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December, 2018

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A CONCEPTUAL APPROACH TO CORE OF CHEMISTRY*

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Abstract. Conceptual Chemistry is to present chemistry into the conceptual understanding of chemical principles. It is a well-kwon and famous statement for chemistries that real-life applications facilitate the understanding and appreciation of chemistry concepts. Philosophy is related with general views of the world and focus on the risk of producing overgeneralizations or one-sided generalizations. Some philosophers of science are dealing with the strange situation that their reactions on science would contain all the activities of the past and present community of scientists. The wealth of research fields assigned to chemistry has wide diversity.
In this paper, we try to give characteristic parts of chemistry that can be conceptually distinguished from subfields of chemistry. we use a conceptual approach together with some methodological implications that allow to develop a kind of cognitive competency for chemistry: the parts of the conceptual approach:

- systematic chemical knowledge
- cognizable chemical species
- chemical classification systems

Keywords: *conceptual chemistry, substances, chemical classification*

Introduction

whenever chemistries talk about chemistry, they distinguish it from other sciences. And, whenever chemistries teach chemistry, then they accept some notion of chemistry that comprises the entire list of research activities assigned to chemistry (Nye, 1989). Nye stayed that it need not be a clear-cut determination, but we presuppose some general ideas about what is more essential to chemistry. He also noted that philosophy of chemistry should help clarify such a concept with philosophical means, keeping in mind the mentioned risks. According to him it should help avoid blind reductive attitudes, based on excessive generalizations. And it should draw the attention to philosophical problems of chemistry, beyond the problems of reduction and how interdisciplinary research is possible.
The conceptual approach will not reproduce the historically grown distribution of weight given to current research activities by chemists (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018; Hiebert, 1996). Hiebert underlined that chemists working at quantum chemistry will pass most of their work in what we noted as conceptual chemistry. According to him, the reason is simply that quantum chemistry is placed in the interdisciplinary area between chemistry and physics and other interdisciplinary fields, not directly concerned with the conceptual chemistry.

Systematic Chemical Knowledge

Chemistry is first concerned with empirical substances and objects (Del Re, 1987; Koparan at all, 2018; Of at all, 2017; Tola at all, 2017). But the focusing is on *material aspects* of the substances and objects. He stayed that it has a fixed exchange value within an economical society, which analyse the empirical substances for being a coin. Also, he noted that the exchange value is an interesting functional property, that is not a material property. According to Del Re, if the coin is antique, we need to on the history of this little substance, and we should learn about its long history from an antique empire towards our hands. A closer look may reveal interesting signs on both sides of the coin, written in a foreign language, or a portrait of an emperor, or an emblem, that we like to interpret. Finally, he proposed that if we are interested only in the substance of that coin, then you need to give up from all these economical, historical, and properties of empirical substances.
Chemistry is the most general science of materials, in the sense that it provides the most general system of concepts (Kucuk at all, 2005; Genel at all, 2012; Sener at all, 2010; Yesilyurt at all; 2005; Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012; Duncan, 1981). He stayed that the concepts of general

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chemistry are applicable to the discriminating about all empirical substances. According to Duncan, the nature of scientific material properties be clear only if we extend our everyday understanding. He noted that for sciences of materials, with chemistry at the center, have been experimental science in the original meaning of analysing the behavior of substances in various contexts.

In this point, we need to deal an important point that material properties are assigned not to isolated substances but to concepts and contexts. Shummer (2003) gave an example that "since everything looks red under red light, we have to specify the color both of the object under investigation and of the light, to make qualified color statements. Since everything is solid at a certain temperature and pressure, solidness always implies specification of thermodynamic conditions". It does not mean that the substance itself, but the context falls dies, if it turns in contact with the substance. Duncan explained this situation as that "precise material predicates require precise and systematic details of the contexts of investigation, making contexts themselves a base subject matter of sciences of materials".

Schummer (1997) characterized material properties by focusing on a certain contextual factor:

- mechanical forces: *mechanical properties*
- thermodynamic conditions (temperature, hydrostatic pressure): thermodynamic properties
- electromagnetic fields: electromagnetic properties
- other chemical substances: chemical properties
- biological organisms: biological or biochemical properties
- ecological systems: ecological properties

According to the above characterization, it is easy to determine standard conditions for each item, since every experimental context can be described by each factor. For this characterization, Schummer noted that "if we verify only one factor and keep the others standardized, then we are investigating the correspondent type of material property. If two or more factors of interest are combined, one can create new types of 'mixed' material properties". He called the properties that mechanical forces, thermodynamic conditions and electromagnetic fields as physical material properties, covering a great part of physical chemistry. Also, he noted about the classification that "physical properties are kept distinct from chemical properties by 'excluding the chemical factor', i.e. by working with inert container materials and atmospheres. But we speak of chemical properties, if and only if the 'chemical factor' is relevant for the behavior".

Cognizable Chemical Species

The usual expressing of 'chemical substances' or 'pure substances' gives the scientific vision, that also the concept of 'pure substance' has a simple and well-defined meaning (Van Brakel, 1986). He noted that get an undetermined homogeneous samples and check to find out which one is pure, and which one is mixed by investigating empirical properties only. Of course, in this step, simple physical material properties do not allow us to make a true decision. Brakel presented a simple approach in this situation that whatever the resulting values of physical properties are determined, we do not get the slightest idea from such values, whether the sample is pure or not. Then, for all types of properties, the values of pure substances change in the same range as the values of mixtures. These properties do not even turn out to give us, whether two samples belong to the same chemical substance or not (Alkan at all, 2009; Durak at all, 2015; Genel at all, 2016; Genel at all, 2013; Schummer, 2002).

Timmermans (1963) gave a simple classification in his book that "take a couple of unknown homogeneous samples and try to find out which one is pure, and which one is mixed by investigating empirical properties only. Simple physical material properties do not allow us to decide. Whatever the resulting values of physical properties such as melting point, refraction index, viscosity, etc. are, we do not get the slightest idea from such values, whether the sample is pure or not". According to this formulation, the values of pure substances stay in the same part as the values of mixtures for all types of properties. Also, this distinguish method is valid that that the crystal forms of the same chemical substance stay in the same part as the values of mixtures for many electromagnetic and mechanical properties.

Today's main method to *distinguish* pureness of *known* substances is spectroscopy that does not present a diaristic result, whether an *unknown* sample is a pure substance or a not. For this ai if we have had enough information about the sample to do predictions about how the pure substance may spectroscopically look like, we give some results. But this is not a general approach to distinguish between unknown samples, which may also include unknown substances.

Chemical Classification Systems

Van Brakel (1997) stressed that "a long-standing tradition of philosophy of science, mainly fascinated by the mathematical elegance of Newtonian mechanics and its succeeding theories, has been neglecting the fact, that classification is one of the fundamental means and aims of sciences". According to him, first it provides a tool with a system of notions that allows to give details about the empirical objects. Secondly, it helps to see the diversity of phenomena, preventing from one-sided and blind over-simplifications. Third, it presents some advantages to make predictions. For example, "if an object is identified to belong to a certain class, then we are

able to predict all other properties belonging to that class". Fourth, with Van Barkel words, "if our classification is systematical, we may assume the existence of objects from obvious gaps in the classification – and what is more in chemistry's classification, we even get instructions to make these objects as exemplars of new chemical substances or substance classes".

Also, Van Berkel made a classification of substances that if pure substances are determinate as the basic chemical species, chemical classification divide pure substance into substance classes according to chemical similarities. Here, great differences in physical properties is not important. We know that substance classification is not hierarchical in chemistry. But, Van Berkel says, "it is always chemical similarity or dissimilarity, what the classification is about. It is a simple reduction that we do not use equivalence classes of the physical material property as the principle of substance classification. Finally we note that, chemically similar behavior makes them closer position.

In his famous book, *Chemistry, Quantum Mechanics and Reductionism*, Primas (1981) stayed that "One might object that today's chemists detect a substance as belonging to a certain substance class, say to alcohols, by spectroscopic means, *i.e.* by sophisticated electromagnetic properties. A certain characteristic part of the IR- or NMR-spectrum unambiguously reveals an alcohol, so that chemical properties seem to be no longer important". Of course, this detection is true that chemical properties are less important in chemical classification practice. We remember that a strong correlation between certain chemical properties of alcohols and certain characteristics of spectra give us a good chance to select the latter for detecting.

Primas noted an underlined information on the concept of similarity that it not has any precise meaning in the domain of homogeneous mixtures: "similarity would be vague and arbitrary either, if it were related to quantitative closeness and difference in value of any physical material property. Instead the concept of similarity used for substance classification refers to the chemical behavior of chemical substances".

It is continuous developing scientific ring that the logical relations are a special underdeveloped field of philosophical logic. In this field, chemistry has found its special and meaning ways to settle the classificatory situations (Beretta, 1993). He also notes that chemical substance classification gives us a certain kind of circularity, because of the concepts of 'chemical similarity' and 'substance class' determine each other that from the logical point of view. Beretta made the following definitions for the classificatory situations:

- Two substances belong to the same substance class, if they are chemically similar.
- Two substances are chemically similar, if each of them react under the same conditions to form product substances of a common substance class.

We add that the "substance class concepts" follow each other staying active.

Result

It was the one of the aims to analyse the characteristic parts from the rich diversity of research fields, all of which are usually called chemistry by conceptual means. we have focused on systematic chemical knowledge and chemical properties from other material properties. Some analysis of the logical features of chemical concepts revealed that the logical structure of systematical chemical knowledge is a network structure.

Later, we discussed on substances are considered as the basic chemical species defining them by empirical and theoretical means. We determined that the basic chemical species are pure substances, also categories as a main way of chemical classification. We mentioned that precise concepts of substance classes are accomplished only about chemical similarity.

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A HISTORICAL APPROACH ON THE CONCEPT OF NATURE IN CHEMISTRY*

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Abstract. A mechanical knowledge of chemistry should be actively taken by learners. The modern images of the learning process being the transfer of information from teacher to student are now widely insufficient. The notion of nature in chemistry looks like a contradiction, since ordinary language suggests a clear contradiction between the concepts 'natural' and 'chemical'. However, using chemistry as a science of nature means that nature is the object of chemistry. So, by the etymological perspective, there is not a contradiction between 'biological' and 'natural.
In this paper, we present a historical analysis of the main concept of nature in chemistry. We focus that the contradiction has been based on static and teleological concepts of nature throughout history and that chemists have neglected the dynamic concept of nature. Later, we present a philosophical perspective of the concepts and give for an explicit discourse about values in chemistry.
Keywords: *chemistry, concept of nature; synthetic- organic chemistry*

Introduction

"Among all the arts, the alchemical art imitates nature best" is the famous words of Albert the Great who lived about six centuries ago. The philosopher constructed the opposite view of alchemy from changing the base of nature to perfectly imitating nature. Latin alchemy was not the same as the chemical crafts. While the latter applied material changes of various sorts, alchemical transmutations were very specific changes (Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016; Schummer, 2003). Moreover, the old philosophers adopted Aristotle's teleological concept of nature, according to which natural things are driven towards their perfect state with a logical procedure. The alchemical series of transmutation towards gold could be conceived as imitating the natural process of the ripening of ores (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012; Kocaman and Abut, 2015; 2015; Kocaman, 2013). So, they believed in the possibility of alchemical transmutation, the imitation was even perfect compared to other arts (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018; Drews, 2000).

According to a new approach, alchemists derived many variants from the phrase 'imitating nature' which served as a frame interpretation and justification of alchemy; alchemy challenged the received dogma that technology is inferior to Nature, regarded as a quasi-personified agent (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Newman, 1989). The same view of perspective was presented in the following terms, frequently expressed in one and short phrase in such a way as to appear contradiction (Ogrinc, 1980);

- Alchemy imitates nature, insofar as it refines metals along the natural pathway.
- Alchemy improves nature, insofar as it refines the actual material state.
- Alchemy changes nature, insofar as it changes the actual material state.

An interesting discussion was a theological debate about the capacities of technology, Nature, and God that focused deeply into the chemical interpretation of material change. Opponents of alchemy added the Aristotelian distinction between mixtures and compounds, which was always supported by atomistic theoretical approaches: only God can create natural compounds, the human capacity to manipulate matter is restricted to mere mixing of some natural items (Alkan at all, 2009; Durak at all, 2015; Genel at all, 2016; Genel at all, 2013; Hooykaas, 1948). He stressed That the mixtures can similar to natural compounds, and they are only imperfect imitations of nature with some scientific organization of human. More clearly, what we would definite a chemical interpretation of material change was an ontological approach to the theological question of how human activity can affect nature.

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Furthermore, since the concept of nature is in discord with the teleological concept, a scientific argument had to be given to how nature can change nature. In this complex situation, an explanatory information was introduced that a sort of astrological explanation, according to which the natural ripening of ores in the mines reveal through the effect of the sun in a way that cannot be presented by technology (Ramberg, 2000).
the normative implications of the notions of nature had effects on the methods and scope of alchemy that some academicians had an approach of alchemy as the basic natural science. They applied alchemical practice to the making of gold or some other items. Such a critical position, the impacts on widening the perspectives of alchemy should make shifts of the notion of nature. Such impacts added when chemical practice was applied to different levels, such as the preparation of medicines (Kucuk at all, 2005; Genel at all, 2012; Sener at all, 2010; Yesilyurt at all; 2005; Schummer, 2002).

Chemistry According to the Public

the teleological concept of nature in the original Aristotelian view is not that different as inorganic from the dynamic concept. Ramberg (2000) stayed that a piece of iron is said to tend to corrode as a chemical potential to combine with oxygen in atmospheric environment. According to him, if atmospheric conditions are changed or cover the piece of iron with a protective layer, it does not corrode but retains the potential level. As to the material world, he stressed that the teleological concept of nature would insist that its development overall is controlled by preexistent ends at the ancient times. In this step, such ends may be controlled in scientific explanations, for example, functional concepts such as the adaptation of species in evolution theory, or selection rules refer to such ends. All these philosophical issues should be distinguished from the teleological concept of nature as a quasi-personalized agent with certain ends (Schummer, 2003).
Schummer (2003) also stressed on the interesting point that chemists have publicly analysed their progress in metaphorical terms from 'learning from Nature' to 'controlling Nature', what alchemists were not allowed to use this method, they have determined their attitude towards nature in an irreversible way and, thus, they formulated their own public image. Also he stayed that there were times when the control of nature was highly estimated in society could effectively base their approaches on the attitude.

Alchemy for Public

At the end of the 18th century, it has pointed out that alchemists felt necessity to defend their transformations of materials against the theological allegation of the creation (Karpenko, 1968). According to him, the situation was complex whenever new substances were produced, like some special acids, that could by no means be represented a modification of nature. Alchemists only accepted that they were also producing things unknown in nature, either in the static or teleological perspective.
In this century, when alchemy received a new utilitarian basis in chemistry, conceptual conflicts increased enormously. Medicines artificially composed from minerals, although having a long tradition from early Roman medicine. Famous old chemist Paracelsus and his team responded by expanding the teleological concept of nature to the extent that utilitarian ends of humanity became included, and his famous definition of alchemy is that "Nature is so subtle and sharp in her things that she does not want to be used without great art. She brings about nothing that would be perfect of its own, rather man must complete it. This perfection is called Alchemy. Those who bring things, which grow out from Nature for the benefit of humanity, to the state prescribed by Nature are alchemists." (Schummer, 2003b).
Schummer (2003b) stressed that transforming materials for the benefit of humanity is prescribed by Nature and inscribed by the infinite power. The supposition is that human ends are natural ends. The background of this belief is the old humanism which pointed out that humans are the ultimate end of God's creation, the rest of which is only instrumental to and to be constructed by humans (Newman, 1998). But, Paracelsus and his team stressed that that chemical processes must imitate Nature (Schummer (2003b). In the Next century, the phrase had lost any active meaning and was simply paying non-sense, since every chemical transformation for medical purposes could now be definite as imitating Nature.

