



# **‘Ex Corde Ecclesiae’, The Heart of Unika Soegijapranata’s Engineering Lifelong Learning<sup>1</sup>**

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## **ABSTRACT**

*The University Missions, teaching, research, and community service, are well-known as main pillars to support the University role in community. UNIKA Soegijapranata as a Catholic University in Indonesia has a specific characteristic in issuing the Third University Mission. As the heart of the Catholic University, the principles of Apostolic Constitution on ‘Ex Corde Ecclesiae’ (‘Born from the Heart of Church’) takes an important role in engineering lifelong learning which provides updates of recent engineering and technical development and also advancement. This paper purposes to make a philosophical review of as a research on the principles of Apostolic Constitution on ‘Ex Corde Ecclesiae’ that is implemented to the manifested to the ‘Eco-Settlement’ that is defined more detail in the ‘Eco-Engineering’ and ‘Eco-Civil Engineering’. The paper meets several conclusions: (1) The philosophical review obviously describes a brief support of the ‘Ex Corde Ecclesiae’ that is manifested to the engineering lifelong learning by mapping the role and contribution of the principles of Apostolic Constitution on ‘Ex Corde Ecclesiae’; (2) The ‘Ex Corde Ecclesiae’ assists the protection and advancement of human dignity and of a cultural heritage through teaching, research, and community service of engineering offered to local, national, and even international communities; (3) The engineering lifelong learning has to be understood, to be experienced, and to be engaged culture, as well as it is implemented by ‘Ex Corde Ecclesiae’ in ‘Eco-Engineering’ and ‘Eco-Civil Engineering’; (4) The University should becomes ‘an agent of change’ to bring the community welfare by the Third University Mission in engineering field by providing updates of recent engineering and technical development and also advancement*

*Keywords: ‘Ex Corde Ecclesiae’, lifelong learning, engineering.*

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<sup>1</sup> This paper is submitted to International Conference on Continuing Engineering and Technical Education (University 3<sup>rd</sup> Mission Programs), 20-22 August 2008, Diponegoro University, Semarang

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## 1. INTRODUCTION

The University Missions, teaching, research, and community service, are well-known as main pillars to support the University role in community. It is very interesting to share ideas, perspective, and hopes, to every person in dynamics society about the importance of university's role, especially its Third Mission Role, in creating a civilized universe. UNIKA Soegijapranata (Soegijapranata Catholic University) as a Catholic University in Indonesia has a specific characteristic in issuing the Third University Mission. As the heart of the Catholic University, the principles of Apostolic Constitution on 'Ex Corde Ecclesiae' ('Born from the Heart of Church') takes an important role in engineering lifelong learning which provides updates of recent engineering and technical development and also advancement. The 'Ex Corde Ecclesiae' states the main duty of a Catholic University to develop human dignity through research, teaching, as well as community service that is characteristically unique for engineering higher education.

This paper try to stand appropriately to make a philosophical review of as a research on the principles of Apostolic Constitution on 'Ex Corde Ecclesiae' that is manifested to the engineering lifelong learning at UNIKA Soegijapranata. Clearly, this paper makes a mapping of the role and contribution of the 'Ex Corde Ecclesiae' to engineering lifelong learning that becomes a significant support of the Third University Mission. It is also engaged to the Principle Scientific Pattern of UNIKA Soegijapranata, 'Eco-Settlement' that is defined more detail in the 'Eco-Engineering' and 'Eco-Civil Engineering'.

## 2. THE 'EX CORDE ECCLESIAE' AND THE CATHOLIC UNIVERSITY

### 2.1. Human, Science, and the University

Human is a living-creature. Human is experiencing and caring the life (Mardiatmadja, 1982). The call of living is meaningful which motivates human being becomes creative, dynamics and fully self-confidence. In this dynamic society, human faces the questions of the development of modern world, about the position and role of human in universe, about the efforts, individually or in community, and finally, about the last goal of the world and human (Gaudium et Spes 3, KWI, 1996b). The meaning of life is engaged to the meaning of world; therefore, human is unity to universe (KWI, 1996a). Human lives, manages, take all the fruits of life, and get responsibility of the world existence. God gives human trust,

together with Him, to create the world, and then the world should be always new and more suitable for living. A man drives his own life; otherwise, many relationships affect and determine his pattern of life, named culture. However, it is still difficult to define or describe what the culture is, but it is not difficult to understand, to experience, and to engage culture (O'Connell, 2000). Every human activity engages culture and contributes to create civilization. It means that cultural situation related to vision, evermore the way of life. Absolutely, the call of living is inspired by faith and religion in various cultures.

Human has all sorts of belief. The way in which they arrive at them varies from reasoned argument to blind faith (Davies, 1992). The manifestation of belief, faith, and senses grows to picture the world and its phenomenon to build a paradigm. This is called *science, the body of knowledge* (Besari, 2003). As noted by Kuhn (1996), if science is the constellation of facts, theories, and methods collected in current texts, then scientists are the men who, successfully or not, have striven to contribute one or another element to that particular constellation. Finding the truth, there were conflict between to believe based on faith and to understand based on experience and sense (Huijbers, 1982), between science and religion. In the next stage, these two regions of conflict generated the secularization<sup>3</sup>, and even more, secularism<sup>4</sup>.

