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Measuring the Future for Better Possibilities in Education:

A Theoretical Literature Review

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Abstract—Various methods have been developed that permit policy makers and decision makers utilize the findings rather than simply project current trends and issues into the future. Futures research known as a systematic study of possible future conditions which includes analysis of how those conditions might change as a result of the implementation of policies and actions. Hence, the focus of this paper is how to measure the future, what are the tools that has been used to appraise the futures trends, forecasting and analysis the possibilities and consequences involved in the plans for better tomorrows especially in planning the better education. The methods in measuring the futures will be discussed including scenarios, visioning, cross-impact analysis, causal-layered analysis and etc. Several futures trends also discussed to see the possibilities of education for tomorrow.

Keywords—future, education

I. INTRODUCTION

The field of futures studies is a relatively new professional discipline, arising in the 1950s and 1960s in response to the growing complexity of organizational life and world affairs. The Futures Studies is concerned with the development of knowledge about the futures (Longstreet and Shane, 1993) and futures research distills a vast array of information from many academic disciplines, and professions, including journalism about dynamics that have shaped the world and how those forces might change to create new opportunities, threats, and uncertainties (Glenn and Gordon, 1996). Futures research known as a systematic study of possible future conditions which includes analysis of how those conditions might change as a result of the implementation of policies and actions. The purpose of future researches is to help decision makers and policy makers anticipate opportunities and avoid threats. Since education policy and planning depend critically on assessment of future development, the future research influence processes that create long-term policies, strategies, and plans in education.

This article discusses the measurement of the future, what are the tools that has been used to appraise the futures trends, forecasting and analysis the possibilities and consequences involved in the plans for better tomorrows especially in planning the better education. The methods in measuring the futures will be discussed including scenarios, visioning, cross-impact analysis, causal-layered analysis and etc.

II. FUTURES STUDIES

The Futures Studies distinguishes itself from traditional forecasting and planning disciplines in four ways: First, futures studies consider a longer time horizon than most forecasters do. Second, futurists are typically studying the world 10 to 50 years from now in contrast to economists and market researchers who look out 1 to 3 years. Third, futurists focus on a degree of change which most forecasters do not consider that is real, systematic, transformational change as opposed to incremental changes from existing trends. Fourth, since we cannot be certain about such long-term change, futurists describe alternative, possible and preferable futures rather than single predictions. Futurists use both qualitative and quantitative methodologies where

traditional forecasting tends to rely more on purely quantitative tools.

The premise underlying the Futures Studies as suggested by Longstreet and Shane (1993) should be utilized as follows:

> The future is not predetermined; one creates it by what one does. As corollary of the preceding point, futures planning is governed by the values and beliefs. The future emerges from the present; hence, the present is an important basis for the future studies. Futures planning is not undertaken to reform the present; its focus is on the possibilities and consequences involved in the plans for better tomorrows. In addition to statistical analyses and projections per se, futures research includes the rational study of anticipated developments can be devised. Humankind is currently capable of developing criteria for establishing the meaning of "better" for the future. (p. 167)

With regards to the foundation underlying of futures studies, Inayatullah (2004) used the term of pillars instead of premises. He identified five main pillars defining the field of future studies namely macro-history, anticipation, alternatives ways of knowing, and transformative knowledge. The first pillar is macro-history which study of grand patterns of change. Macrohistorians such as Ibn Khaldun, P. R Sarkar, Pitirim Sorokin, JohanGaltung, Arnold Toynbee and Riane Eisler is to search for deeper patterns of change, to understand the stages of history and the shape of the future and at another level, it is about asking questions that give us insight to the structure of the future. The second pillar is anticipation known as analysis of emerging issues and trends. This tends to focus on forecasting and the goal is to search for the seeds of change, to identify them before they sprout. This method is a micro dimension of macro-history. The third pillar is alternatives which concerns with scenarios and social design. This dimension has two parts. At one level it is constantly asking what are the alternatives that can be expressed in scenarios are. Alternatives can be deeper: about different ways of timing the world, for example, about creating new dimensions of the future, including social innovation. The fourth pillar is ways of knowing. It is depth, deconstruction, decolonizing time analysis. The fifth pillar is transformative Knowledge. Transformative Knowledge is visioning desired futures or action learning. This process of alternative perspectives allows the creation of knowledge that transforms. Knowledge, however, need not be vertically structured (given from above or based on strong hierarchical relations). Indeed, knowledge can be created through a process of democratic questioning.