The Mechanical Approach to The Concept of Nature

Karpenko (1998) gave a key to understanding the theological basis of mechanical philosophy. For Karpenko, the 'received notion of nature' is how the contemporary 'school-philosophers', the 'Peripatetics', about whom Karpenko was clear and simple that they only loosely refer to the famous idea that of conceived of nature. According to that view, Nature is 'an intelligent and powerful creation, and of the particular components that compose the environment' (Newman 1998). On the one hand, Boyle (1772) construct this view the target of some philosophical criticism regarding conceptual ambiguities. On the other, he analysed it as theological aberration since it definite nature as a 'semi-deity'. He has modulated for us a kind of a goddess (Schummer, 2003a).
Nothing could have been more opposed to Boyle's own theological basis of the mechanical and experimental philosophy (Newman, 1998). What 'the school-philosophers assign to the concept of nature interposing according

to emergencies, we assign to the science of God in the first fabric of the universe that the engine being once set a moving that all things proceed (Schummer, 2003b).
Since for Boyle (1772) the corporeal world is 'nothing but matter and motion' once guided by the Laws of God, the task of science is to reveal the science of God by understanding the design of all material and concrete things by experimental means and in mechanical terms. Then, he suggested dropping the received notion because it was inconsistent with his own mechanic-theological project (Schummer, 2003b).

Organic Chemistry

Vitalism had a pivotal role since it caused to the basic distinction between organic and inorganic substances according to the old Aristotelian distinction between the mineral kingdom and animal kingdoms of nature in the history of chemistry (Boyle, 1772). It is a famous information that the term 'organic substances' coming from 'substances extracted from organized bodies'. It is perhaps less well known that it was provided an experimental meaning to the vitalist distinction of substances. Also, their organic and inorganic substances differ from each other in chemical manipulation, be restored by chemical means. The belief that substances isolated from animals and plants are organized through a force of life and therefore cannot be formed by chemical means, later it turned out as 'chemical vitalism' (Newman, 1998).
In Aristotelian doctrine, the principle of organization that guides the bodily tools towards the unified ends of the body is the natural approach. He considered intimately related to the material element air with the spontaneous generation of small animals. The term 'organic' goes back to the Greek term 'organon' meaning tool or instrument. In the original meaning, the organs of a body are instrumentally organized materials of the body as a full system. With a functional or teleological perspective, considering a part of the body to be organic is a special classification. The unique difference between living and nonliving matter is whether it is organized by a vegetative character. That is the basis of all sorts of vitalism until the 20th century. It is acceptable to say that vitalism was prevalent until the 19th century, since everybody denying a principle of life was in trouble to explain corporeal organization (Schummer, 2002).

Crystal Points in Chemistry

The teleological concept of nature in the form of plastic metaphors the static and concept with its alleged division of the world into natural and artificial substances are not very useful (Schummer, 2003). For example, we abolish both concepts in chemical discourses, then somethings will go missing. In this phrase, many chemists avoid using the term 'nature', or use as 'the nature of the things'. We can say that the two concepts have a double action in combining descriptive and normative meanings. Famous chemist Del Re (1992) says 'learning from Nature' means both that there is an object to be studied and that the knowledge thus gained has a higher value than other knowledge. From this point, he concluded that abolishing the two concepts calls for exchange about the term of chemistry and its values.
Nature in chemistry is a given set of substances or a mysterious agent with the chemical dynamics among possible substances and their specific reactivities. In this context, any real chemical transformation including its outcome is natural. It is not important that it occurs inside or outside a laboratory. If "nature" consists in chemical reality and, then 'unnatural' simply means chemically impossible. So, we can say that 'studying nature' in chemistry means studying chemical dynamics. Another words, the term 'nature' for the object, chemists have studied that they were operating chemical knowledge. Adopting the dynamic notion of nature in chemistry by no means implies subscribing to reduction as physical. It simply sets chemistry on the same level with physics by defining the object of chemistry in a way that the opposition 'chemical' versus 'natural' vanishes (Ramberg, 2000).
The dynamic concept of nature does not present any normative implications, as the static and teleological concepts do in a historical way. Finally we can say that chemical values need to be established in an explicit discourse.

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A NEW PROGRAMMING LANGUAGE: GO PROGRAMMING LANGUAGE*

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Abstract: Everyone knows that hardware does not mean anything without software. Software is developed by programming languages. One of the most important factors determining the reach of software is the characteristics of the programming language. Many rich applications can be developed with a language that is fast, easy to learn, and has a large library.

The aim of this work is to provide information about the Go programming language that a powerful, fast, easy to learn programming language. Go programming language, developed by Google. Many of the deficiencies of traditional programming languages have been eliminated. It appeared in 2009 and 1.0 version was released in 2012. With the Go programming language, fast and sophisticated projects that can work on the web or in a different environment can be produced. It is an open-source programming language that is evident by the notion of rule, flexibility and speed. In a short time, he was among the fastest growing programming languages.

Keywords: *Programming Languages, Go Programming Language, Software Development, Google, Open Source Software, Web Programming*

Introduction

The Go language was originally a programming language developed by Google in 2007 by Robert Griesemer, Rob Pike and Ken Thompson. It is a static written language and has a syntax similar to that of C programming language. It provides many advanced built-in types such as garbage collection, type security, dynamic typing, variable-length arrays, and key-value maps. It also provides a rich standard library. The Go programming language was launched in November 2009 and is used in some of Google's systems.

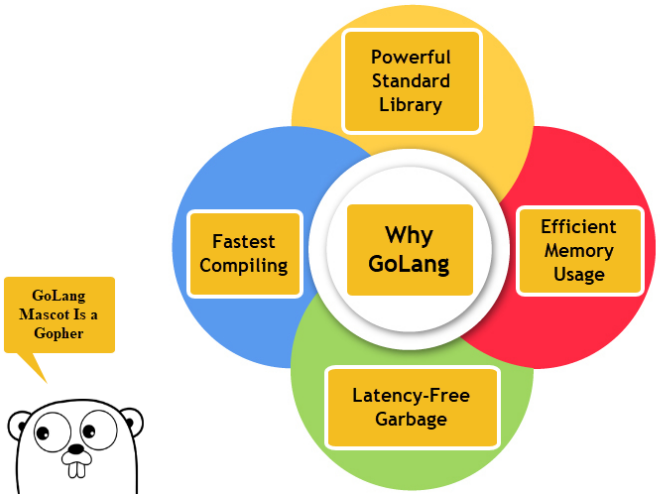

Figure 1: Why Go Programming Language?

* A brief version of this article presented at ISTEC 2018

Google, a large technology and company, for years C, C ++, Java, Python and so on. It uses many different programming languages. These technologies have advantages and disadvantages. You may not notice them in small or under-load projects, but they appear in large projects. These are performance, compilation (in large projects may take hours to compile the source code) security, compliance, time management, resources (hardware, money, energy, etc.) can be listed in many headings such as management (Abut and Akca; 1988; Asadi at all, 2011a; Asadi at all, 2011b; Asadi at all, 2011c) . For many years, Google has developed both an operating system for internal systems and many technologies and algorithms to solve many problems like these (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). Go programming language is one of them. The Go programming language has been initiated by Google to solve its problems. Therefore, all features added to or not added to the Go are completely determined by the software experiences of the years. If you look at the Go programming language a little bit, you might see a question like yok "Why not generics?" (Aydin at all, 2017; Kocaman and Abut, 2015; 2015; Kocaman, 2013). The answer of this question from the developer team to summarize; Generics are not fast. The point of view of Go is so clear. The goal is to create a flexible, fast and powerful language with little language capability and rule. In this article, basic features of Go programming language will be explained. The ease of bringing to the software world will be discussed. Sample codes will be explained. GoLang, which is a fast language, will be examined with its basic lines. Go programming language has many similarities to the C programming language.

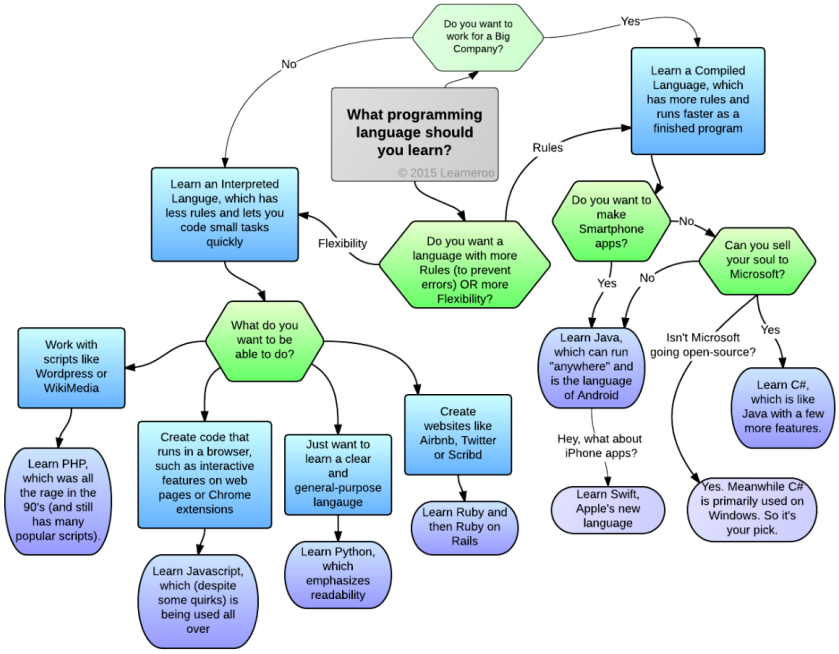

Figure 2: What Programming Language Should You Learn ? (Learneroo, 2015)

1. Features Of Go Programming Language

Most important features of Go programming language are listed;

- Compile time is fast.
- Support for environment adopting patterns similar to dynamic languages. For example, type inference (b := 10 is valid declaration of a variable b of type int)
- GoLang programs are simple and safe.
- Support for Interfaces and Type embedding.
- GoLang is object oriented

To keep the GoLang simple, the following features commonly available in other similar languages are omitted in GoLang;

- Type inheritance
- Method or operator overloading
- Circular dependencies among packages
- Pointer arithmetic
- Generic programming

2. Create, Compile Go Programs

```
package main

import "fmt"

func main() {
        fmt.Println("Hello, World !\nGo is fast")
}
```

```
Hello, World !
Go is fast
```

Figure 3: First Go Program

A Go program lines length can vary from 4 lines to millions of lines. It should be written into one or more text files with the extension ".go". For example, firstapp.go. You can create a Go program use Notepad or Notepad++ in Windows, Nano in Linux, TextEdit in macOS etc. Other, you have to download Go compiler software. You can download golang.org for your operating systems.

A compiler is computer software that transforms computer code written in one programming language (the source language) into another programming language (the target language). Compilers are a type of translator that supports digital devices, primarily computers. The name compiler is primarily used for programs that translate source code from a high-level programming language to a lower level language (e.g., assembly language, object code, or machine code) to create an executable program.

Now Go Compiler stable version is 1.11. You can download Go compiler from this address: https://golang.org/dl/

Go compiler list (As Operating System): Windows, Linux, macOs, FreeBsd

Install Compiler on Windows;

After download Go compiler, run “setup”. Compiler will be install to “Go” folder. Setup software will be make all of go environment.

You can verify installation Go compiler. Open command line (Cmd)

```
Komut İstemi
Microsoft Windows [Version 10.0.17134.285]
(c) 2018 Microsoft Corporation. Tüm hakları saklıdır.

C:\Users\Mustafa>go version
go version go1.11 windows/amd64

C:\Users\Mustafa>
```

Figure 4: Check Go compiler in Windows command line

You are ready to create Go programs in Windows.

Install Compiler on Linux;

$ wget https://dl.google.com/go/go1.11.src.tar.gz

$ sudo tar -xvf go1.11.src.tar.gz

$ sudo mv go /usr/local

Prepare Go Environment;

GOROOT is the location where Go package is installed on your system.

$ export GOROOT=/usr/local/go

GOPATH is the location of your work directory. For example my project directory is ~/GoProjects

$ export GOPATH=$HOME/GoProjects

Now set the PATH variable to access go binary system wide.

$ export PATH=$GOPATH/bin:$GOROOT/bin:$PATH

You can verify installation Go compiler. Open command line (Cmd)

$ go version

go version go1.11 linux/amd64

You are ready to create Go programs in Linux.

2.1. Create First Go Program

First you have to text editor in Windows. For Example Notepad++ (You can download it https://notepad-plus-plus.org)

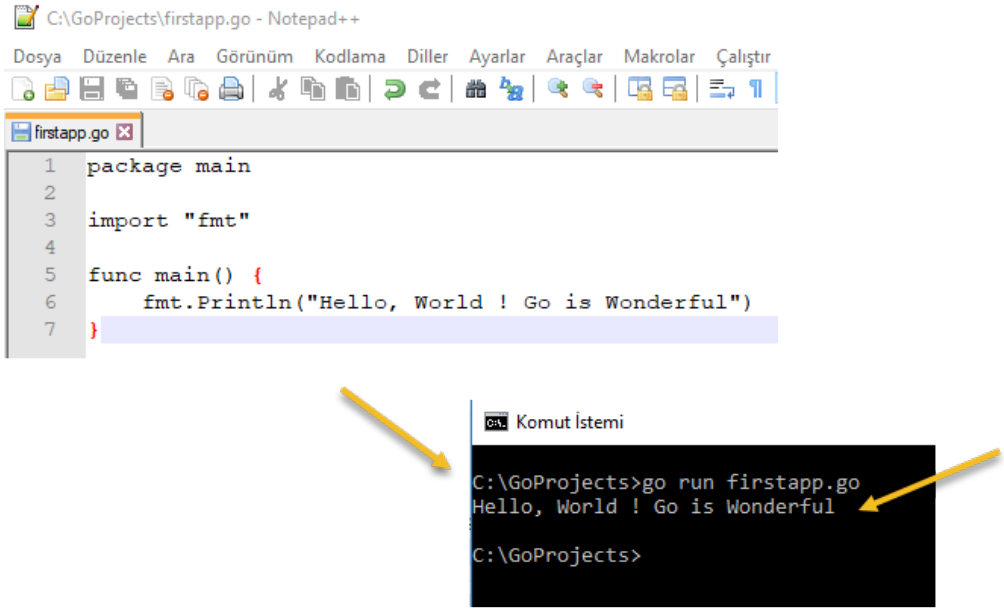

Figure 4: First Go program and result of running

Executing program;
Follow this step;

- Open any text editor and write above code
- Save this file as firstapp.go (File extension is .go)
- Open command prompt (cmd.exe in Windows)
- Go to folder where you save firstapp.go file
- Type “go run firstapp.go” in command prompt
- If there is no errors, it seem below
  Hello World ! Go is Wonderful

3. Go Programming Language Rules

In a Go program, the line separator key is a line terminator. That is, individual statements don't need a special separator like “;” in C.
fmt.Println(“Hello Students”)
fmt.Println(“Go is Wonderful”)
Comments;
Comments are helping texts in your Go program. These lines are not compiled. In a Go program comments character are “/* */”.
/* These lines are comments */
Identifiers;
Go identifiers is a name used to identify a variable, function or any user defined item. It must start with a letter (A-Z) or underscore (_) . It can follow any digits (0-9)
Example;
section, section1, section2, _oursection
section1 = “Computer”
section2 = “Accounting”
There is not in identifier any punctuation characters. (@,$, %)
Go programming language is a case-sensitive language. For example “School” and “school” are different.
School = “Kocaeli University”
school = “Istanbul University”

3.1. Variable Type Declaration

Go Types;
In a Go program you must be declare any variable or function. Basic Go types are listed below;

- Numeric
- String
- Boolean
- Derived

Numeric types;

Integer types;

uint8	Unsigned 8 bit integer (0 - 255)
uint16	Unsigned 16 bit integer (0 - 65535)
uint32	Unsigned 32 bit integer (0 - 4294967295)
uint64	Unsigned 64 bit integer (0 - 18446744073709551615)
int8	Signed 8-bit integer numbers (-128 - 127)
int16	Signed 16-bit integer numbers (-32768 - 32767)
int32	Signed 32-bit integer numbers (-2147483648 - 2147483647)
int64	Signed 8-bit integer numbers (-9223372036854775808 - 9223372036854775807)

Floating types;

float32	32 bit real numbers
float64	64 bit real numbers
complex64	Complex number with float32
complex128	Complex number with float64

byte (like uint8), rune (like int32), uint (32/64 bits), int (like uint), uintptr (Unsigned integer of a pointer value) types are other numeric types.