In one side, we meet science. The truth of science can only be conceived by fitting the phenomenon to the models of paradigm. If the model of paradigm cannot represent the phenomenon, it is called *anomaly*. When the anomaly is found every time, then a new model of paradigm will replace it. In other side, there is *technology*. The technology is based on human himself. Human creates technology as an instrument to fulfill his needs (Besari, S, M, 2003). A man should optimize his sense to create technology by exercise, based on ratio, to make it, to engineer it to be a concrete product. It should be emphasized that the application of engineering is

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<sup>3</sup> Secularization is a development to reach profane. Taken from Latin word, "saeculum" that means profane (Huijbers, 1982)

<sup>4</sup> Secularism is defined as a rejection of transcendence based on experience or statement of experience. Secularism is a doctrine of redemption or profane ideology (Huijbers, 1982)



needed to create technology, as well as technology, in the next turn, will help human in engineering.

The journey of science had been emerged since ancient period of human civilization. The art of engineering is believed as old as the existence of *Homo Erectus* whose lived in Nusantara and Africa (Sahari, 2003, based on Leonard, 1973). The age stone apparently became a starting point of a kind of engineering process by introducing stones as tools and equipment. The stone-technology proved the efficiency of fulfilling needs for ancient-man and developed to support the civilization. The agricultural technology took place in the next period, about 10,000-15,000 years ago, followed by animal domestication and agricultural revolution until the Classic Greece period. In this period, the science is still qualitative, irrational, finite, and myths. Principal of Greece thought encompassed many axioms and premises to intellectual discovery. The science influenced the technology in the next 1,000 years later, that science changed into formal, rational, discrete, infinite, and secular. It is interesting that science transformed from flexible artistry to rigorous discipline that will open the gate of the future engineering development (Besari, 2003). In the 15<sup>th</sup> to 17<sup>th</sup> century, the scientific revolution changes the paradigm radically to a new one, to become a mechanism of the development of science, to emerge a modern science (Kuhn, 1996). The paradigm that was generated by trial and error experiments moved to organized experiment and motivated human discovery.

The 16<sup>th</sup> century became the birth of institute of formal scientist that was developed by the group of scientists whose paid attention to new sciences (Besari, 1998). This formal institute was called Academy. The oldest academy was Accademia dei Lincei in Rome (1600-1630), followed by Accademia del Cimento (1657-1667). There were also the Royal Society of London (1662) in England, and Academie Royale des Science in French (1666), which were given a patronage from the states. The last two academies became the model of organization of scientist community that was formed formally by states in Germany, Austria, Swedish, and Russia.

Besari (1998) has summarized the development of the university. It is necessary to remind the first academy in Classic Greece period established by Plato (427-347 BC) that was limited for high-class family. The history noted the Lyceum that was established by Aristotle (384-322 BC) whose the student of Plato, took an important role in the development of university and

knowledge, followed by the Museum of Alexandria. After the Classic Greece period, the development of knowledge in Europe and the countries around Middle Sea influences by religions (Catholic and Islam). In the 10<sup>th</sup> century, some schools were established such as Chartres and Reims in French and developed more organized looked like a modern university (Besari, 1998 based on Bernal, 1997) and this kind of university established in Europe (Besari, 1998 based on Good, 1947). The University of Paris (1160) was honored as regarded university in lectures, liberal arts, philosophy, and theology followed by the establishment of universities in Bologna, England, Germany, Hungary, Austria, etc. It should be noted that the universities in that period were legally incorporated. The university has autonomy to run their law and regulations. The university has the right to recruit the professors, to manage their status, to determine title of scholarship, to determine the subject of studies, examinations, and requirement of graduation. Even though the renaissance period still put the high-class society in education in this last period, the education reformed into a modern system. The next period of the Age of Reason (around the 18<sup>th</sup> century), the society formed into egalitarian, tolerant, and democrats. The university started to open the gate for public. The establishment of politics made the university then has no more privilege, or in another words, the university must obeyed the government and law of the states. The establishment of University of Berlin (1890) is a mark of the existence of university in modern era. It forwards the teaching as well as the research development. Entering the 20<sup>th</sup> and 21<sup>st</sup> century, the progress of information and communication technology has colored the globalization to become global society and open market.

## 2.2. The Apostolic Constitution about The Catholic University, 'Ex Corde Ecclesiae'

The dialogue about the role of the Catholic University in global society had been conducted between the Catholic Universities itself and the Holly See. Pope John Paul II issued the document of Apostolic Constitution about The Catholic University, 'Ex Corde Ecclesiae' (Born from the Heart of the Church), on August 15, 1990. This document consists of the Introduction and two Parts of main document, and also the Conclusion.

In the Introduction, Pope John Paul II stated a great appreciation to the Catholic University. It is also emphasized about the responsibility of the University to dedicate for the truth and to



communicate the truth and the meaning of the truth. The University faces challenges in science and technology development that brings wide implication (Sastrapratedja in KWI, 1992). This document is directed to all elements who are involved in University management, such as the academic community, the foundation, the Bishops, and common people. The First Part encompasses the identity and mission of the Catholic University and mostly a citation of the document of "The Catholic Universities in Modern World" (1972). The beginning of this part emphasized that a University is an academic community and has main duties of developing the human dignity through teaching, research, and community service. On behalf of identity, the Catholic University's characteristic should inspire all members of the University individually and also the University institutionally. This part of document also mentioned the contribution of Catholic University to Church, especially to solve problem and to fulfill society needs. The Constitution reminded the role of the Catholic University in building a cultural dialogue in evangelization that cannot be replaced by (Sastrapratedja in KWI, 1992). The Second Part of the Constitution contains the general norms. The Bishop Conference should implement the seven general norms stated in this chapter in local and regional level. The seven sections are the normative implementation of the First Part (Sastrapratedja in KWI, 1992). In the Conclusion, the Holy Father emphasized the importance of role of the Catholic Universities in the future of human being.