III. BRIEF HISTORY OF THE FUTURES STUDIES

Longstreet and Shane (1993) had provided us a systematic explanation and elaboration on the history and the development process of the Futures Studies and its continuity up to the present, which is significant in understanding the history of the Future-Studies, as described in the following discussions.

The education's aim in the ancient Greek city-states was for youth's preparation for citizenship. The Athenian youth were focused to study philosophy and the arts. As for the Spartans, they were acquainted with military skills to become soldiers-citizens. On the other hand, the Romans youth were sent to the public elementary schools despite of their class with required payments from their parents. It seems that both the Romans and the Greeks held that education indulged the spirit of good citizenship.

The first century historian, Flavius Josephus, affirmed some Middle East countries had established schools to prepare the youth (aged 6-13) to practical ways of life and latter Charlemagne (742-814), the king of the Franks, in the ninth century, established schools for masses' youngsters in monasteries and cathedrals and the nation castle for the nobles. In a later period, in the eighteenth century, J.L. Favire (1711-1784) was probably the earliest to be involved in the Future Studies and was appointed by Louis XV to apply multiple dimensions of speculations about the future to challenge the French Monarchy but failed to forecast

France revolution. Napoleon (1769-1821) also laid down a state-controlled education system of primary to college, to prepare the youth for the life that their parents were living in and not for the future. In the nineteenth century, the British author, H.G. Wells (1866-1946), wrote on The War of the Worlds (1898) and The Time Machine (1895) have since come true and once had uttered, which is quoted by Longstreet and Shane (1993, p. 168) as follows: "Every disastrous things that has happened in the past twenty years was clearly foretold by a galaxy of writers and thinkers twenty years ago."

In 1890s, in the United States of America, The Committee of Ten made a concept of not limiting considerations to the secondary school curriculum and later this concept was known as the junior high school. They also recommended the number of years spent in the elementary schools should be reduced from ten to eight. Similarly the duration of study for the grammar should also be reduced. The natural sciences to be taught in the elementary schools should be stressed on experiments. Physics should be taught in the upper elementary grades. In the seventh and eight grades, mathematics should be replaced with algebra.

The committee's dispossession of vocational education had an impact on most of their children (whose parents were poor-European immigrants) who had to work before they were able to attend college. In 1893, they made recommendations, for education appropriate for that period instead of a world anticipating rapid social and technological changes, such as: stress on mental discipline; the omission of art, music, and physical education as they viewed the subject to be absent of disciplinary value. As replacement, they included the nine subjects that had equal values, and this resulted in an equal allocation of time in instruction.

The committee designed a curriculum that symbolized the production, operations, and organization of the factory economy supremacy to prepare the youth for the future. As a result, in less than a century, the United States evolved from the factory-based economy to the post-industrial revolution based on electronic microchips and a populace where the offering of services is primary and goods-based production of is secondary causing an excess of labor.

Futuristic activities also grew exponentially and became an interest among the Americans. In conjunction, the Hudson Institute (founded by Herman Kahn in 1961) and other institutes such as The Future Institute began to emerge. Between 1963 and 1964, Theodore Gordon and Olaf Helmer conducted the RAND "Report on a Long-Range Forecasting Study," based on retrospect, and they projected 130 scientific achievements, which mostly have since come true such as moon landings and heart transplants. This resulted a number of business organizations involve into future research, in the last several decades, such as the Bell Telephone Company, which developed Systems Approach for the purpose of bonding together networks of policy decisions, and The Singer Company, General Electric, Westinghouse, and various automobile companies, developed in-house agency and employed policy research advisors.

The 1960s-1970s marked the period when the system's development came into being, whereby in 1967, Olaf Helmer concluded that an entirely new attitude had become obvious among policy planners in the United States and acknowledged that "intuitive gambles are being replaced by a systematic analysis of the opportunities the future has to offer" (Longstreet and Shane, 1993, p. 168). By the mid 1970s, methodical speculations about the future had spread in the United States and overseas. For instance, in Britain and Italy, magazines such as The Futurist and the journal Futurist were published in the former, and The Limits to Growth of The Club of Rome was published in the latter; The Futuribles Center was opened in Paris; and in Britain, Germany and other European countries, teams of scholars were at work on the future.