Variable declaring;

If you use any variable you must declare it.

var variable_name variable_type;

Example;

var a, b, c, d int

var amount, total float32

var day = 20 /* Variable can be initialized in declaration */

This using is without type declaration. The type is determined according to the value.

a := 50 /* a type is int*/

vartype.go

```
1  package main
2
3  import "fmt"
4
5  func main() {
6     var a float64
7     a = 100
8     b := 200
9     name := "Mustafa"
10    fmt.Println("a value =", a)
11    fmt.Printf("Type of a variable is %T\n", a)
12    fmt.Println("b value =", b)
13    fmt.Printf("Type of b variable is %T\n", b)
14    fmt.Println("name value =", name)
15    fmt.Printf("Type of name variable is %T\n", name)
16
17 }
```

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```
C:\GoProjects>go run vartype.go
a value = 100
Type of a variable is float64
b value = 200
Type of b variable is int
name value = Mustafa
Type of name variable is string

C:\GoProjects>
```

Figure 5: Variable declaring

Declaring constant;

const variable type = value

const height int = 100

const pinumber float32 = 3.14

circlearea.go

```
1  package main
2
3  import "fmt"
4
5  func main() {
6     var radius float32
7     var area float32
8     radius = 10
9     const pinumber float32 = 3.14
10    area = radius * pinumber * pinumber
11    fmt.Println("Radius =", radius)
12    fmt.Println("Area =", area, " m2")
13 }
```

Komut İstemi

```
C:\GoProjects>go run circlearea.go
Radius = 10
Area = 98.59601  m2

C:\GoProjects>
```

Figure 6: Variable and constants declaring

3.2. Operators

We make various operations when working with variables. Arithmetic or logical operations. Operator symbol is a decision of this operation. In a Go program you will find operators are listed;

- Arithmetic
- Relational
- Logical
- Bitwise
- Assignment

Arithmetic operators;

+	Sum	c = a + b
-	Subtracts	c = a - b
*	Multiply	c = a * b
/	Divide	c = a / b
%	Modulus	c = a % b
++	Increment	c++
--	Decrement	c--

arithmeticop.go

```
1  package main
2
3  import "fmt"
4
5  func main() {
6     var a float32 = 100
7     var b float32 = 10
8     var c float32
9     c = a + b;
10    fmt.Println("Sum :", c)
11    c = a - b;
12    fmt.Println("Subtract :", c)
13    c = a * b;
14    fmt.Println("Multiply :", c)
15    c = a / b;
16    fmt.Println("Divide :", c)
17    var c1 int
18    c1 = 10 % 3;
19    fmt.Println("Modulus :", c1)
20    var d int = 5
21    d++
22    fmt.Println("Increment :", d)
23    d--
24    fmt.Println("Decrement :", d)
25 }
```

Komut İstemi

```
C:\GoProjects>go run arithmeticop.go
Sum : 110
Subtract : 90
Multiply : 1000
Divide : 10
Modulus : 1
Increment : 6
Decrement : 5

C:\GoProjects>
```

Figure 7: Arithnetic operations

Assignment operators;

These operators are Go programming language assignment operators. These are listed below.

Operator	Description	Example
=	Assign values right to the left	c = d + f
+=	Sum and assign	c += d → c = c + d
-=	Subtract and assign	c -= d → c = c – d
*=	Multiply and assign	c *= d → c = c * d
/=	Divide and assign	c /= d → c = c / d
%=	Modulus and assign	c %= d → c = c % d
<<=	Left shift and assign	c <<= d → c = c << d
<<=	Right shift and assign	c >>= d → c = c >> d
&=	Bitwise And then assign	c &= d → c = c & d
|=	Bitwise Or then assign	c |= d → c = c | d
|=	Bitwise exclusive Or then assign	c ^= d → c = c ^ d

Relational operators;

These operators are using to compare variables. Suppose c = 5, d = 6

Operator	Description	Example
= =	Checks two operands equality	c = = d → not true
! =	Checks two operands equality	c ! = d → true
>	Checks two operands great than	c > d → not true
<	Checks two operands less than	c < d → true
>=	Checks two operands great or equal than	c >= d → not true
<=	Checks two operands less or equal than	c <= d → true

relationalop.go

```
1  package main
2
3  import "fmt"
4
5  func main() {
6     var c int = 5
7     var d int = 6
8     if( c == d){
9      fmt.Println("Compare 1 : c is equal d")
10    } else {
11     fmt.Println("Compare 1 : c is not equal d")
12    }
13    if( c < d){
14     fmt.Println("Compare 2 : c is less than d")
15    } else {
16     fmt.Println("Compare 2 : c is not less than d")
17    }
18    if( c > d){
19     fmt.Println("Compare 3 : c is greater than d")
20    } else {
21     fmt.Println("Compare 3 : c is not greater than d")
22    }
23 }
```

Komut İstemi

```
C:\GoProjects>go run relationalop.go
Compare 1 : c is not equal d
Compare 2 : c is less than d
Compare 3 : c is not greater than d