The science and technology become parts of new civilization. It is the duty of the university to keep the science and technology is always dedicated to human welfare without degrading the human dignity. The 'Ex Corde Ecclesiae' has truly revealed the role of the university in creating the civilized universe.

### 2.3. The Catholic University in Dynamic Society

A very crucial question about the Catholic University is: "When does the label of 'Catholic' can be applied?" The Supplementary Ordinances for Catholic Institutes of Higher Learning in Indonesia of 'Ex Corde Ecclesiae'<sup>5</sup> conveys some

important requirements such as: the Catholic Institutes of Higher Learning encompasses University, Institute, Advanced Schools, Polytechnic, and Academy (Article 1.1); the Catholic Institutes of Higher Learning may be established by any local Episcopal Conference, religious institute, or other public juridical person, and also the cooperation of the elements mentioned above (Article 1.2); there is no Institutes of Higher Learning can apply the label of 'Catholic' without any approval of the authority of Catholic hierarchy; etc. According to Örsy (2004), the Catholic Universities can be classified as their position in canon law as follow: (1) Secular universities in Catholic environment, (2) Secular universities integrated with a Catholic academic unit, (3) Universities nourished by Catholic tradition but no formal institutional commitment, (4) Universities with institutional commitment to Catholic ideals but without an ecclesiastical charter, (5) universities established by the Church with a canonical charter; and (6) "Ecclesiastical universities and Faculties" established by the Church and dedicated to 'sacred sciences'.

It is a necessity to quote some parts of the Apostolic Constitution on Catholic Universities. The Pope John Paul II noted a very fundamental understanding about the Catholic University, 'Born from the Heart of the Church'<sup>6</sup>, a Catholic University is located in that course of tradition which may be traced back to the very origin of the University as an institution. It has always been recognized as an incomparable center of creativity and dissemination of knowledge for the good humanity. By vocation, the *Universitas magistrorum et scholarium* is dedicated to research, to teaching and to the education of students who freely associate with their teachers in a common love of knowledge<sup>7</sup>. Apostolic Constitution on Catholic Universities (www.vatican.va) conceived the Catholic University as an academic community which, in a rigorous and critical fashion, assists in the protection and advancement of human dignity and of a cultural heritage through research, teaching and various services offered to the local, national and international communities<sup>8</sup>. When the basic mission of University is a continuous quest for the truth through its research, and the preservation and communication of knowledge for the good of

<sup>5</sup> APTIK. 1998. Lampiran - Perencanaan Strategis Perguruan Tinggi Katolik Anggota APTIK Memasuki Milenium Ketiga 1998-2008. *Appendix - The Strategic Plan of Catholic Institutes of Higher Learning, Members of APTIK, Entering the Millenium Third*. APTIK Publication. Yogyakarta.

<sup>6</sup> "Born from the Heart of the Church" is translated from "Ex Corde Ecclesiae".

<sup>7</sup> Apostolic Constitution on Catholic Universities, 1.

<sup>8</sup> Apostolic Constitution on Catholic Universities, 12.



society; then a Catholic University participates in this mission with its own specific characteristics and purposes<sup>9</sup>. The *Ex Corde Ecclesiae* reveals a deep and inspiring vision of what a Catholic university can and should be. Therefore, its promulgation was timely and absolutely essential (Freddosso, 1995) to be engaged in harmony with the universe.

The society is now growing dynamically. The universe should adapt any changes, the humanistic have to run after the Cultural Revolution. Becoming a part of dynamic society, the Catholic University is called on to become an ever more effective instrument of cultural progress for individual as well as for society<sup>10</sup>. O'Connell (2000) emphasized that the University exists for just such a purpose: "to understand, to experience, to engage culture". Then, the values system in culture gives the University duty as the place of the cultivation of character. If the values are the elements and language of culture, then they must also and at the same time be the elements and language of the university, especially a Catholic university. These values are the most important factors in cultivation of character (to be 'humanior') of an academic community named a university. O'Connell also emphasized, when human life emerges as the primary human value, it also becomes the primary language of a Catholic University.

The Catholic University should interact to the society without any discrimination. Based on the document of *Lumen Gentium* 9 (KWI, 1996), it is said "God is willing to salvation and sanctification of human beings not one by one, without any connection of each other, but He is shaping them to be His members, who confesses and serves Him with purity of soul." Living in harmony in dynamic society, the Catholic University must give priority to concern for justice. Hollenbach (2004) insisted that the concern for justice is proper to the university because of the university's humanistic aims. If it is necessary need, the Catholic University should have any courage to speak the uncomfortable truth, which does not please public opinion<sup>11</sup>, for the goodness.