IV. MEASURING THE FUTURES

Within four decades in the history of future studies development, various methods emerged in measuring the futures. Inayatullah (2004) used the word mapping instead of measuring and he identified 6 methods in mapping the futures as follow:(1) The futures triangle, (2) The futures landscape, (3) Emerging issues analysis, (4) Causal Layered Analysis, (5) Scenarios and, (6) Visioning. Longstreet and Shane (1993) stated that tools and tactics for possible future development analysis have been affected after the 1940s. The trends analysis is centered on forecasting, yet the present research tools often unable to actually measure the futures critical trends. The tools has been used in the futures studies research or in the other hand to measure the futures including linear or classic projection, alternative futures projection, bibliographic analysis, environmental scanning, scenarios, visioning, cross-impact analysis, and causal-layered analysis.

Linear or classic projection is a tool in trend analysis. The first stage of this projection is planning that involves descriptive data collection of present situations. The next stage is decision-making and execution and followed by the final stage known as the future. Another tool for trend analysis is Alternative futures projection, which is an approach that provides for multiply likely futures. The complex future is developed by dynamic and creative involvement that includes control of the shape of the future by some significant scale.

One of the tools of trend analysis known as Bibliographic analysis typically involves a system's implementation for material collection that can be seen in selected journals or magazines. The objective of this analysis is to distinguish trends based on the entries found in relevant written material. Most of large corporations and higher education institutions utilize Environmental scanning as part of their planning processes. This analysis involves collecting systematic data about the external situations associated with an organization or institution to find out the development of recent and the futures trends of social, technological, economics, and political that would possibly have an impact on the organization or institution's futures. In general, the objectives in monitoring and scanning are to detect scientific, technical, economic, social, political and ecological events and other elements important to the institution. Define the potential threats and provide continuous awareness and evaluation of trends to guide planning and action choices. Active scanning is a more deliberate and conscious effort to review information from a broad array sources and subject areas.

Scenarios also map the future but in horizontal space. It is also tools for organize our perceptions about alternative futures in which today's decisions may play out. A scenario is simply a series of events or ventures that we imagine happening in the future. Professional researchers utilize these scenarios to develop probabilities and prepare precautions that will minimize the problems which might result in the future.

Visioning is another tool that usually uses to measure the futures. It focuses more on the preferred future. This is a powerful pedagogical tool, as individuals become creators instead of receivers of the future (Inayatullah, 2004). Visioning is a process of making images of the future sufficiently real that give people a sense of current drivers of change so they can imagine a range of alternative futures, and facilitates a process of achieving some consensus of a preferred vision for the future.

Another tool that represented an effort to extend the forecasting techniques of the Delphi method is Cross-Impact analysis. The cross-impact concept originated with Olaf Helmer and Theodore Gordon in conjunction with the design of a forecasting game for Kaiser-Aluminum (Helmer, 1977). The cross-impact method is an analytical approach to the probabilities of an item in a forecasted set. In this approach, events were recorded on an orthogonal matrix and at each matrix intersection the question was asked: If the

event in the row were to occur, how would it affect the probability of occurrence of the event in the column? The judgments were entered in the matrix cells. Its probabilities can be adjusted in view of judgments concerning potential interactions among the forecasted items. Advantages are many, gives decision makers an advantage, not necessarily in influencing the trend, but in positioning the organization to minimize negative impacts and maximize positive impacts. There are 4 steps in using this method as follows:

Step 1: Define the events to be included in the study (usually 10-40 events). Initial set of events is usually compiled based on literature search and also interviewing key experts.

Step 2: Estimate the initial probability of each event -- possibility of their occurrence between now and some future year eg 2010, 2020,2030. An individual experts may estimate the initial probabilities but, more commonly, groups of experts from the various disciplines covered by the events estimate them. Questionnaires, interviews, and group meetings can also be used to collect these judgments.

