trainers and trainees can take the next level of the courses together supporting each other. The next level trainings include different subjects and disciplines pedagogical, didactical and ICT practices.

This model has been developed in the Central Finland region and has spread all over the country. The model is very simple to localize and implement in different teaching and learning cultures and all the curriculums.



In brief, the evolution of **ICT literacy** in different regions has developed in the following stages:

Stage 1: Building access and connectivity.
Stage 2: Introducing basic Internet use as well as more sophisticated and sustainable digital competences.
Stage 3: Developing trust, confidence, and multiplatform use. Using social media for problem-solving, cooperation, and community building.

The world of work is facing similar challenges everywhere on the globe. New possibilities of using ICTs in education and training will improve workers' chances to get vocational qualifications. The development of the educational structure will also bring changes: the need of face-to-face training can be reduced, the training material can be reused numerous times, and it can also be updated easily. Formal vocational education is becoming more integrated into everyday working life. Vocational qualifications are nowadays increasingly measured by competence tests. Also, competence-based qualifications have a great role in the in-service training of employees.

Recent trends put emphasis on the innovation strategy for education and training. Attention is given to skills and needs used by modern firms, working population, and also in arts and science education. In technical and vocational education there is a tendency to highlight the "learning by doing" approach. Today, managing work in which responsibilities have been distributed to a high degree among the network of workers is a major challenge. Communication between employees and their managers may be based only on virtual contacts. As a consequence, the demand for professional competences and skills is increasing, and education and learning are adopting new forms. The challenges of vocational education are quite similar in countries that vary widely in their current economic level of development. Entrepreneurship and Technopreneurship, which are closely connected with ICTs, are very important factors in both the global and local economies.

The nature of ICT competence in the emerging global social and communitarian society can be classified in knowledge work, service work, and technical work. New skills and competences in different fields can be acquired both in small modules and lifelong learning environments by using open educational resources (OER) and through cooperation with the industry and SMMEs. Instead of being limited to traditional testing, skills can be evaluated through product demonstrations and performances.

New Humanism and Culture for Peace

In order to learn new technologies and become digitally literate, new forms of learning paths have to be developed utilizing all forms of learning, especially at work and non-formal environments. At the same time, special attention should be given to teacher education in ICT skills and competencies. The period of transition in which we are now living differs from the periods of change of older dominant media. Traditional print and electronic media were introduced within a period of reasonable length, and when we moved to the active use of a new form of communication, we could also have a rough estimation of the economic and social impacts of this transition and train new professionals for the media and support people for the institutions. Now different forms of communication and technologies integrate and converge with a speed that hardly anyone has the time or ability to assess all of the consequences, real possibilities, or problems.

The use of ICT and digital skills in performing art, craft, and other fields require a team work with special skills. The trend of digitalization does not mean that everything traditional should be rejected. New communicative inventions have always also destroyed something valuable, and special attention should be given to the diversity of approaches in the ICT applications. A blended approach is often adopted.

The cultural dimension in the ICT applications also brings the dimension of feelings and the spirit of sharing and caring to the process. The social dimension requires inclusive policies. In an intercultural world communication necessarily mediates different values and cultural behaviors. Great civilizations and cultures have very different patterns of communication and use different senses in a different way. In consequence, if a truly global information society is to be created, more attention should be given to the diversity of cultures and the co-existence of different civilizations and cultures

Jose Manuel Perez Tornero and I identified five important dimensions of the new humanism that in comparisons to the old humanism of the renaissance need to be developed now in the 21st century. If the global communication society has come hand in hand with disproportionate promises and unfulfilled utopias, today it is compulsory to examine and evaluate why this has transpired. It is now imperative to abandon *blind trust* in technology and to deepen our critical spirit. We need to develop an aware attitude that is capable of weighing the positive and negative effects of the changes, and one especially that is able to inspire new technical developments that jibe with human beings' aspirations.

To accomplish this, we must first dissolve the *axiom of spontaneous technological progress* and accept the fact that when technological alternatives are chosen, progress is only one option among many. The positive development of the media technologies will depend on our ability to take the right decisions and gain cognizance of their potential impact. The global communication society harbours enormous potential, along with some risks. However, its full, positive realisation depends on whether humanity, including each and every one of us, gains in awareness and responsibility.

From our standpoint, today this *awareness* must be *media-related* and *humanistic.* On the one hand, as media-related, its main goal must be to monitor the development of the media and be keenly aware of what it may represent for humanity, for better or for worse. On the other hand, this awareness must drive the values of a new humanism, and it must do so in many senses:

a) In the sense that it must situate *the human person at the core of this media civilisation,* this new manmade, telecom world around us, just as in the Renaissance the humanists managed to place human beings at the centre of a world which had been organised by theology until then.

b) In the sense that this new awareness must drive *the primacy of the critical sense towards technology* and thus replace this *trusting* and rather unselective attitude that prevails today and forces us to unconditionally accept technological

innovation. This echoes how the humanists defended a free, critical interpretation of the classical texts and ultimately the autonomy of the intellect and the human person. While Renaissance humanism served as a critical filter of the values of its day by filtering mediaeval culture with classical culture, the new 21st century humanism most foster a critical sense which is alert to the hypertechnologised environment and capable of discerning between what should be kept and what should be revamped.