The Catholic University marked by its specific identity. The identity doesn't 'catholicize' (make everybody to be catholic) all the members of university, put the 'cross' in every corner of university, or even build a big chapel in the university yard. However, it is still important to maintain the majority of Catholic University member (teachers, officers) as Catholics, because the Catholic identity will face obstacles if they become the minority in the academic community (Bertens, 2004). The identity is personality of the Catholic University, as mentioned by Apostolic Constitution on Catholic Universities<sup>12</sup>. It is said that the objective of a Catholic University is to assure in an institutional manner a Christian presence in the university world confronting the great problems of society and culture. The Apostolic Constitution also emphasized four essential characteristics of a Catholic University as follows: "(1) a Christian inspiration not only of individuals but of the university as such; (2) a continuing reflection in the light of the Catholic faith upon the growing treasury of human knowledge, to which it seeks to contribute by its own research; (3) fidelity to the Christian message as it comes to us through Church; and (4) an institutional commitment to the service of the people of God and of the human family in their pilgrimage to the transcendent goal which gives meaning to life."

The main course of Apostolic Constitution "Ex Corde Ecclesiae" is not only implemented as dogma or judicial regulation, but more, it is a renewal doctrine for the Catholic University as a university that prior to an excellence of higher learning institution. Living with the dynamic society, the Catholic University should take challenges (Sastrapatedja in KWI, 1992) as summarized as: (1) in the middle of compartmentalizing of science development, the Catholic University should take effort to synthesize knowledge totally and deeply<sup>13</sup>, (2) being an instrument of cultural progress, The Catholic University should pay attention to the dignity of human life<sup>14</sup>, (3) the Catholic University is called to promote the social justice and serve to the poor or members of minority groups who customarily have

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<sup>9</sup> Apostolic Constitution on Catholic Universities, 30.

<sup>10</sup> Apostolic Constitution on Catholic Universities, 32.

<sup>11</sup> Apostolic Constitution on Catholic Universities, 32.

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<sup>12</sup> Apostolic Constitution on Catholic Universities, 13.

<sup>13</sup> Apostolic Constitution on Catholic Universities, 16.

<sup>14</sup> Apostolic Constitution on Catholic Universities, 32.





been deprived of it<sup>15</sup>, and (4) the Catholic University should involved in the dialogue between Christian thought and modern science; therefore, it needs persons particularly well versed in the individual disciplines and who are at the same time adequately prepared theologically, and who are capable of confronting epistemological questions at the level of relationship between faith and reason<sup>16</sup>.

According to Arinze (2000), it sounds almost tautological to say that a Catholic university should be truly a university and authentically Catholic. It was also emphasized that the Catholic University should be an efficient, respectable and good university recognizable as such in its cultural milieu. It should be competent. It should be able to stand its ground among secular or religious-inspired universities as an academic public forum, a community of students and teachers in search of truth, and a crossroads where many currents of thought meet. The whole universe has a great expectation of Catholic University, which will become the 'agent of change', shape the world to be a civilized universe.

#### **2.4. APTIK (Asosiasi Perguruan Tinggi Katolik Indonesia/Association of Catholic Higher Learning Institutions of Indonesia)**

A globalization is necessary aspect that must be faced by every member of society, included the Catholic University. The APTIK, *Association of Catholic Higher Learning Institutions of Indonesia*, plays an important role in bringing the Catholic higher learning institutions in Indonesia to their position in a solid footing of dynamic-plural society. Absolutely, the Catholic University is in this context, so the term of Catholic University will be used in this part. The "Strategic Plan of APTIK for 1998-2008" concerned the globalization in two aspects, subjective and objective aspect. The first, the subjective aspect, is a process that is realized by human who experiences as a member of the world; that means the world is getting unity. The second, the objective aspect, is a real process the shaping of global system in any fields: politics, economics, social and cultural. It must be understood that globalization is not a linear process, but a dialectical process that conveys a dynamic development that is a paradox.

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<sup>15</sup> Apostolic Constitution on Catholic Universities, 34-40.

<sup>16</sup> Apostolic Constitution on Catholic Universities, 46.

There is a new trend of relativism of life norms, included moral norm and religion Pluralism, openness, competition, technology of information, democratization and bigger participation of members of society, could also become the characteristic of globalization.

Placing a fundamental vision and mission of Catholic Universities, it is a necessity to implement the academic community as mentioned by the Apostolic Constitution (no. 12). The members of APTIK affirmed their vision and mission based on the Apostolic Constitution, 'Ex Corde Ecclesiae'. A vision of the Catholic University is a point of view or fundamental conviction about the Catholic higher learning institutions existence and main values which is struggled and reached for. A mission of the Catholic University, then, is a goal that must be reached by as a realization of the vision. It should be noted that in APTIK, the Catholic University is a community, specifically: an academic community. It is association, but community. The community means the unity aspect because of the same commitment to create Christian and humanity values. The Catholic University should represent a center of intellectual, promulgation and development of science, technology, and professional. It is a duty of the Catholic University to promote human dignity and cultural heritage, gives 'humanior' education based on Pancasila and Holly Gospel (Supplementary Ordinances, art. 2). The Catholic University becomes a place for research and plays a role as instrument of cultural progress. As a part of society, the Catholic University conceived the service to society by education and research as humanity aims to create a civilized universe. It is also emphasized that the Catholic University should have national and international dimension, therefore, develops nationality and global perspective. The Catholic University must take some efforts to be more autonomous, has courage to speak the truth to safeguard of society. The Catholic University is called to subscribe "preferential option for the poor", and also engaged in good solidarity and cooperation with other Catholic Universities.