Step 3 : Estimate the conditional probabilities. Typically, impacts are estimated in response to the question, "If event m occurs, what is the new probability of event n?"

Step 4 : Perform a calibration run of the matrix. Once the cross-impact matrix has been estimated a computer program is used to perform a calibration run of the matrix.

Findings from Cross-Impact analysis provide input to policy makers in planning new system or policies in administration or in other fields for the future.

Inayatullah (2004) explored another measurement for the futures called Causal layered analysis. This method takes a depth view of the future by exploring how forecasts are dependent on other dimensions – social, political, cultural, for example – the systemic level. This systemic view is, however, nested in worldviews. These are deeper paradigms of civilizations see self, other, future, time and space. Causal layered analysis explores these multiple levels of the future, ensuring that the future: first, is seen as layered; second, it is seen as complex; third, can be entered through multiple spaces and; fourth, is seen not as given but as constituted by various levels of reality. Causal layered analysis transforms the listing of a particular future by relate them into a system, worldviews and myths. The deconstructed future thus can be reconstructed by switching to an alternative system, worldview or myth.

V. FUTURES TRENDS

The futures trends should be deeply and systematically analyzed to help people better understand future possibilities in order to make better decisions today. There are various approach in understanding about future trends. Michael Marien (2004) from the future survey, Spring 2004 had selected top ten forecasts known as significant probable developments that deserve wide attention as follows:

- World population, now 6.3 billion, will grow to an estimated 8.9 billion by 2050. Nearly all of the 2.6 billion increase will be in developing countries. This new projection for 2050 is lower by 400 million than the one made in 2000, due to an increase in AIDS-related deaths (278 million by 2050).
- China is likely to overtake and India to equal the US economy in size by mid-century. And, as the world's economic center of gravity shifts to Asia, US preeminence will inevitably diminish.
- The number of urban dwellers will equal the number of rural dwellers in the world by 2007. By 2030, urban population will be 60% of the world total, up from 47% in 2000 and 30% in 1950.
- Our planet's climate can change, tremendously and unpredictably. Beyond that we can conclude with the IPCC that it is very likely that significant global

warming is coming in our lifetimes. This surely brings a likelihood of harm, widespread and grave.

- The world's energy use is at an epochal crossroads. The new century cannot be an energetic replica of the old one, and reshaping the old practices and putting in place new energy foundations is bound to redefine our connection to the universe.
- Over time horizons of 5-10 years, the inertia of the energy/economy system is so strong as to leave little room for change, but over longer periods the future will almost certainly look different.
- No drug, no medical device will appear after 2010 without having been customized for a class of users with similar genetic information.
- Cloning may turn out to be less prevalent and less scary than we imagined. Market forces might make reproductive cloning impractical, and scientific advancements may make it unnecessary.
- The prospect of enhancing normal brain function is real. And with it will come a host of ethical issues concerning who has access to what.
- Preliminary evidence suggests that expanded school choice options, even a voucher system, will not lead to a mass exodus from public schools. If we are witnessing a revolution, it is a slow-moving, uneven revolution, whose outcome is very much in doubt.

Longstreet and Shane (1993) had organized the futures critical trends forecasting into the following criteria, which are: world threats, socio-economic and political phenomena, social regression, multiplying family problems, and problems in schools. Somehow and in someway these futures trends have impacts on the futures-curriculum intended to be developed. Thus, it is extremely important for the policy maker and education decision makers.

The first futures critical trend is the world threats. Among the threats are: food problems, the greenhouse effect, old zone layer threat, population booming in many countries, land degradation, pollution and toxic waste, deforestation and desertification, the AIDS epidemic, deteriorating infrastructures in large cities, reduction of fuel, water shortage, nuclear hazards, global security and peace necessity and others. For example, in 1988, the American industry pumped 2.4 billion pounds of chemical and other toxics substances into air. As a result, the EPA concluded that over 100 millions of Americans in the fifty states breathed contaminated air containing mercury, radon, asbestos, benzene, and arsenic. This clearly shows the harmfulness of toxics especially in industrialized areas due to the fact that each day the Americans inhale between ten and twenty thousands of liters of air. In conjunction with this matter, Glenn (2000) asserts that nanotechnology (identified as one of the futures-means to assist in pollution reduction and improve the living standard of the poor); and solar power satellite (identified to be one of the futures electric sources and will conclude the greenhouse gases and nuclear wastes problems) are two possible futures alternatives that may concluded the current and future of nuclear hazards and contaminated air problems.