C:\GoProjects>
```

Figure 8: Relational operations

Logical operators;

Go programming language logical operators are listed. Suppose c = 1, b = 0

Operator	Description	Example
&&	If both operands are true (as logical) then result is true (AND)	c && d → false
&&	If any operands are true (as logical) then result is true (OR)	c | | d → true
!	Reverse logical condition. (NOT)	! (c || d) →false

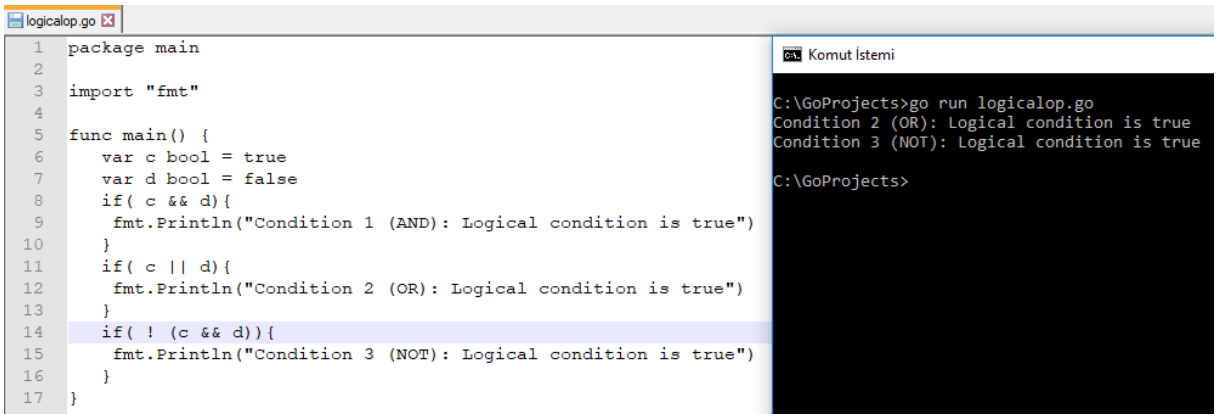

Figure 9: Logical operations

Bitwise operators;

These operators work on bits and run bit by bit operation.

& (AND) , | (OR), ^ (Exclusive OR), ~ (NOT)

<< (Left shift), >> (Right Shift)

Suppose c = 5 and d = 6

c is 5 (decimal), 00000101 (binary)

d is 6 (decimal), 00000110 (binary)

c = 00000101

d = 00000110

&----------

Result is 00000100 (binary) and 4 (decimal)

c = 00000101

d = 00000110

|----------

Result is 00000111 (binary) and 7 (decimal)

c = 00000101

d = 00000110

^---------- (Same "|" operator. Different is only "true ^ true" is false)

Result is 00000011 (binary) and 3 (decimal)

~c 00000101

Result is 11111010 (binary), 372 (decimal)

Conclusions

The Go programming language is quite simple and comfortable. It is completely open source. It has a fast compilation structure. Provides increased speed of operation with large data. The standard library is wide. Go programing language is a good choice for programmers who are looking for a new programming language. This article describes the basic characteristics of Go programming language. This language will provide a basis for new programmers.

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A WEB CSS FRAMEWORK WHICH FAST AND SMOOTH: W3.CSS*

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Abstract: The aim of this work is to explain how to use the W3.CSS library, one of the Css (Cascade Style Sheet) style libraries used in preparing web pages. Web Css libraries are largely lacking in the HTML language, which is based on web pages. Css libraries such as Bootstrap are widely used in the web design world. The World Wide Web Consortium (W3C), an international organization that sets Web standards, has developed a fast and smooth Css library called W3.CSS. Some of the key features of the W3.CSS library; It is space-saving, fast, compatible with all web browsers, does not require JavaScript codes, responsive to the screens of the hardware. In this study, the basic benefits of Css libraries will be explained. Examples of usage patterns will be given. It will be explained examples of how to use. The basic characteristics of the W3.CSS library will be explained, and the results will be discussed using sample codes. It will be explained how some designs needed on a web page can be done with W3.CSS.

Keywords: Html, Css (Cascade Style Sheet), W3.CSS, Bootstrap CSS Library, Web Browsers, W3C (World Wide Web Consortium)

Introduction

With the development of web technologies, there have been developments in the Html field which are the basis of web pages. Developed to address the formal deficiencies of HTML (Hyper Text Markup Language), Css has been mandatory for use on web pages (Abut and Akca; 1988; Asadi at all, 2011a; Asadi at all, 2011b; Asadi at all, 2011c).

CSS is a markup language that describes the style of an HTML document. CSS defines how HTML elements should be displayed. CSS is abbreviation for Cascading Style Sheets (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). Css simplifies the formal editing of HTML tags. Css file extension is external stylesheets. Example style1.css. On the screen of the desktop computer (Aydin at all, 2017; Kocaman and Abut, 2015; 2015; Kocaman, 2013) and on the screen of mobile computers the web pages can be displayed correctly with the help of Css codes. The developer of web pages is Css3 and the developer of Html5 is W3C (World Wide Web Consortium)

* A brief version of this article presented at ISTEC 2018

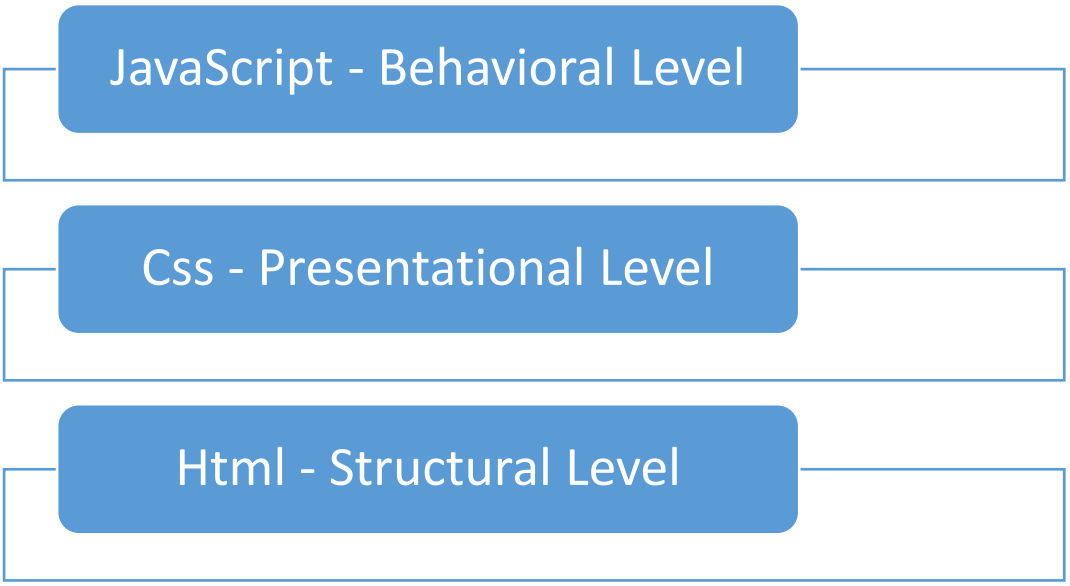

Figure 1: Web page elements

In the software world, library structures are used too much to make things easier. The library structure for Css, the markup language, was developed. BootStrap has pioneered this issue. Such libraries are called the Css framework. With the widespread use of mobile devices, the Css framework is being used too much. Because the web programmer needs to design the web page to a responsible screen width. It has become very simple to develop a responsible page with prepared Css classes.

1. Css Framework

A CSS framework is a prepared software framework that is meant to allow for easier, more standards web design using the Cascading Style Sheets language. The CSS framework is designed to overcome recurring problems across web pages. This greatly reduces the time it takes to start creating applications and websites. In this way developers, large applications do not always have to start from scratch. Re-use the basis of previous applications. A framework is a standardized and set of concepts, practices and criteria for dealing with a common type of problem, which can be used as a reference to help us approach and resolve new problems of a similar nature.

Below is a list of the best css framework.

- BootSrtrap
- W3.Css
- Bulma
- Foundation
- Mini.css
- Uikit

BootStrap is the most commonly used Css framework.

Figure 2: Top 5 Css framework

1.2. W3.CSS

W3.CSS is a modern CSS framework with built-in responsiveness. It supports responsive mobile first design by default, and it is smaller and faster than similar CSS frameworks. W3.CSS can also speed up and simplify web development because it is easier to learn, and easier to use than other CSS frameworks. W3C developed this Css framework. W3.Css is free.

If you want to use W3.CSS in your web site, just add a link to "w3.css" from your web pages:
<link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">
You can download w3.css to your web folder.
<link rel="stylesheet" href=" w3.css">
First, create a web page (index.html) with Notepad++ or any Html editor.

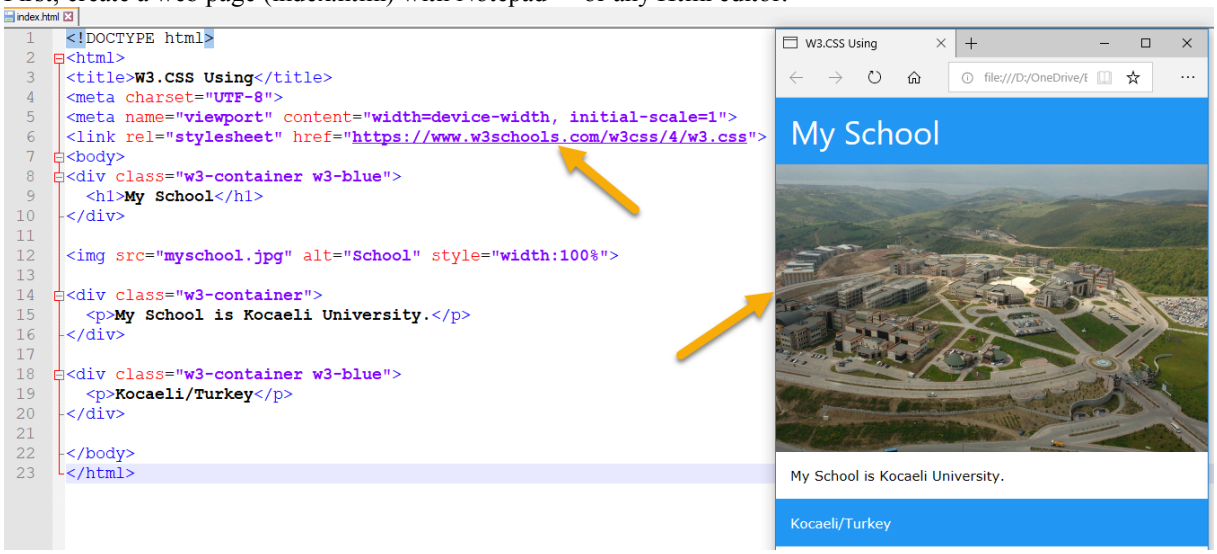

Figure 3: Web page is used W3.Css

W3.CSS Containers;
The w3-container class is the most important of the W3.CSS classes.
The w3-container class is used with HTML container elements, like:
, <header>, <footer>, <article>, <section>, <blockquote>, <form>, and more elements.
Create container1.html and use a W3.Css container.

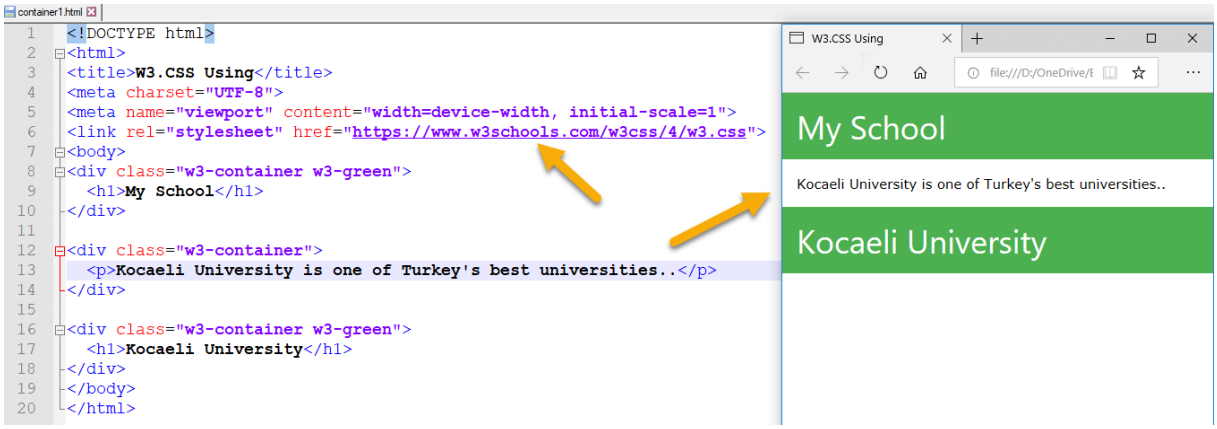

Figure 4: W3.Css Container

W3.CSS Panels, Notes, and Quotes;
You may need to use many text and content in panels on your web page. W3.Css panels have a stylish and beautiful appearance. The w3-panel class can display all kinds of notes and quotes.

Figure 4 : W3.Css panel

W3.CSS Cards;

The w3-card classes are suitable for your images and contents.

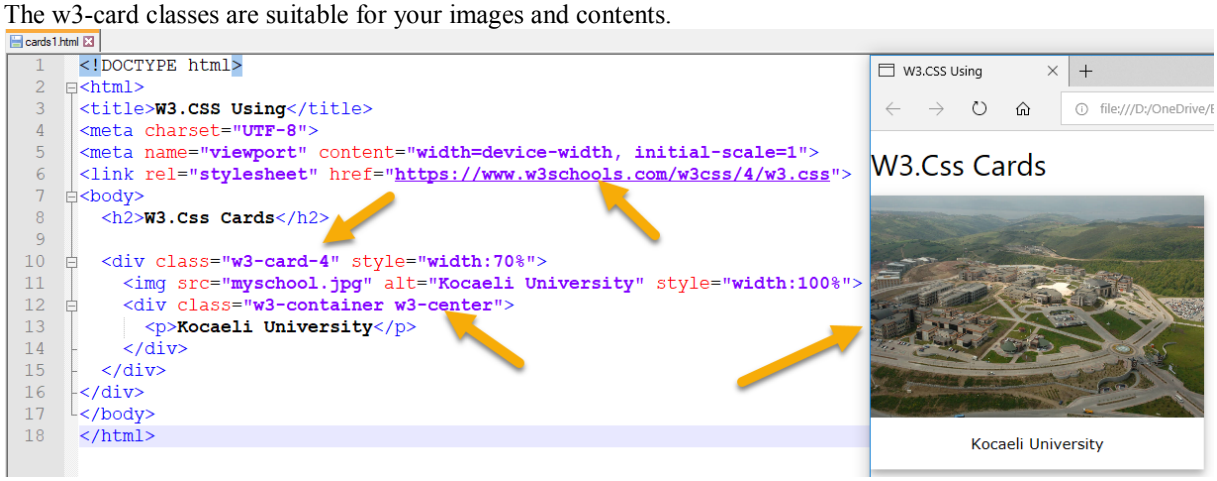

Figure 5: W3.Css cards

W3.CSS Tables;

The w3-table classes can perform all tables.

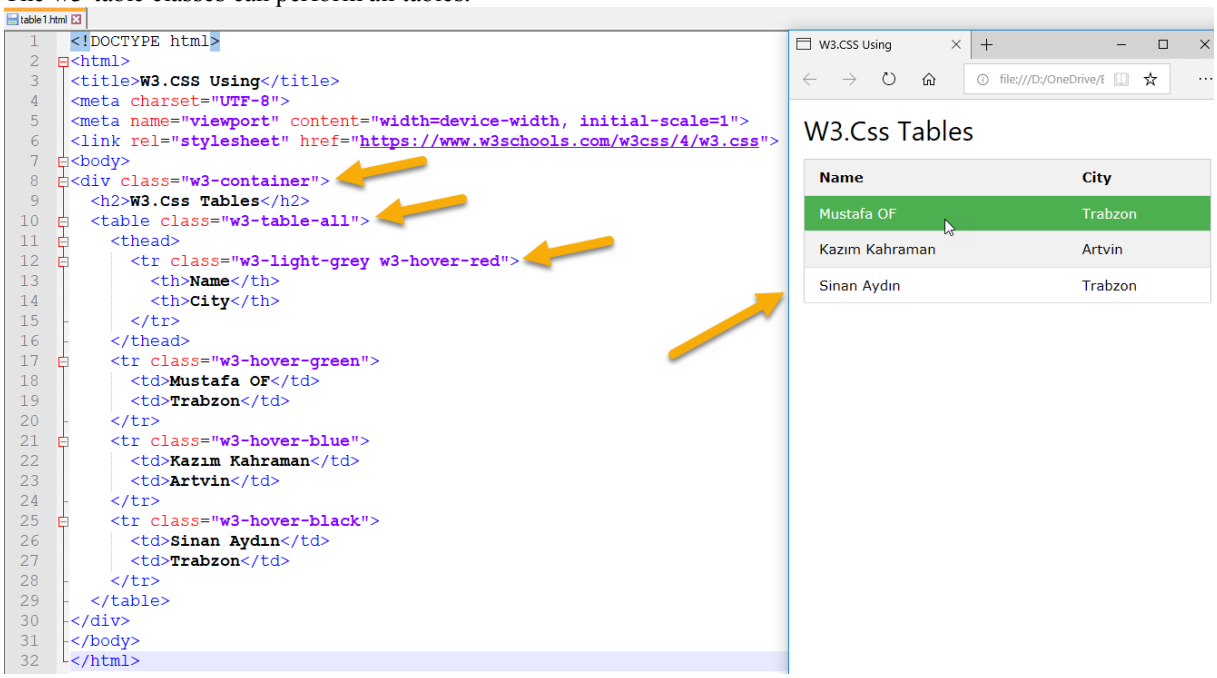

Figure 6: W3.Css tables

W3.CSS Lists;

The w3-ul class can handle all of lists. This way you can prepare stylish lists.

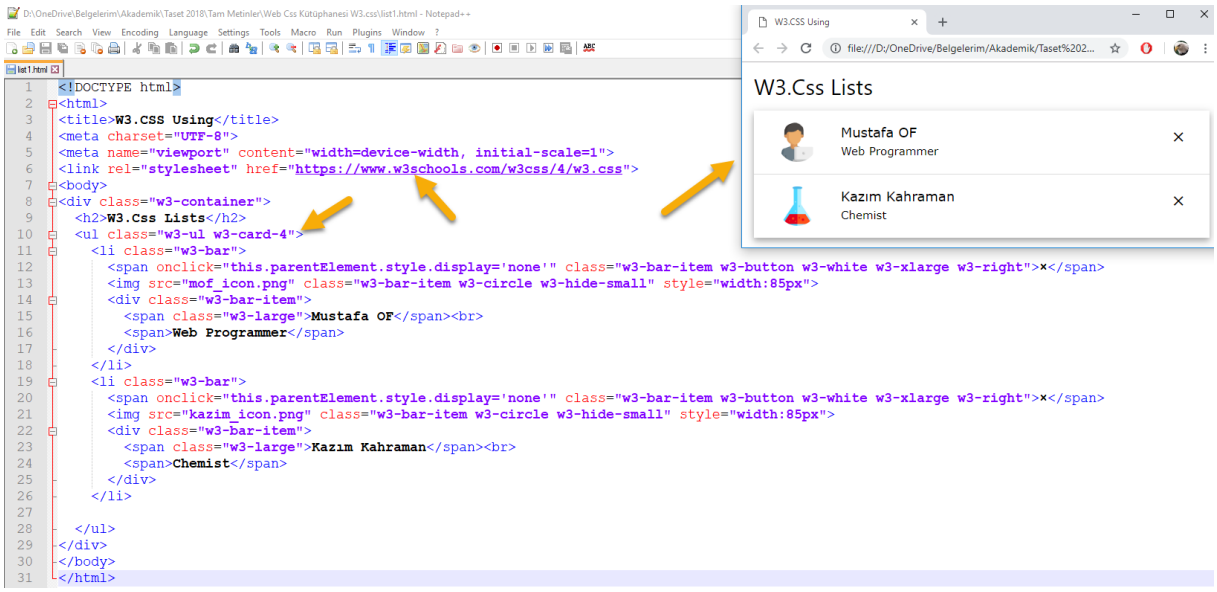

Figure 6: W3.Css tables

W3.CSS Buttons;

The w3-button and w3-btn class provides your buttons of all sizes and types what you want.

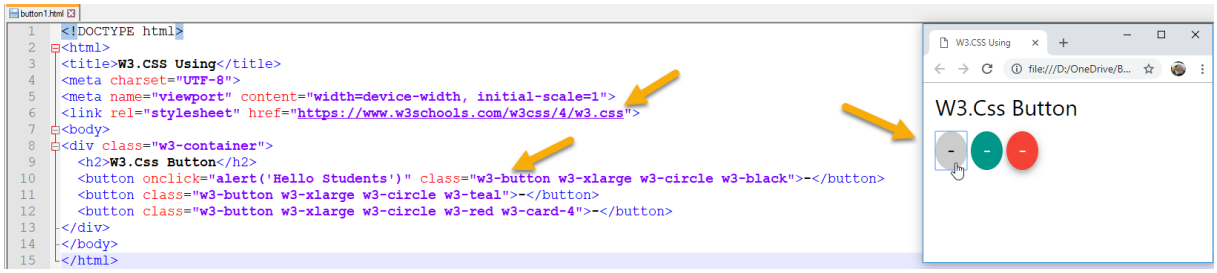

Figure 6: W3.Css buttons

W3.CSS Modals;

The w3-modal class provides modal dialog in HTML no JavaScript codes. Fast and simple.

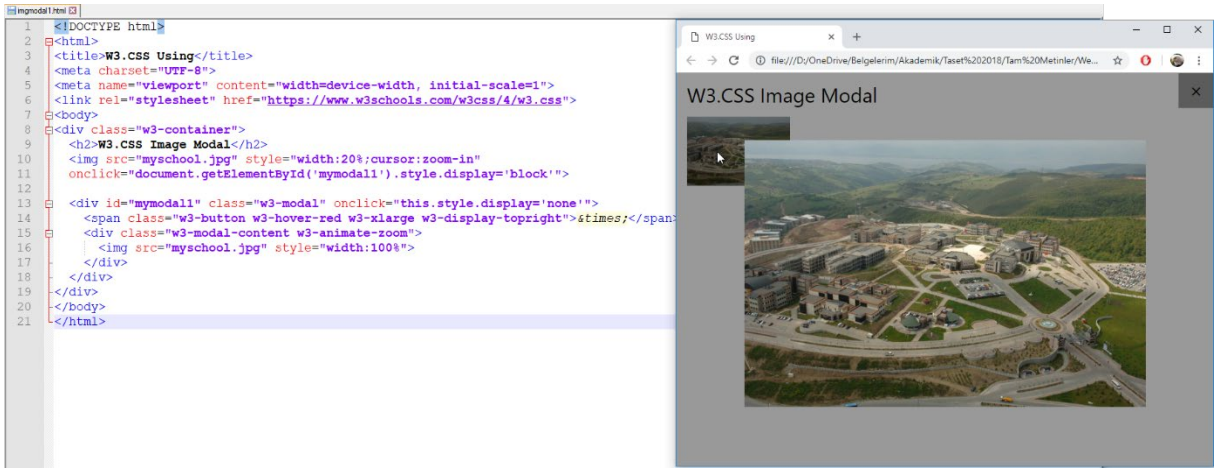

Figure 6: W3.Css image modal. It consists only pure Html

W3.CSS Navigation;

The w3-bar class can be used to create any navigation bar.

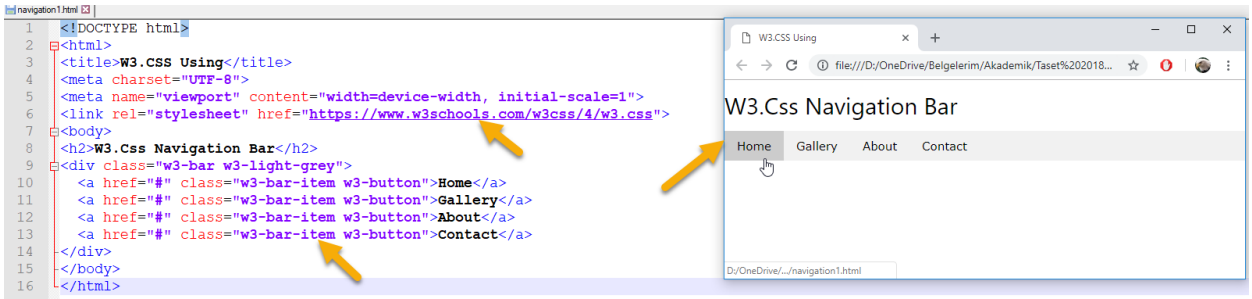

Figure 7: W3.Css navigation bar

W3.CSS Sidebar;

The w3-sidebar class creates a horizontal or vertical side navigation.

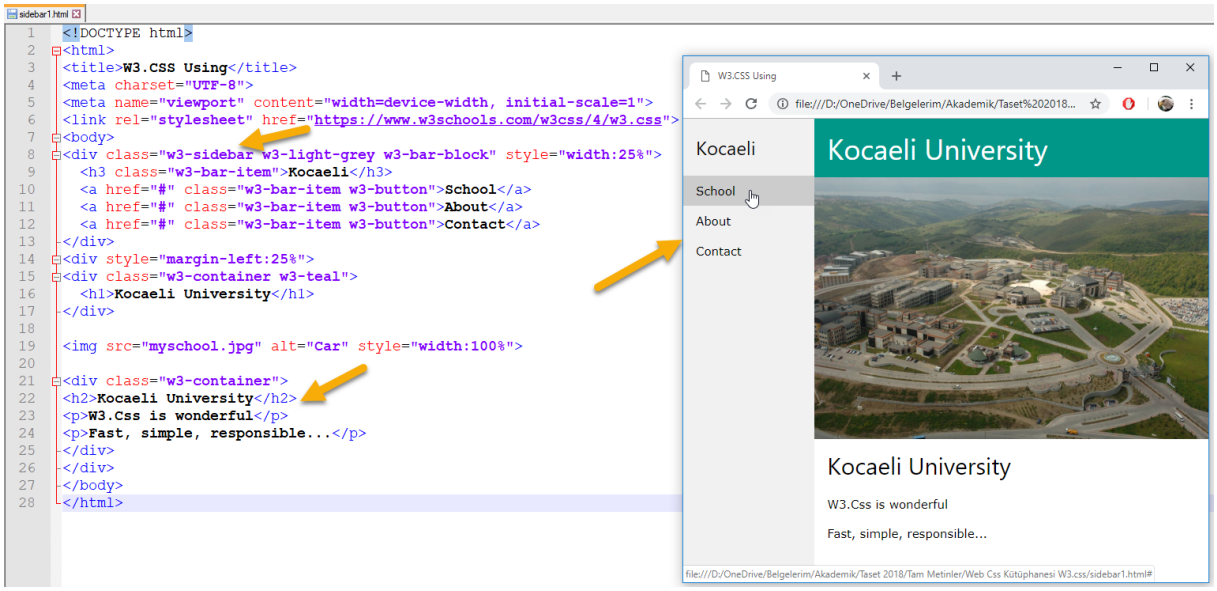

Figure 8: W3.Css sidebar navigation

W3.CSS Animations;

The w3-animate classes provide an easy way to slide and fade in elements.

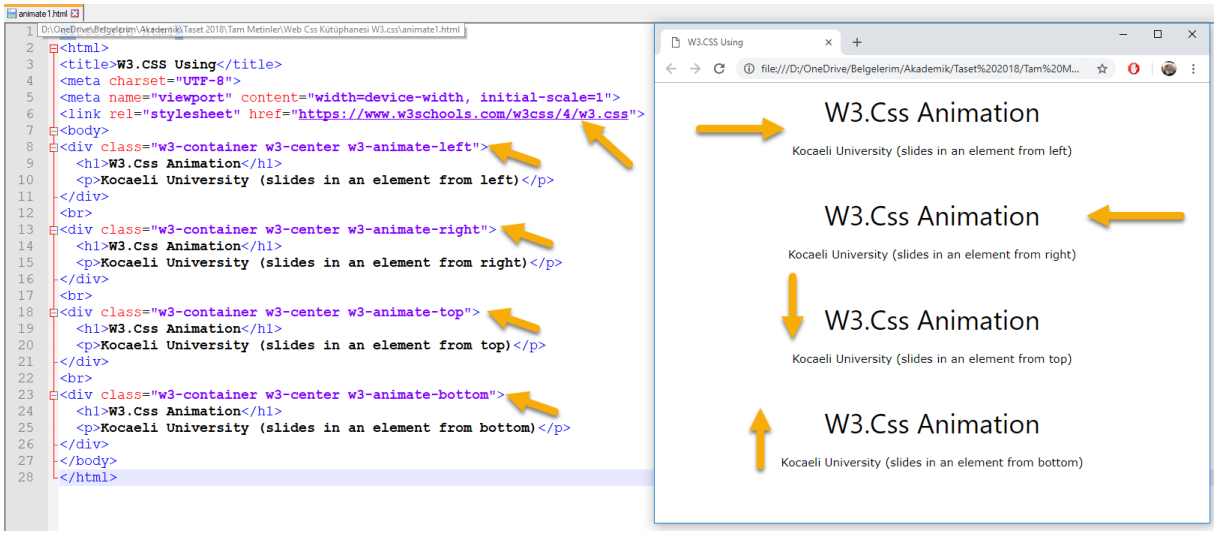

Figure 9: W3.Css animations

W3.CSS Input Forms;

The w3-input classes are for your input forms.

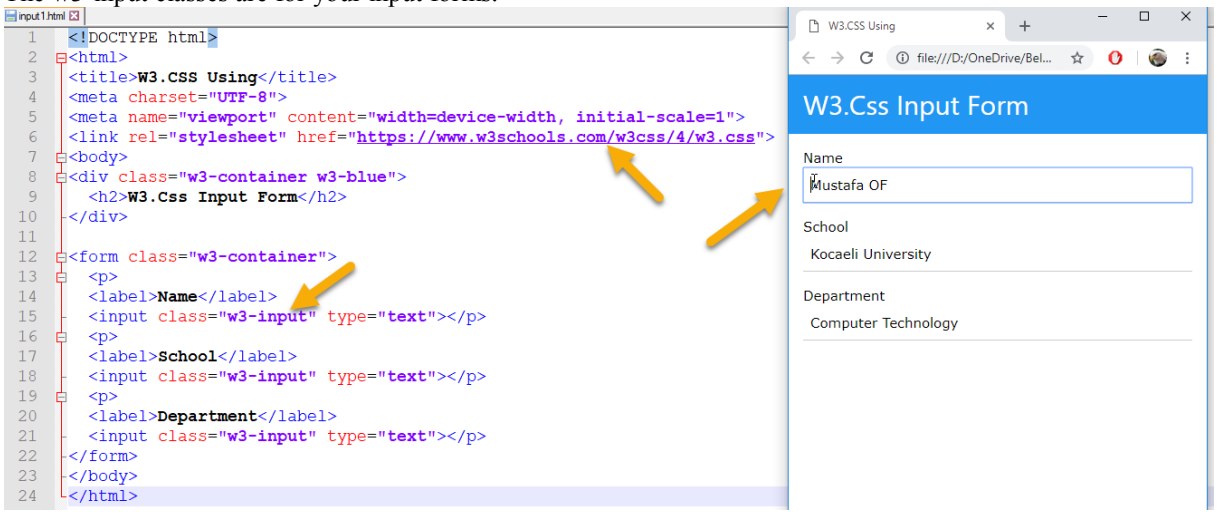

Figure 10: W3.Css input forms

Conclusions

It is easy to design a web page with W3.Css. Both fast, simple and straightforward, as well as fit all devices. All responsible. Unlike other Css, W3.Css mostly consists of Css codes. Does not use any other language codes unless required. This will load web pages faster. It also uses less memory than the web browser.

A few simple steps are needed to use W3.Css, which comes from the group that develops the Html and Css languages. As the projects grow, the codes used increase. As a result, the web page begins to load slowly. Here W3.Css makes you feel the difference. Less work with less code.

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ACTIVATING THE DISTANCE LEARNING MANAGEMENT SYSTEM ON A CLOUD COMPUTING SYSTEM*

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Abstract: In this study, the basic elements of the distance learning management system will be explained. It will provide basic information about Moodle, a distance learning management system running on a web browser. It will be emphasized that the Moodle education system, an open source remote learning management system, is a very popular educational system. The creation and generalization of a distance learning management system that can be activated on a cloud computing system running on a server will be practically explained. As a result, it will be explained that the server infrastructure required for the installation of a distance learning management system which can be accessed from any environment where the internet is available can be easily obtained by the cloud computing system. In a very short period of time, a distance learning management system with full features in terms of training infrastructure may become operative. The main aim is to express that the remote learning management system, which will meet the educational needs of people without face-to-face training, is easily applicable.
Keywords: *Distance education, Moodle, BigblueButton, Moodlecloud, Live Conference Systems*

Introduction