### **3. THE 'ECO-SETTLEMENT' AND 'ECO-ENGINEERING'**

The engineering field becomes an important part in the body of the University. The application of engineering is needed to create innovation and make human welfare. It is emphasized that the engineering is the main player in infra structure development. As the



consequences, the infra structure development supported by engineering should provide sustainable development. Unfortunately, the climate change gives serious impact for the planet earth. It generates the global environmental change that challenges the countries to make appropriate social economic policies (IPIECA, 2003). The engineering field, in term of construction industry, gives great contribution in CO<sub>2</sub> emission and green house gases. For instant, the cement industry has a responsibility in creating 5% of CO<sub>2</sub> emission and 3% green house gases (Humphreys and Mahasanen, in John, 2003). Supartono (2007) states that the energy used for cement production (8-9 MJ/kg) is 90% of total energy consumed in concrete production (4000-5200 MJ per m<sup>3</sup>). Hence, the construction industry should takes dramatic step to change the paradigm from being the 'destroyer' to become the real 'builder' for the sustainable development by implementing efficiency and substitutes resources. One has to be noted that the progress of construction development needs eco-balancing that means the challenge of energy saving and cement production efficiency (Sobolev dan Naik, 2005) is an answer to prohibit the environment from the catastrophic destruction.

The raising of the environmental awareness then becomes an objective in UNIKA Soegijapranata. It is running together with the value of environmental revitalization by education, applied by the Principle Scientific Pattern (PIP, Pola Ilmiah Pokok, Indonesia language) of UNIKA Soegijapranata, 'Eco-Settlement' which is translated into Faculty of Engineering as 'Eco-Engineering'. As a major part in the University, the Faculty of Engineering has responsibility to avoid the environmental degradation that is caused by construction industry and infra structure development. The responsibility of Faculty of Engineering is applying the ecologic principles of design that keep the resources and the environmental balance to reach sustainable development.

The 'Eco-Settlement' principle of the environmental awareness the UNIKA Soegijapranata characteristic has inspired all members of the University individually and also the University institutionally. It can be seen that the 'Eco-Settlement' implemented in Faculty of Engineering as the 'Eco-Engineering' and then defined more detail and specific in Department of Civil Engineering as the 'Eco-Civil Engineering'. According to the 4<sup>th</sup> essential characteristics of Apostolic Constitution 'Ex Corde Ecclesiae', the

engineering education has commitment to the service of the people of God and of the human family in their pilgrimage to the transcendent goal which gives meaning to life. It can be said that the 'Eco-Engineering' and the 'Eco-Civil Engineering' play its role to implement the Third Mission of University, community service. The engineering education in UNIKA Soegijapranata takes effort to synthesize knowledge totally and deeply and being an instrument of cultural progress. It is also noted that the engineering education in UNIKA Soegijapranata pays attention to the dignity of human life and being called to promote the social justice and serve to the poor or members of minority groups who customarily have been deprived of it. In simpler words it can be stated that all efforts in development should stay inside the sustainable development boundary.

The term of sustainability in civil engineering is defined as a guarantee of the structure that still performs appropriately as its design and function during its life-service (Gerwick, 1994). An illustration of the sustainability in civil engineering could be learned by construction sustainability in development context (Soegiarso, et. al, 2004) that is keeping the balance of several construction factors for example financial, environmental, and operational. Another term of sustainability conceived by Susilorini (2008) that is a sustainability of structural design and performance, and also life-cycle of building. Obviously, a sustainable structure is a structure that is constructed properly then the social effects during its life-time and life-service is less. Hence, a structure should be safe in design and performance. Of course, several aspects such as material using, structural engineering design, failure analysis, and environmental concern, need to be a necessity.

Governing the need of sustainable construction, the concrete structure has become option around the world. Its popularity comes from the strength, durability, and low environmental impact (Naik and Moriconi, 2007). The durability of concrete noted as positive contribution in environmental revitalization. Thus, the advance of concrete can be applied by innovation of 'green concrete' (Meyer, 2002; Naik and Moriconi, 2007; Suhendro, 2007) and nano-technology of concrete (Wagner and Aia, 2004; Suhendro, 2007).

The 'Eco-Engineering' and 'Eco-Civil Engineering' state an important clear concern in environmental awareness. It is called a principle of 'Eco-Civil Engineering for Sustainable



Development'. This principle is a crystallization of several aspects as described by Figure 1.

The principle of 'Eco-Civil Engineering for Sustainable Development' is a basic thought of sustainability cycle in civil engineering that is engaged to the maintenance and assurance of environmental conservation. The environmental conservation is a basic for sustainable development. The sustainable development is engaged to infra structure development that involves the civil

engineering field as major player. Thus, the infra structure development is obviously supported by sustainable civil engineering and environmental conservation criterion. The role of sustainable civil engineering will generate the sustainable construction. The sustainable construction is provided by sustainable concrete which is engaged to sustainable material technology and nano technology for concrete. The sustainable concrete will guarantee the eco-civil engineering, and then the cycle can be flowed continuously.