The second futures critical trend is socio-economic and political phenomena. The world's social, economy and political problems have increased and become so critical. For instance, in the United States, an aging problem will burden the American youth in terms of medical costs, funds, for social security payments, and education needed, increasing American debt by purchasing foreign property; AIDS epidemic – with an annual 1988 increase rate of over 72 percent, violence – the United States has dreadful records on handgun killings. It was reported that 8,092 of these slayings occurred in the nation in recent years, as compared to 5 in Canada, 57 in Britain, and 121 in Japan. In Los Angeles alone, at least 200 American youth gangs have been recognized in 1985, and in the following year the

number reached 287, an increase in 24 percent in 12 months. Robbery in one of American cities has grown from 1,072 to 12,236 robberies during a recent ten year-period. The drug problem, in the United States alone and the usage of drugs among the Americans has tremendously risen. As for Glenn (2000), the futures critical trend forecasting is Vulnerabilities, which comprises of info warfare, cyber-terrorism, fraud, cultural threats, widening knowledge gaps, US$2 trillion/day moves around the world, jobless growth, automation is replacing knowledge and judgments.

Cyber-terrorists or computer hackers are one of the main factors that cause these problems (Chareonwongsak and Cheow, 2000). Cyber-terrorists can unlawfully break in the main servers of companies or national authority and alter or catastrophe information related to transfers of cash, private individual data or national security's data. Furthermore, when more countries accumulate computer-controlled nuclear weapons, the destruction ability of the terrorist will increase. These problems occur due to fact that "in December 99, it was reported by Salomon Smith Barney that for the first time, the value of the world's publicly-traded companies surpassed the world's total economic output, estimated by the IMF at US$30.1 trillion (the world's total GDP)!" (Chareonwongsak and Cheow, 2000, p.1).

The third futures critical trend is social regression including the regression in technology advancement. Technology-awareness is the stage where humans become I-imitators (individuals who are Internet-alert); stimulate-generate intellectual milieu; the Internet becoming the culture; active correlation in advancement of technology and awareness growth; fusion of religious attributes with private sector management; humans and intellectual technology are interconnected. Longstreet and Shane (1993) described awareness-technology as follows:

> the deluge of electronic development will be used to support our ongoing forward on an eight wave – one on the crest of which we shall move from mere information or knowledge to wisdom based on knowledge and during which our heightening consciousness changes us from mere human beings to humankind beings. (p. 180)

According to Chareonwongsak and Cheow (2000), one of the future trends and challenges in this millennium is to ensure network security of worldwide computer connections. They stated that in the future, the world will be linked globally by a computer-controlled database, and the security of the world will depend on this system. If computational errors occur in this system, this could be followed by a sequence of increasingly serious errors as the errors are passed from one system to another. For example, in 1990 and 1991, telephone networks in the United States suffered wide-ranging and extensive failures causing airports to be closed and capital to be cut off. Later in Britain, in 1992, 2,400 errors in an early version of software, designed for utilization of controlling its huge new nuclear fuel reprocessing plant at Sellafield, was detected by the British Nuclear Fuels.

The fourth futures critical trend is multiplying family problems. For instance, throughout 1980s, the number of homeless American children drastically increased. By 1990, about 100,000 school-aged children were of absence of permanent residence. The 1998 Census Bureau reported that "approximately 25 percent of American children lived with just one parent and over half, about 21 million, were in single-parent homes headed by a women in nine cases out of ten" (Longstreet and Shane, 1993, p. 193).

The fifth futures critical trend is problems in schools. For instance, latest technologies have been applied among the students with practical activities such as flying a plane – in concordance with the school's philosophy "free to learn whatever they want" as reported by Hellfand (2002, p. 2), and mobile computer labs (Lifelong, n.d.) in the United States yet the problems in schools still exists. Moreover,

new challenges are brought to education as ethnic and cultural change. With assumption that present trends continue within the decade of 1990s, the minorities of the 1980s such as Asian, Blacks, and Hispanics, will be the majority of the students in 53 of America's 100 largest school system. Besides that, the media have widely published problems related to sex, drug abuse and teenage suicide hence further explanation concerning the topic is needless.