With each passing day, information technologies are developing and becoming an integral part of our lives. It has now become very easy to obtain information with mobile phones, tablet computers, desktops or laptops. Education opportunities have also had its share from this technology. Distance Education, which has an infrastructure based on Internet technologies, has been accessible to everyone. Educational institutions, voluntary organizations, private firms and many other institutions can enjoy the training they want to offer to their trainees independently from the place (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). A learning management system (LMS; Learning Management System) can be prepared in a very short time due to the expansion of the distance education system and the development of Internet technologies.

In this study, the basic elements of distance education system are explained. Basic information about Moodle, a distance learning system based on Internet technologies, will be given (Abut and Akca; 1988; Asadi at all, 2011a; Asadi at all, 2011b; Asadi at all, 2011c). Creating and managing a distance education system that can work on cloud computing system will be explained in practice (Aydin at all, 2017; Kocaman and Abut, 2015; 2015; Kocaman, 2013). In this way, a separate cost expenditure will not be made for the server infrastructure required for the operation of the distance education system. In a very short time, the full-featured remote education system will be able to work.

The main aim is to express that the distance education system that will meet the educational needs of the students who do not have face to face education is easily applicable and to provide the necessary attention to the subject.

1. Distance Education

Distance education is a modern education system in which students and instructors are not required to attend the school or education institution, live, video, audio and interactive courses are taught in a virtual environment. It is a type of education which is completely independent from time and place. Distance Education System, for those who have not completed their education by entering the intensive pace of business life, and who cannot go to the universities they have gained in distant cities due to financial difficulties, provide the education they want in very favorable conditions.

* A brief version of this article presented at ISTEC 2018

In the Distance Education System, both instructors and students do not come to any educational institution or any designated place for education, they do not leave their country or city to attend classes. Everyone registered to the program at any point in the world, on the road, travel, vacation, business trip and so on. With a portable computer with a wired or wireless Internet connection, they can effectively participate in the classroom in virtual classrooms or follow the registered trainings.

Virtual lessons, such as blackboard, PowerPoint applications, videos, case studies, multimedia tools, animated texts and many current educational tools are used as in formal education. Students who cannot participate in the course on time or want to follow again can access the courses recorded in the archive at any time, regardless of the time and space limitation, they can follow the courses at their own time and place. Especially with the development of open-source software philosophy, open-source live course server systems such as BigBlueButton have made virtual lessons much more effective.

The Distance Education System also provides serious opportunities for disabled students. Students with disabilities who do not have an associate, bachelor or master's degree due to transportation problems have the opportunity to attend classes under the same conditions as the other students.

Courses in the distance education system can be performed in a virtual classroom environment. Academicians and students can connect to the system from any environment with internet connection and participate in class. In the virtual classroom environment, academicians can tell the lesson, use the blackboard and even share the applications on their computer with the students. Students can also be connected to the lesson with audio and video, ask questions and make file sharing. Concurrent courses can be recorded, and then all students can follow that course any time they want.

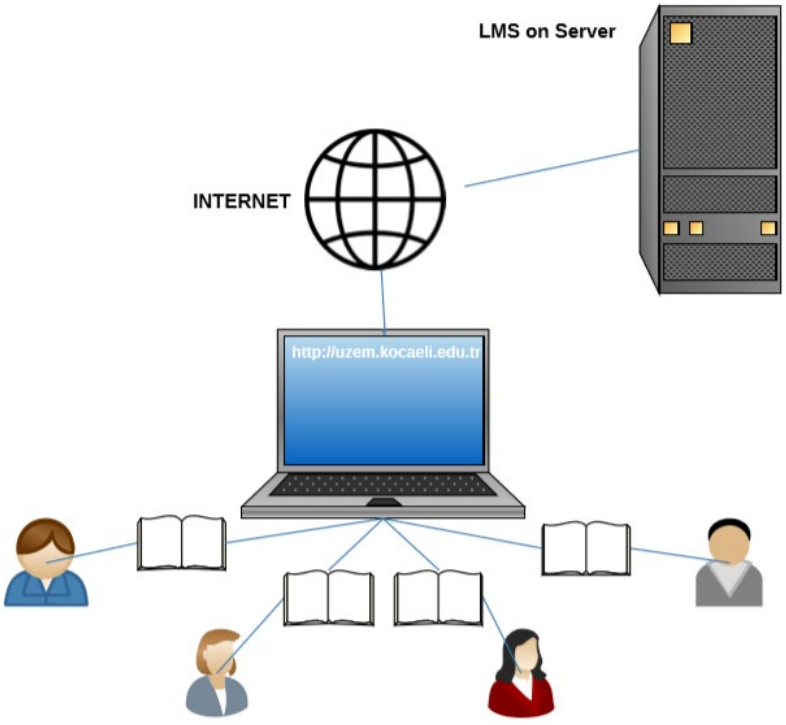

Figure 1: Distance Education working diagram

1.1. Learning Management System (LMS)

LMS is software that runs on web browsers designed to perform remote training activities. In English, Learning Management System is produced from the first letters of the words. The basic tasks of learning management systems, presenting learning material, sharing and presenting learning material, managing lessons, taking homework, taking exams, providing feedback on these homework and exams, organizing learning materials, keeping students, teachers and system records, creating reports.

The LMS may consist of many contents.

Registration component: It is the component that takes the basic information about the participants in the education by including the individuals who will participate in the education and training activities. Many websites have very similar features with the sign-up screen.

Content presentation component: The component with the management-based features required for all teaching and learning activities.

Course component: This is the component where the students will have access to the contents of the education and training, access to the course resources and other course contents.

Testing and evaluation component: It is the component in which the evaluation (examination) to be performed as a result of the learning and teaching activity is prepared and applied.

Reporting component: It is the component that provides the learning, teaching and system administrators the data related to the entire education and training process based on various criteria.

With the SCORM technique, which paves the way for interactive training, students can receive self-education. SCORM is a standard for e-learning based learning management systems. SCORM, which is named after the first letters of the Sharable Content Object Reference Model, refers to the reference model for shareable content objects. Mobility has been adopted to standardize features such as reusability.

Fixed presentation content, animated animations, videos, sound recordings, quizzes and many more educational contents can be found in a SCORM package. Although the process of preparing these packages requires technical knowledge, the basic computer usage and the Internet literacy of a tutorial with SCORM objects has become very easy with the appropriate software. Articulate, Adobe Captivate software to create these objects can be easily. SCORM is an interactive environment created with web technology.

The most common open source learning management systems are listed below;

- Moodle (http://www.moodle.org)
- Sakai (http://www.sakaiproject.org)
- ILIAS (https://www.ilias.de)
- Atutor (http://www.atutor.ca)

The most common commercial learning management systems are listed below;

- Blackboard LMS (http://www.blackboard.com)
- Alms (http://alms.com.tr)
-

1.2. Moodle LMS

Moodle is an acronym for the “Modular Object-Oriented Dynamic Learning Environment”. Moodle; It is a free, open source, object-oriented, dynamic distance education system.

The Moodle current version is Moodle 3.5.2+. Moodle is able to run under MySQL and PostgreSQL database systems and in any environment that supports PHP language. Moodle, Apache + Php + Mysql trio provides a fast and effective LMS service.

The official site is http://www.moodle.org. Http://download.moodle.org address can be used to download the installation files. The installation stages are quite simple.

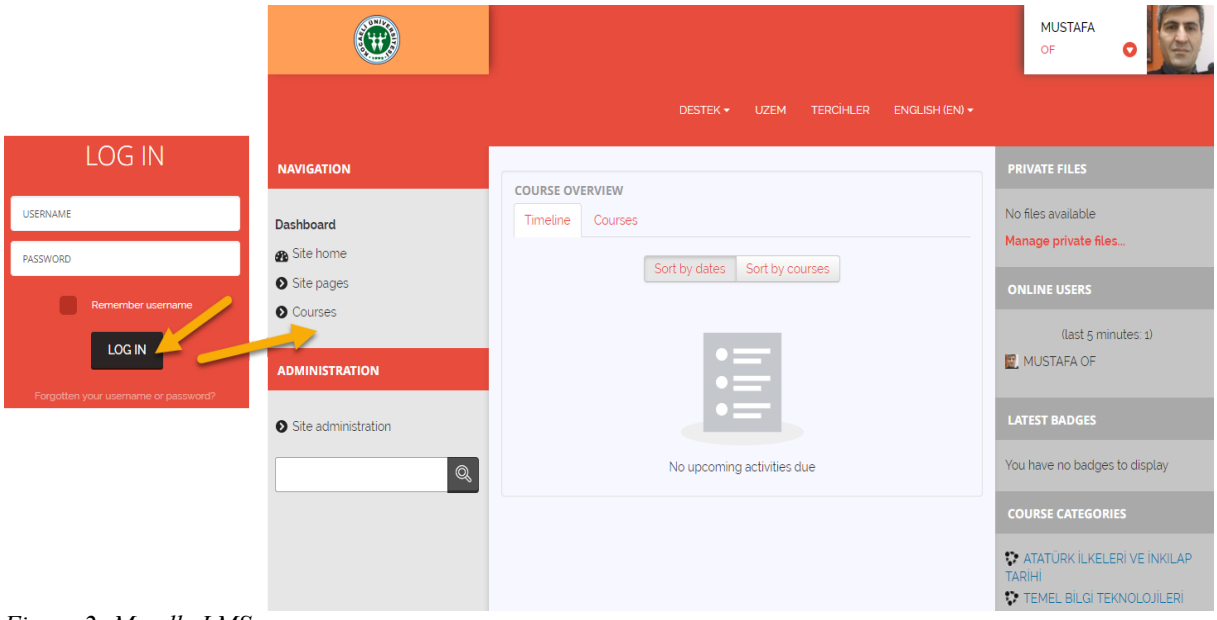

Figure 2: Moodle LMS

1.2. Sakai LMS

M.I.T. (Massachusetts Institute of Technology) is a learning management system created by Sakai Foundation and related volunteers as a result of the joint work of Indiana, Stanford and Michigan universities. Today, it is used by many educational institutions for Distance Education purposes.

Sakai LMS is developed with Java Programming Language. It is an open source learning management system created with the support of many people or institutions. Supports Windows, Linux, MacOS operating systems. The current version of Sakai LMS is version 12.3.

The following packages are required for Sakai installation.

- Java Development Kit 8 or higher (Java Development Kit - JDK)
- Apache Tomcat 8 or higher as application server
- Mysql 5.6 / Oracle database or Oracle 12c database management system
- Sakai installation package files

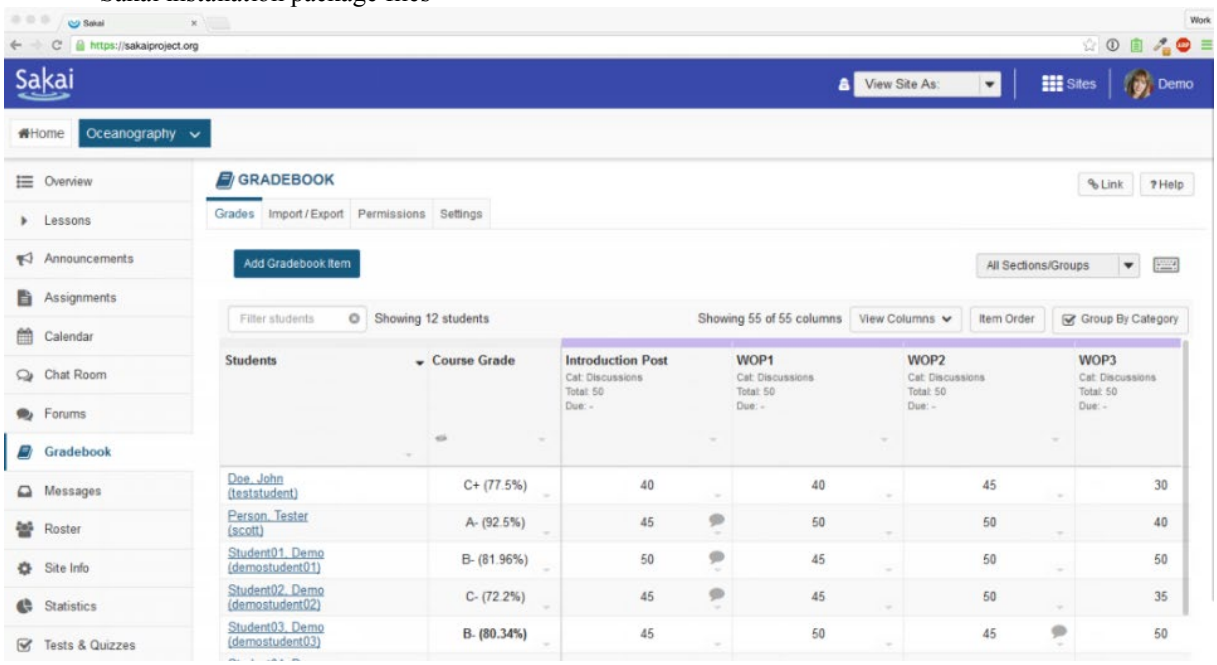

Figure 3: Sakai LMS

2. Cloud Computing System

While it is not known exactly when the term cloud computing is known (Estimated 1950s), this concept is the most generic name given to the Internet-based information services that can be shared among users by using the server computers and similar devices connected to the Internet. It is about the provision of services to be taken by using software at minimum level without the need for service infrastructure by the user. Cloud computing provides services based on three basic models. These are Software as a Service, Platform as a Service, Infrastructure as a Service.

With cloud computing, data, applications and many other information services are stored in the server systems of the provider or organization. Ease of use is one of the great benefits. Google Drive, Microsoft OneDrive, cloud services are the obvious. With mobile, tablet, laptop or desktop computer access, data can be accessed continuously wherever an Internet connection is available. While cloud computing has good sides, it also has bad sides. The presence of data in a server system that is unaware of the user can lead to unpredictable results if the trust agreement is compromised. For example, cloud computing is one of the bad results that the country has cut off its support on a country or company basis. In terms of security, countries must have their own cloud computing server systems.