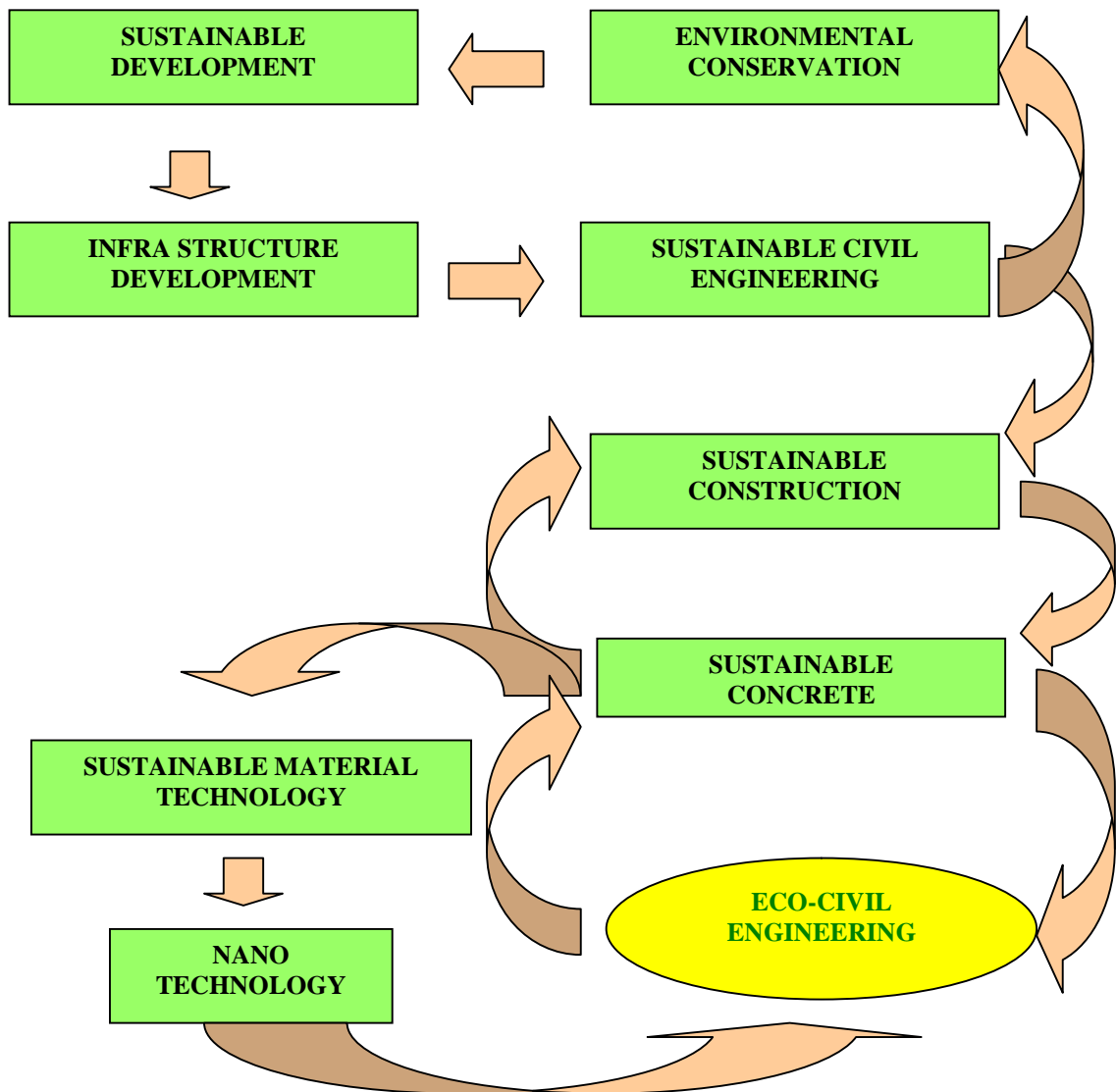


Figure 1. The Principle of 'Eco-Civil Engineering for Sustainable Development'

4. THE MAPPING OF 'EX CORDE ECCLESIAE' ROLE AND CONTRIBUTION TO ENGINEERING LIFELONG LEARNING





The role and contribution of the principles of Apostolic Constitution on 'Ex Corde Ecclesiae' is mapping. It shows several significant integrated points. The points are included essential fundamentals and challenges. Those points clarify that the engineering lifelong learning is engaged to

the 'Eco-Settlement' which is defined more detail in 'Eco-Engineering' and 'Eco-Civil Engineering'. The explanation and implementation of 'Ex Corde Ecclesiae' to 'Eco-Settlement', 'Eco-Engineering' and also 'Eco-Civil Engineering' will finally meet the engineering lifelong learning.