Chareonwongsak and Cheow (2000) discussed that the potential catastrophes that could change the world within the next 25 years, other than cyber-terrorists, is computer viruses. Viruses are intelligent software-weapons, which can destroy data banks or steal both secrets and cash by transmitting them through network connections into the computer network of institutions. They can implant false messages, modify records and assist enemies in spying. Some can revive after being destroyed. Possibly, one virus could demolish the whole world's network of data.

Another ideas Glenn's (2000) trends forecasting mainly focused on science and technology, which include the following: globalization of science and technology, space technology, nanotechnology, biotechnology (genetic engineering), information technology, conscious-technology, and bizarre ideas and controversial technology. Only two of these futures critical trends forecasting will be discussed.

The first trend forecasting is on space technology. Glenn (2000) stated that "By 2050 an additional 3 billion people will be added, 5-7 billion of the 9 billion will live in megacities, economic growth will accelerate, 300 nuclear power plants will be closed, electric cars will increase. Where will the extra electricity come from?"(slide 9). In regards to this statement, by 2050, the world population will increase and this will have some impact on the energy issues. There are several alternatives to solve this crisis. The first is the usage of fossil fuels. However, fossil fuels are limited and will eventually cease from existence if they are not preserved. Nuclear power is the second alternative. This type could be the solution, but it's safety and effects to the environment have to be taken into consideration. Another alternative is consuming the resources of the earth. Nevertheless, these resources are insufficient to cope with the demands of huge metropolitans.

Based on the above questions, Glenn forecasts space solar power as the best option to conclude future global energy shortage. This resource is probably the safest and unlimited resource due to the fact that it does not generate deadly toxics and gases. Glenn explained that in future, humans might gain space solar power by building solar satellite elements on the earth, assembling them in orbit, and beaming energy to earth. Another possible method is to build solar panels on the moon from lunar material and beam energy to earth, or build solar satellites in orbit from asteroids or from lunar material and beam energy to earth. These future ways of gaining space solar power are supplements to wireless transmission of energy from earth sources to other locations on earth.

The second futures critical trend is the futures economy. For the purpose of understanding briefly on the economic patterns of agricultural era till the future, Glenn's "Simplification of Economic History" can be derived for outline and foundation of futures trend analysis in the Futures-Curriculum research. Glenn classed the era into four, the Agricultural, Industrial, Information, and Conscious-Technology eras and simplified the patterns of the eras to product, power, wealth, place, and war, accordingly. In the Agricultural era, he described the food as product, the religion as power, the land as wealth, the farm as place, and the location as war. The Agricultural era was replaced by the Industrial era, whereby in this era, the machine was considered as product, the state was as power, the capital was as wealth, the factory was as place, and the war was as resources. In the proceeding era, emerged the Information era, the info-service referred to product, the

corporation referred to power, the access referred to wealth, the office referred to place, and the perception referred to war. In the future Conscious-Technology era, the linkage was signified as product, the individual signified power, the being signified wealth, the motion signified place, and the identity signified war.

Glenn forecasts that nanotechnology and biotechnology (genetic engineering) will play important roles in the futures economy. For instance, nanotech food production will provide future food. Nanotech will also cause machines to operate by themselves (finger-sized solar panels); and the existence of home-scale nano-manufacturing computers for the means of production. As for biotech, agricultural and food productivity, nutrition, combinatorial chemistry, and human intelligence are the components that comprising it. These two technologies will be the driving-force of the economy of the future.

Glenn's futures trends forecasting, particularly related to nanotech and biotech, has its roots from the Biological Sciences Curriculum Studies (sponsored by the American Institute of Biological Sciences with the funding from the United States government). The materials developed in the study are based on nine themes, which are quoted by Longstreet and Shane (1993, p. 244) as follows:

> Evaluation and change in living things across time; university and diversity in the patterns of living things; the genetic continuity of life; the complementary relationship of the environment living organisms; the biological origins of behavior; the complementary relationship of function and structure; genetic continuity: the preserving of life in the face of change; science as inquiry; and the history of the development of biological ideas.