2.1. Cloud Computing Service Models

Software as a Service (SaaS): A software deployment model that hosts software (SaaS) as a service and delivers them to users over the Internet. It also includes the application of services over the cloud. For example, the Microsoft Office application runs online through the cloud.

Figure 4: SaaS

Platform as a Service (PaaS): The platform as a Service (PaaS) is a complete cloud computing environment for development and deployment that includes resources that allow us to distribute everything from simple-based applications to cloud-enabled advanced enterprise applications. However, we can purchase the resources we need from a cloud service provider based on the price you pay, and access resources through a reliable Internet connection.

Infrastructure as a Service (IaaS): Infrastructure as a Service (IaaS) is an instant data processing infrastructure provided and managed over the Internet. IaaS supports our cost and complexity of purchasing and managing our own physical servers and other data center infrastructure. Each resource is offered as a separate service component, so we can only rent what we need and for the time required.

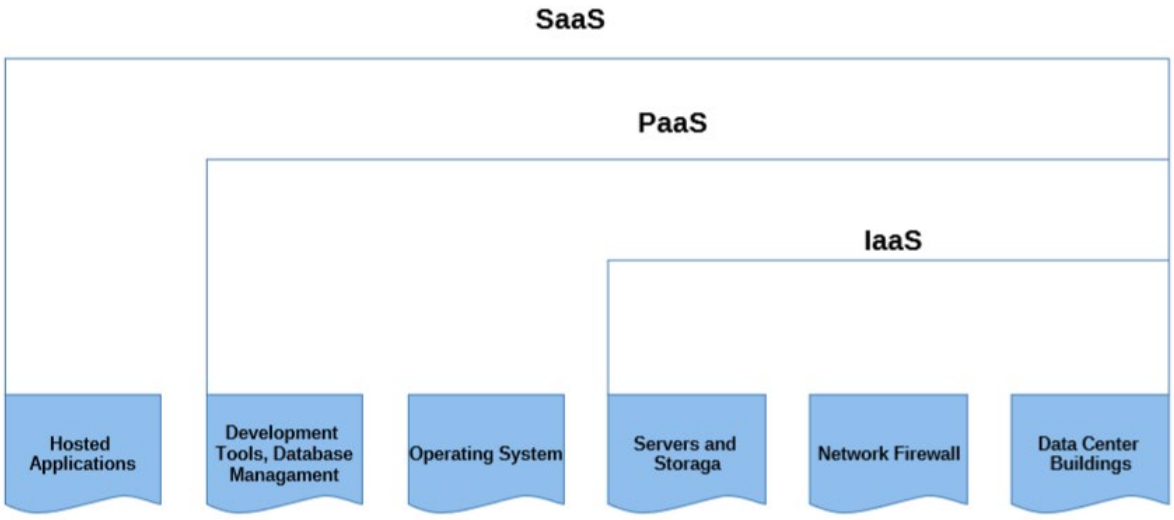

Figure 5: Cloud Computing service models

3. Moodlecloud Lms

Moodlecloud is a system that enables the most current version of Moodle LMS to be put into service on a cloud system. This system is available at http://www.moodlecloud.com. The server needs for which the LMS is needed in the specified system are provided from a publicly available server pool on the cloud. In this way, a full-featured LMS can be created very quickly. For this, the server software does not need to be installed and configured on user computers. In addition, there is no need for a separate study for server maintenance and configuration services through the creation of LMS in the cloud system.

With Moodlecloud, a full-featured LMS can be created in minutes. The free version includes the following features;

- Current latest version of Moodle LMS
- Free BigBlueButton (Virtual Lesson / Conference Server) use
- Up to 50 Users, 200 MB disk space, Basic themes and add-ons,
- One Moodle site per phone number at account creation,
- Up to 10 user live lessons with BigBlueButton (Virtual Lesson)

3.1. Creating a Distance Learning System from Moodlecloud

You will see the steps to create an LMS via Moodlecloud in below;

Step 1; A new account is created by accessing http://www.moodlecloud.com. Switch to free account creation pages.

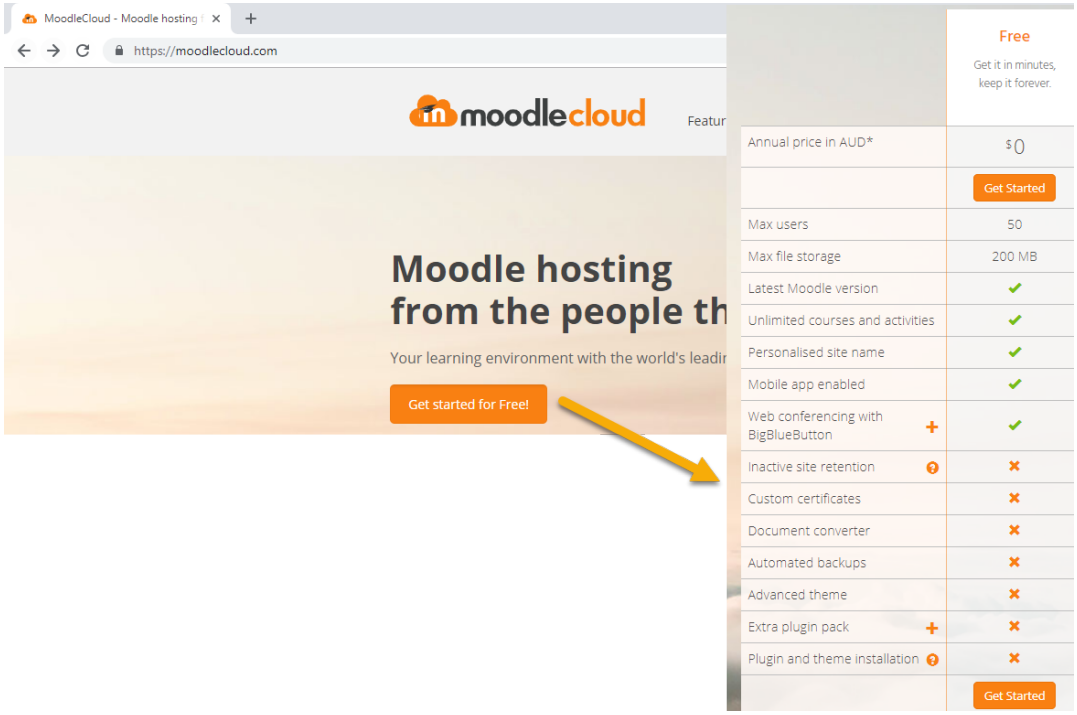

Figure 6: Create free account on Moodlecloud

Step 2; Personal information is entered. The phone number must be entered correctly. Because a code will be sent to the number.

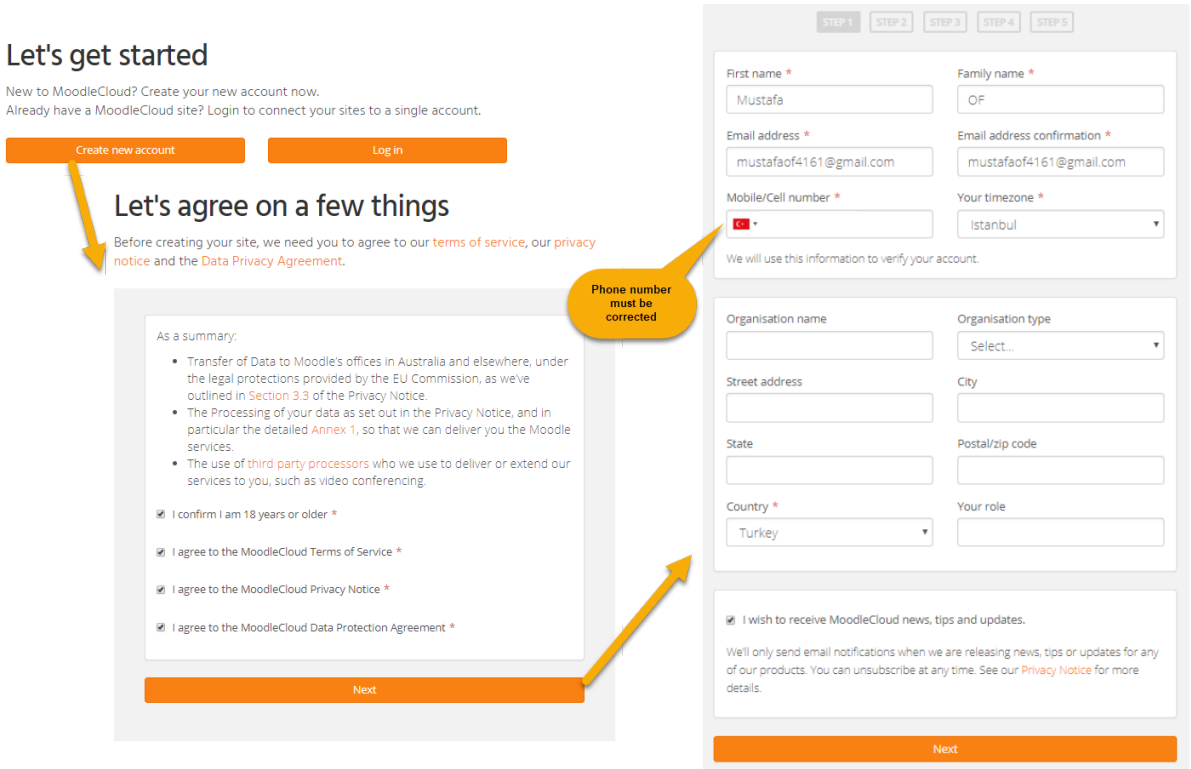

Figure 7: Enter correct informations these forms

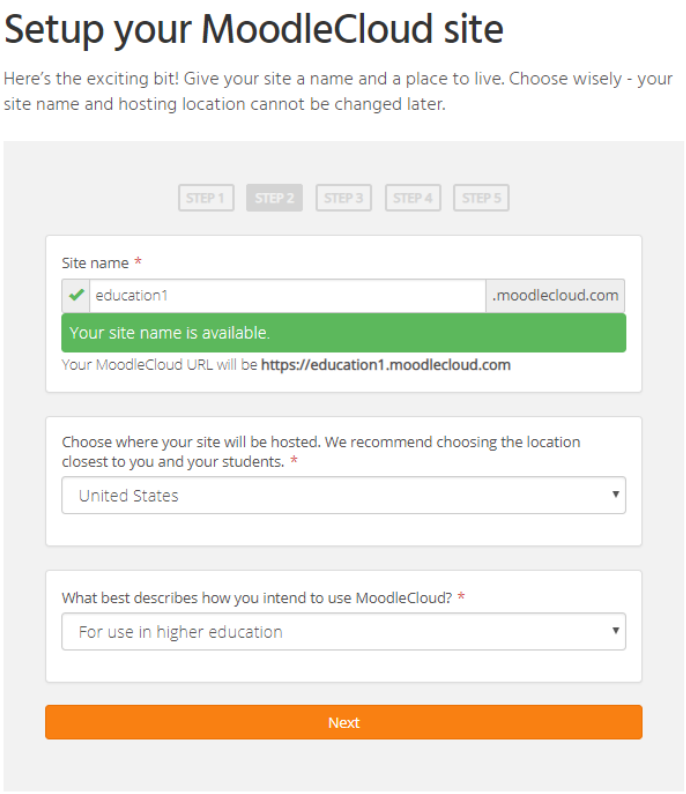

Figure 8: Your Lms web address is education1.moodlecloud.com

Step 3; The code entered in the mobile phone and entered a strong password is set for access to the LMS management. In the final screen, the LMS has become available in the cloud system. You can now log in to the sample LMS at https://education1.moodlecloud.com. User name is "admin"

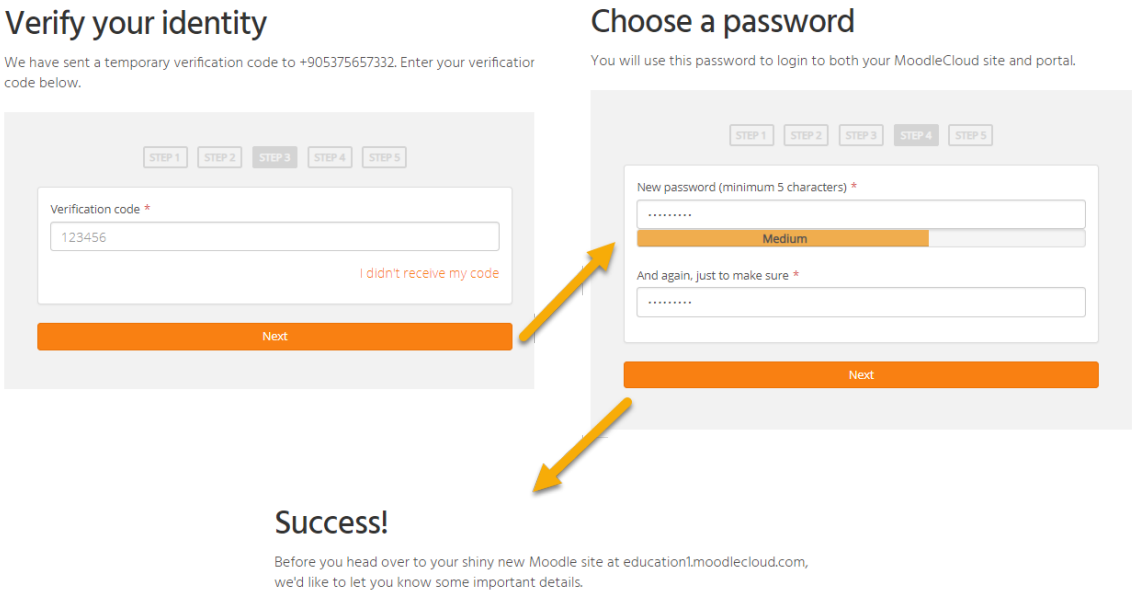

Figure 9: Enter code via sms and LMS admin password

Step 4; The main page screen of the LMS is seemed. You can open Site Administration for customization.

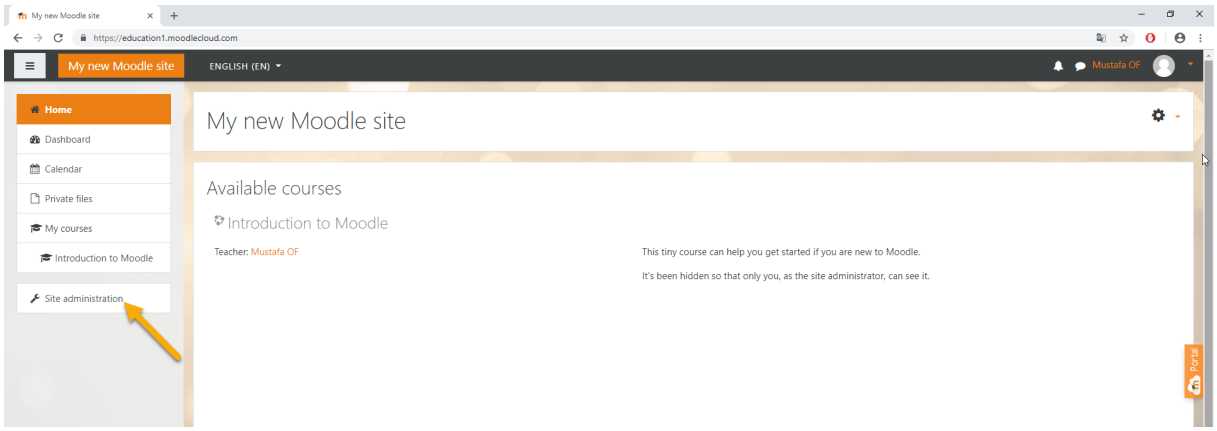

Figure 10: Your LMS main page screen

Step 5; Creating or changing courses can be done under Site administration. Desired courses can be created by selecting "Courses" under the Site Management link.

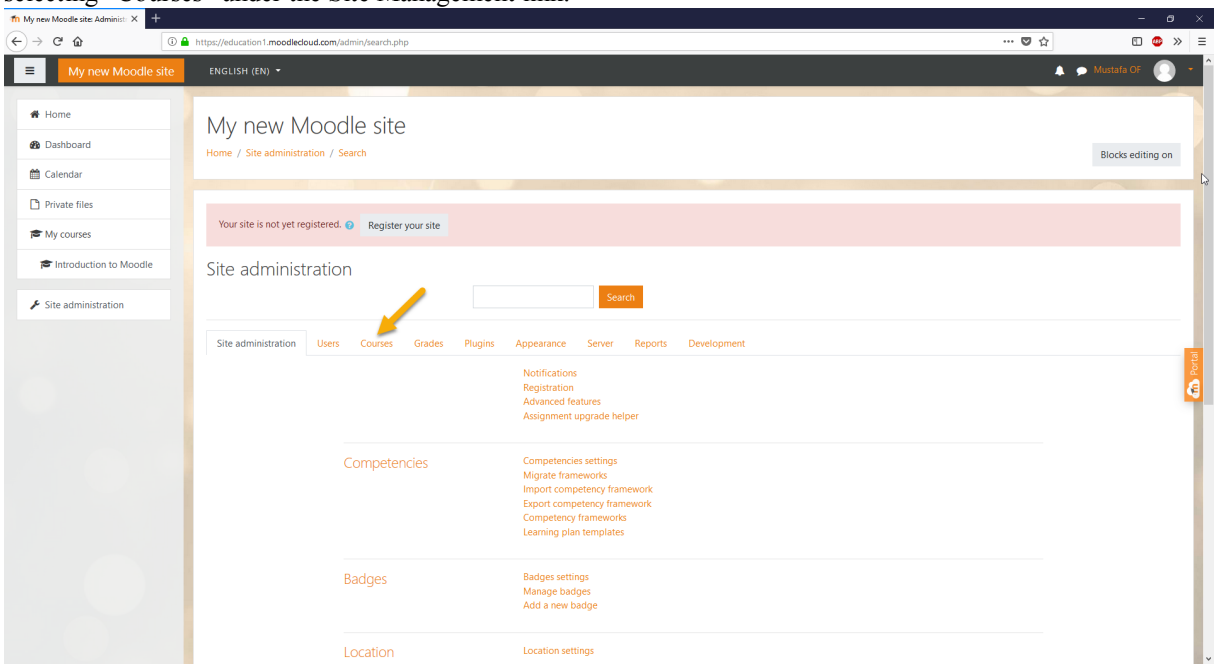

Figure 11: Your LMS administration screen

Now your training site is ready on Moodlecloud. You can customize according to yourself.

Conclusions

Distance education systems provide facilities for those who want to receive and give education. As mentioned above, it is clear that an LMS can be created in a very short time. Every trainer or person with Internet usage information can create this system immediately. Distance education is an education system that can be used effectively in primary, secondary, high school and university education.

Educational institutions, trainers have a great task in this regard. It is necessary to bring this education method together with the students as soon as possible. In this system, where the necessary infrastructure is an excuse, as mentioned above, the LMS will be ready at a very low cost. It is our greatest hope that the instructors and administrators who are able to see that the future education system is a distance education system is urgently transitioned to these education systems.

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ADAPTIVE RELAYING IN POWER SYSTEMS: SOME BASIC PROTECTION SCHEMES*

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Abstract. Adaptive relaying defines protection schemes that conform settings and logic of operations based on the prevailing conditions of the system. These adjustments can contribute to avoid repeating of miss-operation. Adjustments could include well changing relay parameters, the logging of data for post-mortem analysis and communication throughout the system. The electrical distribution system is considered one of the most complicated machines in existence in many countries. Electrical phenomena in such a complex system can inflict serious damages. This requires damage prevention from protection schemes. There was a safety problem between capacity to deliver power and the demand until last years. The protection schemes worked on dependability allowing the disconnection of lines and transformers with the purpose of isolating the damaged element. In this paper, adaptive protection schemes for power system protection will be discussed, one of which is communication.
Keywords: *adaptive relaying, protection scheme, power system protection*

Introduction

The method of delivering energy in the form of electricity to businesses and homes was one of the most complicated systems in many countries all over the world. Later, power engineers are forced to push the limits on the capacity of what they can deliver with the current system. This has led to many changes in the approach of electricity distribution, specifically a sophisticated approach in the methods of protective relaying.

A system is usually looked at in terms of its reliability when describing its protective relaying (Horowitz and Phadke, 2008). They noted that this reliability spectrum has two extremes, dependability and security. According to them, "a system is said to be dependable if it will react for any type of fault but may also operate inappropriately when not needed. A system is said to be secure if it will not react inappropriately or unnecessarily, but it may not react if there is indeed a fault". They pointed out that many engineers preferred to select the dependability side of the spectrum to clear any possible problematic condition because for many positions there were alternative delivery paths. Also, they noted that constraints on the growth of the infrastructure have caused to increased system stress, which helps to possible operation of dependable protection schemes.

Grainger and Stevenson (1994) stayed that security versus dependability is an option made with even the simplest of protection schemes. According to them, a "fuse" is the easiest form of protection in isolating a problem within the system. A fuse's melting point is choice based upon the maximum current to be allowed. They noted that a "secure fuse" melt for a current just below the minimum fault current expected. And, a "dependable fuse" melt for a current just above the maximum current expected under normal operation. So, the selection of the triggering point is what determines the reliability of a protection scheme. The triggering point is simple for fuses.

Adaptive relaying and advancements of computer relaying can provide positive impact in several areas (Vassel, 1991). He pointed out that computer-based relays present protection engineers' important tools. Vassel noted the other useful advantages as below:

- They allow for adaptive relaying so that a scheme can alter itself in real time to better serve the network.
- They allow for the logging of data which can be analyzed both for determining the overall state of the system
- They allow for the logging of data which can be analyzed both for locating possible problems with data collection itself.
- They provide communication between different parts of the system which can be included in the development of a more advanced, better informed protective system
- They provide communication between different parts of the system which can be included to the improvement of present schemes.

* A brief version of this article presented at ISTEC 2018

Because of it has developed as a result of the introduction of microprocessor-based protective devices, intelligent electronic devices and communication systems, adaptive relaying is an important concept (Chapman, 2002). According to Chapman, it allocates a protection scheme to automatically alter transfer settings based on the prevailing conditions of the power system protection. It has a special important and meaning that a relay could be active within the reliability spectrum based on the level of stress of the system in the current discussion of adaptive protection. The stress of the system can turn out when there is a heavier load or in a system with removed facilities. The relay would conform to the secure side of the spectrum to prevent the failures if the system is stressed. Also, Chapman noted that the relay would be conformed to react in a more dependable way to isolate portions of the system if the system was not stressed.

Adaptive Protection Schemes