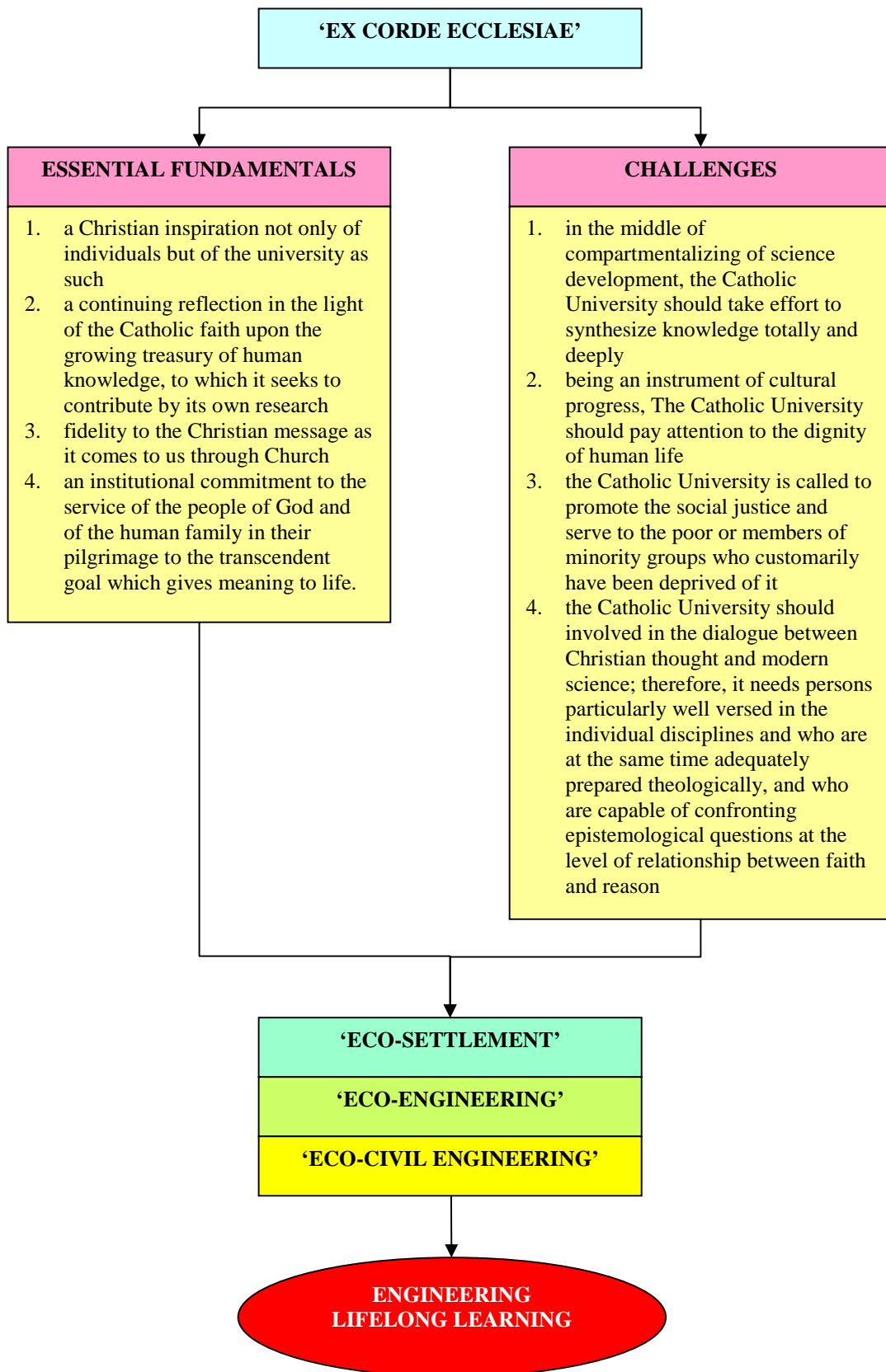


Figure 2. The ‘Ex Corde Ecclesiae’ Role and Contribution to Engineering Lifelong Learning



The mapping concisely provides an important message. The message specifically notify that 'Ex Corde Ecclesiae' assists the protection and advancement of human dignity and of a cultural heritage through teaching, research, and community service of engineering offered to local, national, and even international communities. The engineering lifelong learning has to be understood, to be experienced, and to be engaged culture, as well as it is implemented by 'Ex Corde Ecclesiae' in 'Eco-Engineering' and 'Eco-Civil Engineering'. It is emphasized that The University should becomes 'an agent of change' to bring the community welfare by the Third University Mission in engineering field by providing updates of recent engineering and technical development and also advancement.

## 5. CONSLUSIONS

The paper meets several conclusions:

1. The philosophical review obviously describes a brief support of the 'Ex Corde Ecclesiae' that is manifested to the engineering lifelong learning by mapping the role and contribution of the principles of Apostolic Constitution on 'Ex Corde Ecclesiae'
2. The 'Ex Corde Ecclesiae' assists the protection and advancement of human dignity and of a cultural heritage through teaching, research, and community service of engineering offered to local, national, and even international communities
3. The engineering lifelong learning has to be understood, to be experienced, and to be engaged culture, as well as it is implemented by 'Ex Corde Ecclesiae' in 'Eco-Engineering' and 'Eco-Civil Engineering'
4. The University should becomes 'an agent of change' to bring the community welfare by the Third University Mission in engineering field by providing updates of recent engineering and technical development and also advancement