c) In the sense that while Renaissance humanism helped to "discover" the sense of self and biography and fostered a new form of individual autonomy compared to the sometimes asphyxiating weight of traditionalist thinking, the *new humanism must help to foster a sense of autonomy in a context in which global communication* can engender dependence and very subtle forms of intellectual subjugation.

d) In the sense that while Renaissance humanism was characterised by a "discovery" of new "worlds", America first and foremost, but also Africa and Asia, giving rise to an "encounter" – often violent – between cultures and civilisations, the *new humanism in the global communication society must prioritise a new sense of respect for multiplicity and cultural diversity and* must support media development with the goal of consolidating the new culture of peace.

e) Finally, in the sense that, just like Renaissance humanism, through the new media and humanistic awareness now is the time for us to be capable of *reviving the classical idea of cosmopolitan, universal citizen, with very clear rights and responsibilities,* which entail a planet-wide commitment. We must foster a kind of citizenship that stimulates the idea that individuals view themselves as the bearers of universal rights, as well as responsibilities which are also universal.

Summary and Recommendations

When studying the innovating community higher education institutions to innovate society in Southern Brazil Renato de Oliveira and I concluded in 2012 that the community universities are facing the technological revolution. Their institutional leadership is needed for innovation, social agents and their ethical role is needed. But there should be clear strategic programme of action.

Recent trends in ICTs put emphasis on the innovation strategy for education and training. Attention is given to skills and needs used by modern firms, working population, and also in arts and science education. In There is a tendency to highlight the "learning by doing" approach. Today, managing work in which responsibilities have been distributed to a high degree among the network of workers is a major challenge. Communication between employees and their managers may be based only on virtual contacts. As a consequence, the demand for TVET is increasing, and education and learning are

adopting new forms. The challenges of vocational education are quite similar in countries that vary widely in their current economic level of development. Entrepreneurship, which is closely connected with ICTs, is a very important factor in both the global and local economies.

The nature of technical and vocational education in the emerging global Knowledge Society can be classified in knowledge work, service work, and technical work. New skills and competences in different fields can be acquired both in small modules and lifelong learning environments by using open educational resources (OER) and through cooperation with the industry and SMMEs. Instead of being limited to traditional testing, skills can be evaluated through product demonstrations and performances. The division between manual and mental work is vanishing as many traditional forms of work undergo major changes, and therefore a sustainable vocational education should develop both manual and mental competences. UNESCO's work should determine general key competences and identify other special competences needed in different fields.

Existing free training courses and open-licensed resources should include constantly updated modules for lifelong learning in. E-Learning applications seem useful and cost-effective, but will easily become counterproductive unless local and cultural elements are integrated into the learning process. The most promising in utilizing ICTs is a blended-learning environment where the course manager holds adequate didactic and ICT competences. The basic pedagogical principles should give key importance to motivation, activation, concretization, variations, individualization, and cooperation.

My general conclusion in promoting these projects are build on our own model of Global University System (GUS) which we have developed in the Unesco Chair in Global e-learning at the University of Tampere, Finland. It does not impose one cultural or civilizational basis for global education. The Global University System (GUS) [Utsumi, et al, 2003] is a free (volunteer-based, multi-sponsored) grass-roots initiative to widen access to higher education and vocational education and training, and to help participating institutions to meet local needs in ways that are locally-appropriate and globally-informed. The GUS encourages the integration of untapped or poorly-deployed human and technical resources, particularly to facilitate the diffusion worldwide of low-cost means of access to the communication and education resources that the privileged West takes for granted.

In my talk to ECOWAS countries in April 2013 I presented an agenda for action:

1. Fighting the digital and cognitive divide
2. Stimulating international cooperation and participation
3. A global education
4. Education must therefore open up to global interaction
5. Revitalizing the global public sphere
6. Integrating communication values
7. ***The creation of a culture of peace and peaceful understanding between communities and people must be the ultimate value for media literacy***

Recommendation to this Conference (PROPOSED)

1. ***Nigeria is capable and should devise strategies to champion the accelerated improvement of Africa's knowledge index.***
2. ***Ensuring that education environment is integrated with knowledge laboratories and techno-enabled lecturer and trainers is a strategic imperative.***
3. ***With a youth population of 60%, Nigeria should build the capacity and capability to demystify technology innovation.***
4. ***Establish future schools models to champion emerging challenges of globalization and ensure national security and survivability.***
5. ***Mastery of Information and Communication Technology Software represents a predictable framework for Nigeria's competitiveness – the National Software Competition at education and industry levels should be vigorously promoted.***
6. **"Establish an International e-Learning Centre for ECOWAS/Africa in Nigeria (preferably in Tinapa) to act as a clearing house for Domestication of e-Leaning Technology Research and Standards"**

I think that peace in this context means accepting the elementary principle that no one is right without dialogue and there is no peace without freedom and justice.

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