Shortfall in power system protection performance are applied at both transmission and distribution networks. Many factors are the reason of that including increased penetration of distributed generation, varied operational conditions and severe wide area disturbances (Horowitz at all., 2008 and Salman & Rida, 2001). Salman and Rida stressed that maintaining acceptable protection performance is vital for a functional smart grid as these schemes ensure the reliable and safe operation of the primary system protection. Adaptive protection using dvanced setting calculation techniques has been proposed as a solution to enhancing the performance of protection schemes in response to many of these factors (Tholomier at all., 2009). But, they added that a body of work tackling adaptive protection schemes for the verification and validation of such schemes is non-existent.

Adaptive protection essentially relies on modifying its behavior based on the prevailing power system conditions (McLaren at all., 2011). According to them, this reality raises a number of concerns related to the validity of adaptive behavior, the nature and amount of information required to infer the system state and the appropriate scheme performance at any given time. Also, they noted that these issues compared to conventional protection philosophies and present a challenge in terms of devising suitable scheme implementations. Adaptive protection schemes are the result of the application of microprocessors in protective relays. The protection schemes are growing in importance in the electrical power systems all over the world. Many of these concepts are simply expansions on previous protection applications.

Differential Protection

Differential protection schemes are constructed simply to check for any difference between two quantities at a given instance (Zaremski, 2012). Limitations on time synchronization changed this implementation only reasonable for equipment protection and difficult for other applications. The burden of communication turned out the implementation of differential protection difficult or unattainable for signals collected from distant points into a system. Its application required the two measurements to be added very close to one another because of the constraints on communication in past, while the protection is useful in detecting a difference in current from one substation to the next one. This mean that the scheme was limited generally to transformer and generator protection.

Zaremski pointed out that percentage differential protection of transformers determines the difference between two current levels that should be close to equal. This work is operated by putting the output of two current transducers in parallel with a relay that detects current flow. If both the secondary currents are same, no current will flow through the relay. The system includes the mismatch due to current transformer limitations. These problems are reduced by establishing a restraint current. The restraint current is simply the average of the secondary currents.

Computer based relays can provide solutions to all these issues to significantly increase the accuracy of operation for a percentage differential protection scheme. According to Zaremski, the main error caused by mismatched ratios is quickly mediated by the fact that a computer can take the output from any current transformer. But, current transformers do not need to have secondary currents that are close to each other, simply take the current low enough for an analog to digital conversion to be given to the computer. In this situation, current transformers can be selected based on their accuracy and their incorporation limits to prevent some of the other issues. Moreover, he added that the computer can be registered inputs on different phenomena going on to prevent unnecessary operation

Communication

Protection schemes did have ways of communicating between two distant points through technologies in the past like pilot wire, power line carriers, and microwave signals (Abdulhadi at all., 2010). They stayed that microprocessor-based relays easy access the internet to communicate with other relays. So, these connections allow new sources of communication to pass data between relays. Older forms of communication are based on direct links: microwave communication has transmitters and antennae transmitting data down the line wirelessly. This needs a direct line of sight. Power line carrier is based on the power line conductor as the communication

media. Pilot wire is a communication wire hung on the same poles as the transmission lines themselves. Each of these methods has their own advantages and disadvantages about the types of schemes that they use.
Tripping schemes are usually implemented in communication forms that are separate from the power line itself (Catterson at all., 2011). A signal is sent to the adjacent substation to take the line out of service in tripping schemes. If the communication fails, lines may fail to be removed. They noted that these schemes could be altered and the communication links themselves can be monitored for operability with communication via the internet and dedicated intranets. They also stayed blocking schemes are used in power line carriers. According to them, if there was a systematic problem that was confirmed to be outside of the protected line, a blocking signal was sent to the other side of the protected line to prevent unnecessary working. The line should be removed from service, if the line itself was compromised during the fault and the communication fails.
Belivanis and Bell (2010) stayed that data can be passed great distances between substations quickly and accurately with more data points than before. We know that latency and heavy traffic could slow down communication in the internet so schemes requiring instantaneous communication would require a dedicated intranet. According to Belivanis and Bell, snapshots from adjacent substations can expand the abilities of differential protection beyond transformer protection using an intranet.
They also pointed out that, the accuracy of the data points could be validated through synchronized data collection using the internet. An accurate time tag provides for the coordination of data taken over a wide area. It could be confirmed that the voltage measurements are not being accurately recorded if the voltage between two stations is different. In this step, we need to add that all other factors like the angle between voltage and current, outgoing and incoming current indicated normal operation. We also point out that this doesn't need immediate action and could work with heavy traffic on the network. But, these technological developments could significantly reduce unwanted actions in protective relaying.

Data Mining

One of many advantages that microprocessors bring to protective relaying is that they give protection schemes a hard drive in which data can be stored (Tleis, 2008). So, the system conditions can be recorded with a great deal of precision and synchronization. He stayed that this small piece provides the ability to automatically scan data for preset limits. The recorded data can be used to detect incorrect relay settings. Tleis also pointed out that an obsolete relay setting could be described as a setting. This system was applied to protect a part of the system that has developed or changed significantly.
Data mining and analysis could be implemented easily in order to prevent future events of this nature (Tleis, 2008). When we consider the power flows can change significantly on a seasonal basis, these types of algorithms would probably need to be run monthly. He pointed out that, the algorithm would simply be set up to detect percentage changes of average and peak records for currents and any other variables measured by a relay. He also noted that the main concern is ensuring that the loadability, which is simply the amount of load that can be handled by a protection scheme before the relay operates due to heavy loads, of the relay is still acceptable. According to us, the loadability will need to be increased, but there are occasions where it may be decreased in the case of a shrinking load. Finally, we note that data mining and analysis can provide protection engineers notice of potential loadability issues far in advance of the development of an actual problem.

Result

By establishing the supervisory zone, which is a simple way to help a relay distinguish between a fault condition and a load encroachment, the relay can better react to stressed system state abnormalities. We believe that the stressed system conditions have proven to be more common and will continue to become more common as power system engineers are forced to do more with less. Also, when this concept is applied correctly it will not receive much notoriety. When the innovations made possible by the new tools given to protection engineers, prevention of blackouts and improvement of system stability are no matter.

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ASSISTANT BED CONSTRUCTION AND UTILIZATION*

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Abstract. Hospitals, rehabilitation homes and retirement homes around the world are dependent upon a quality medical staff to maximize safety of people. Staff professionalism, facility quality and the condition of equipment are all key components in medical care which must be considered when designing hospitals and especially beds. Particularly, hospital beds are of recent concern around the world. All around Europe, there is a particular need for improving and modernizing hospital beds. But, high price in bed cost is passed down to the patients further increasing the cost for quality healthcare and thus resulting in only the upper echelon of people being able to utilize technologically advanced hospital beds and hospital care. Pressure ulcer is u common skin disease when patients or the elderly stay in bed for long. The assistant bed is aiming at making the nursing easier or even make the elderly living independently possible.