## REFERENCES:

- [1] APTIK. 1998. *Perencanaan Strategis Perguruan Tinggi Katolik Anggota APTIK Memasuki Milenium Ketiga 1998-2008*. "The Strategic Plan of Catholic Institutes of Higher Learning, Members of APTIK, Entering the Millenium Third, 1998-2008". APTIK Publication. Yogyakarta.
- [2] Arinze, FC. 2000. *The Role of Catholic University in Interreligious Dialogue*. Lecture. Boston College. <http://puffin.creighton.edu>
- [3] Bertens. 2004. *Refleksi tentang Hakikat Universitas Katolik*. Speech. UNIKA Soegijapranata, February 6. Semarang.
- [4] Besari, S.M. 1998. *Peranan Universitas dalam Masyarakat Modern..* Speech, Agust,11. ITB - Bandung.
- [5] Besari, S.M. 2003. *Rekayasa dan Kapitalisme*. ITB Press. Bandung.
- [6] Davies, P. 1992. *The Mind of God*. A Touchstone Book of Simon & Schuster Inc. New York.
- [7] Freddoso, AJ. 1995. "Church Tradition and The Catholic University: A Response". The Nature of Catholic Higher Education: Proceeding of the 18<sup>th</sup> Convention of the Fellowship of Catholic Scholars. Minneapolis.
- [8] Huijbers, Th. 1982. *Manusia Mencari Allah*. Kanisius Press. Yogyakarta.
- [9] IPIECA. 2003. "Energy, Development and Climate Change: Considerations in Asia and Latin America", Journal – UNEP Industry and Environment, April-September, pp. 95-98.
- [10] Khun, TS. 1996. *The Structure of Scientific Revolution*. Third Edition. The University of Chicago Press. Chicago and London.
- [11] KWI, Konferensi Waligereja Indonesia. 1992. *Paus Yohanes Paulus II, Konstitusi Apostolik tentang Universitas Katolik*. Translated by: YE. Budiyan. Comments by: M. Sastrapratedja, SJ. Departement of Documentation and Information KWI. Jakarta.
- [12] KWI, Konferensi Waligereja Indonesia (KWI). 1996a. *Iman Katolik – Buku Informasi dan Referensi*. "The Catholic Faith – Information and Reference Book". Kanisius Press in cooperation with Obor Press. Yogyakarta and Jakarta.
- [13] KWI, Konferensi Waligereja Indonesia (KWI). 1996b. *Pedoman Gereja Katolik – Sidang Agung KWI Umat Katolik 1995*. "The Catholic Church Orientation - The Supreme Synod of KWI, Catholic Members-1995". Konferensi Waligereja Indonesia Publishing. Jakarta.
- [14] Mardiatmadja. 1982. *Panggilan Hidup Manusia*. "The Calls of Human Life". Kanisius Press. Yogyakarta.
- [15] Meyer, C. 2002. "Concrete and Sustainable Development", *Special Publication ACI 206, Concrete Materials to Application – A Tribute to Surendra P. Shah*, American Concrete Institute, Farmington Hills, MI.
- [16] Naik, TR., dan Moriconi, G. "Environmental-friendly Durable Concrete Made with Recycled Materials for Sustainable Concrete Construction", [www.uwm.edu/Dept/CBU/Papers/2005%20CBU%20Reports/CBU-2005-08.pdf](http://www.uwm.edu/Dept/CBU/Papers/2005%20CBU%20Reports/CBU-2005-08.pdf), (download pada tanggal 29 Oktober 2007).
- [17] O'Connell, DM. 2000. *The Role of Universities in Building a Culture of Life*. Voice On-Line Journal. Vol. XV No.2, Summer 2000.
- [18] Örsy, L, SJ. *Teaching Authority – Catholic Universities – Academic Freedom*. [www.womenpriest.org](http://www.womenpriest.org). 2004.



- [19] Sobolev, K., dan Naik, TR. 2005. "Sustainability of Concrete and Cement Industries", CBU-2004-15;REP-562, January, Center for By-Products Utilizatons, Department of Civil Engineering and Mechanics, College of Engineering and Applied Science, The University of Wisconsin, Milwaukee, USA.
- [20] Soegiarso, R., Gondokusumo, O., dan Jap, DSR. (2007). "Global Trend on Sustainable Construction", Prosiding Seminar Nasional "Sustainability dalam Bidang Material, Rekayasa dan Konstruksi Beton", KK Rekayasa Struktur FTSL ITB, Bandung, pp.1-19.
- [21] Suhendro, B. (2007). "Beton Hijau (*Green Concrete*) – Dambaan, Realisasi, dan Permasalahannya", Prosiding Seminar Nasional "Sustainability dalam Bidang Material, Rekayasa dan Konstruksi Beton", KK Rekayasa Struktur FTSL ITB, Bandung, pp.20-38.
- [22] Supartono, FX. (2007). "Usaha Menuju Konstruksi Beton Berkelanjutan", Prosiding Seminar Nasional "Sustainability dalam Bidang Material, Rekayasa dan Konstruksi Beton", KK Rekayasa Struktur FTSL ITB, Bandung, pp.52-63.
- [23] Susilorini, Retno, Rr. M.I. (2008). "Analisa Kegagalan Struktur Berbasis Fraktur untuk Penyelamatan Bumi dan Pembangunan Berkelanjutan", Seminar "Save The Forest, Save The Earth", Fakultas Teknik, Unika Soegijapranata, Semarang, pp.1-11.
- [24] Wagner, HD., dan Aia RA. (2004). "Nanocomposites: Issue at the Interface", *Materials Today*, Elsevier, November Edition, pp. 38-42.
- www.vatican.va. 2004. *Apostolic Constitution of the Supreme Pontiff John Paul II on Catholic Universities*.

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