Futures Possibilities in Education

Based on the aforementioned discussion on world future trends, as quoted by Michael Marien (2004) Future Trends, one of the implications:

> "I aim [in this book] to take a step toward the day when futures studies will become a basic part of the curriculum of every school, every college, and every university, and when everyone, everywhere, will take for granted that having some understanding of the principles of futures studies is an essential part of what it means to be an educated person."
>
> Wendell Bell in Foundations of Futures Studies (New Preface, FS 26:3/148)

In agreement with aforementioned statement, the writers suggest that the curriculum designers should consider the research findings from future trends studies as one of the vital underlying the futures curriculum. The students should expose more about the futures and the possibilities they might face and also equip them with the problem solving skills and decision making skills. The future trends including world threads with food problems, the greenhouse effect, old zone layer threat, land degradation, pollution and toxic waste, deforestation and desertification and many others problem need in depth study to see the impacts toward education. Social regression issues including multiplying family problems and the number of homeless, deprived children after war and many other problem related to the technology advancement will occur in the future world. The role of future researches is vital in determining the future direction of the education system. The curriculum experts should analyze the nation's basic philosophy, the needs of the future young generation, and others possible solutions. These experts should also

determine the studies to be pursued in the schools with the main objective is to provide better preparation for the future education of the youth. In this way, the youths are more prepared to face the future challenges they encounter. However, more often than not, the planners and designers have to deal with uncertainty partly due to the present socio-political and economical structure. To a certain extent, they have to face the challenges in dealing with curriculum decisions that they have never experienced before. In other words, they must somehow endow the knowledge of recognizing the complexity and indefiniteness epitomizing nowadays societal or national future. For these reasons, additional goals that have links in the future should be included into the planning and designing curriculum activities that are futures-oriented to a specific notion.

Latest technologies have been applied among the students with practical activities such as flying a plane – in concordance with the school's philosophy "free to learn whatever they want" and mobile learning – learn anywhere, anytime and anyplace will take place in future school system. For the purpose of future pedagogy betterment, for instance, the instructional environment must be flexible in order to widen citizen-scientist curriculum and provide various study experiences in the pedagogy of the science. The changes in the pedagogy of the social studies need to be accommodated. By applying the hypothetical mode, the changes involving the public and students that would deal honestly with possible futures and foreseeable uncertainty must be premised. This mode would create an atmosphere where instructors assist students to explore social problems; open to questions with uncertainty, and involve students in decision-making activities.

New conceptions of education (eg Viruses as intelligent software-weapons, Nanotechnology and biotechnology) have to be invented in response to new questions such as: What would cause a subject to be for both present situations and future needs? Which subject-areas would help the youth resolve with both uncertain futures and current difficulties? What is the focal point of studies when there are nationwide networks of data shared by million pair of eyes daily? What can we do and what are we suppose to do to manage the psychological causes between technological means such as the Internet and the capability of human to wisely use these means? There are emerging needs in the society to become educated-foresight. In effect, they could grasp the better future living.

VI. CONCLUSION

Taken into consideration that research for the futures will play an important role in designing the curriculum for the future education, the writers conclude with five factors will influence curriculum design. The first factor is the humans as a developer of their own future based on the fact that the future is not predestined. Secondly, the humans' values and beliefs dominate the futures planning of the futures-curriculum. Third, the present is essential for the futures studies due to the fact that the future emerges from the present. Fourth, the futures planning are based on the possibilities and consequences of the current plans concentrated on creation of a better future, and not to ameliorate the present. Fifth, as well as statistical analysis and forecasts, futures research must be pursued on the basis of a study, which is based on rational synthesis towards the futures advancements forecasted that is subjected to reconstruction. Sixth, at the present, humans are able characterize the significant establishment of enhancing tomorrow. As stated by Glenn and Jerome (1996) in the Report of the Millenium Project:

> Whether consciously or not, future images influence processes that create long-term policies, strategies, and plans. Future studies examines the plausibility of such images, and the gap between desirable future visions and likely futures produced by current dynamics of change. Future studies helps bring desired

and likely future circumstances in closer alignment. This approach improves our ability to anticipate change, adapt to forces beyond our control, and influence those within our control.

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