In this paper, we research existing models of hospital beds and analyze the components and functions of them. We try to determine some features that could be useful in a modern hospital bed. We hope to see designing and manufacturing a reliable, reproducible and marketable bed for all patient, especially living independently.

Keywords: assistant bed, performance -service, living conditions

Introduction

Today's technology presents many different bed designs available for purchase by a medical care facility. These beds are produced by a wide range of companies in many countries. Each bed is designed for a specific use and the functions. We divided the concept of the bed is into two parts that are living bed and service bed. The service board is mostly used for toileting, washing, and offers smart tablet entertainment to users (Wong, 2006; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). Wong noted that the living board is divided into head zone, upper zone, lower zone; "the upper and lower zone are divided into more semi-zones to meet the ergonomics needs better. In-between two adjacent zones, pivot connects the two parts to offer rotational flexibility. The living board is covered with a kind of mattress to prevent from Pressure ulcer (Figure 1).

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Figure 1. Assistant bad designed with a special protective layer

(www.ewlclublondon.com/anti-dekubitus-matratzen/anti-dekubitus)

Rittweger at all. (2004) pointed out that a prefabricated platform is assembled in the room in advance; “it is consisted of one strong central pivot which is fixed onto the wall and two strong "arms". With the help of these two arms and the cooperation of two units, a tough problem in nursing: turning-over can be solved. The arm for living unit locates on a half-envelop structure which is designed for hiding the equipment for the whole system. The mechanisms under the living board for moving the zones have the potential for transforming the bed to a wheelchair through a special docking method”.

Design

The assistant bed is mainly consisted of two units: living unit and service unit (Ishizaki at all., 2002). They stayed that the basic function of service unit is for toileting, washing, and some other user personal service to realize more basic daily activities. They explained that: “this board is divided into upper zone, hip zone and lower zone; in hip zone, there locates a device works as a toilet and in upper zone provides smart tablet entertainment for users. The basic function of living unit is for sleeping, relaxing as bed, sitting as chair and taking exercises. The living board is divided into head zone, upper zone, lower zone to meet the ergonomics needs better. The upper and lower zone are divided into more semi-zones. In-between two adjacent zones, pivot connects the two parts to offer rotational flexibility” (figure 2).

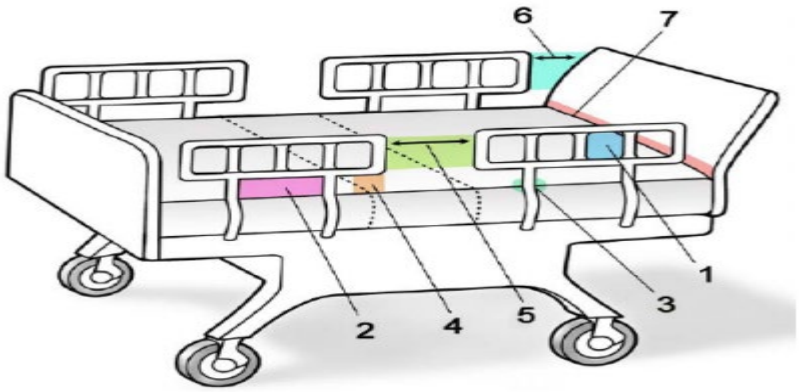

Figure 2. Basic parts of Assistant Bed

(www.wpi.edu/Pubs/E-project/Available/E-project)

Section 1 is the area of spacing within the rail • Section 2 is representative of the area under the rail, between the rail supports or next to a single rail support • Section 3 is the area between the rail and the mattress • Section 4 distinguishes the area under the rail, at the ends of the rail • Section 5 is defined as the area between split bed rails • Section 6 between the end of the rail and the side edge of the head or foot board • Section 7 clarifies the area between the head or footboard and the mattress end.

Yousefi at all., (2011) explained some detailed information about the layer of the assistant bed: “a prefabricated platform is assembled in the room in advance. It is consisted of one strong central pivot which is fixed onto the wall and two strong "arms". The so called "arms" are used for supporting and lifting the two boards just like human arms. With these two arms, two units can work together to solve a tough problem in nursing: turning-over. The arm for living unit locates on a half-envelop structure which is designed for protecting the equipment for the whole system”. There is two different types of assistant bed to realize the functions;

- motor embedded pivot (figure 3)
- hydraulic jacks

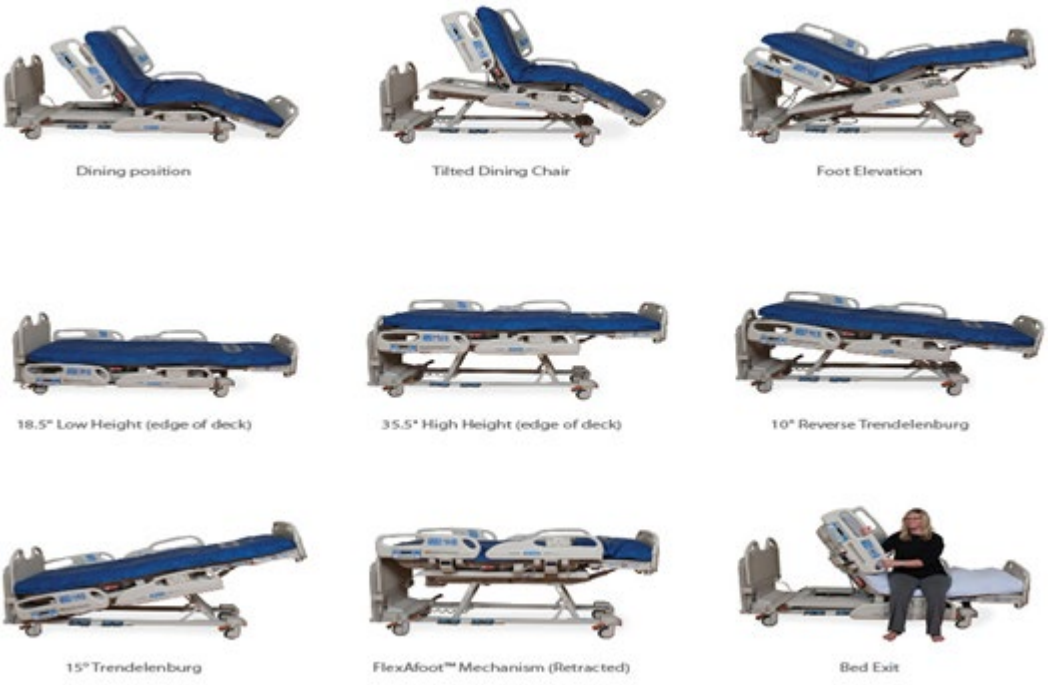

Figure 3. Different positions of an assistant bad with the motor embedded pivot

(www.google.com.tr/search?q=Different+positions+assistant+bed&tbm)

In the pivot method, it is used a special pivot, which is embedded with a motor or several motors inside to connect related parts. The pivot has enough force to maintain one posture, and it is also sensed by force and a sensor to provide a feedback when exercise mode is active. This mean that the amount of exercise is best for the patient. If motor pivots are used, it is simpler, and a specially designed wheeled base is necessary. The detail of the transformation from bed to wheelchair is still in research. In the hydraulic method, at least five or six jacks are used under the unit (Ostaddabas at all., 2011). They noted that through adjusting the height of stroke, the live board performs different configurations. The bed can be converted to a wheelchair with the mechanisms under the lower zone of living unit. A practical attaching system is necessary to connect unit with jack mechanisms if hydraulic jacks are used.

Some Activities

if the patient wants to be passed from living unit to service unit, he leans on his right side, and the living board starts to rotate about the central pivot to a predetermined angle (Kocaman and Abut, 2015; 2015; Kocaman, 2013). According to force analysis, when the frictional force equals the component of gravity along the board, the user can slide slowly and smoothly to the service board Also, to realize turning-over and transferring in a relatively simple way, the best condition is user leaning to his side on one unit (Sakakibara at all., 2011).

We can add some exercise methods into the assistant bed as well. The bed offers three kinds of exercises (Miller Keane, 2012);

- Active
- Passive
- Mental

Miller Kean presented some practice for these exercises. “In active studies, exercise refers to voluntary contraction of muscles controlling a part, assisted by a therapist or by some other means. If the patient had the ability to move actively, the application also covers active exercise. In this exercise mode, about the pivot, the lower zone rises or falls down, and the patient on the bed has to follow the action. In this way, patient practices leg muscles easily”.

Miller Kean presented some basic exercises for passive position that “passive exercise refers to motion imparted to a segment of the body by another individual, machine, or other outside force, or produced by voluntary effort of another segment of the patient's own body. That is to say, in passive exercise mode, the bed offers a relatively elastic force, and what the patient needs to do is to overcome this force, just like arm wrestling. Patient is involved in passive exercise”.

Finally, for mental exercises, Wei at all. (2007) pointed out some useful exercises that “Normal patient can play with the smart tablet PC when he leans on his left. Some apps that can be downloaded from online store are also valid for patient recovery, not only the physical, but also the mental. So assistant bed producer can cooperate with app developers and nursing department to develop new apps based on treatment requirements. Since tablet PC is a popular entertainment device as well, patient can enjoy nice movies or has video chat with relatives and friends. Doctors and nurses can also perform simple diagnosis through HD video camera. In this way, nursing staffs don't need to see one patient too frequently, so that one staff is able to take care of more patient at the same time”.

Result

Everybody know that patient can sleep, take exercises, and do other basic daily activities such as washing, and toileting can be achieved on living unit. If you need and use an assistant bed, it is not important that you are not in a nursing home, or in your private house. A well-designed assistant bed presents you its efficient functions, such as turning-over, transferring, and different exercises. In this paper, we try to explain the design and modification of some kinds of assistant beds and point out the ability to live independently back to immobilized patients, so they are able to live like normal people. The assistant bed is a perfect tool to use for the assistant persons of patient as nursing staff or civil person with because of its easy operated functions.

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CHEMICAL DESIGN AND ENVIRONMENT: ENERGY GENERATION AND CONSUMPTION*

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Abstract. The tittle of this paper refers to developing and adapting homes or cities to meet the emerging needs of people with the help of chemical sciences. By 2000s, most of humanity lives in cities, up from 30 percent in the 1950s, and within two decades, nearly 65 percent of the world's people will be city-dwellers. City growth is most rapid in the developing world where cities gain an average of five million residents every month.

The challenges that have to be faced in providing enough food, water, shelter, energy and security are huge, especially when exacerbated by climate change. In this paper, we are focusing at the role for chemists in addressing the challenges cities face due to the pressures they place on resources, concerning that their creation and continued growth, energy generation and use in buildings and homes, public safety and security and transport.

Keywords: chemical design, environment, energy, city, home, transfer

Introduction

Cities place huge demands on waste, water and air quality management. We require technologies and sciences that help provide healthy, clean, sustainable urban environments. Many cities already live beyond their means and their ecological footprint is enormous. Cities cover only two per cent of the Earth's surface, but they use 75 percent of the planet's natural resources (UN-HABİTAT, 2008). In this report, it was stayed the these include fresh water, fuels, land, food, construction materials and raw materials. So, the chemical sciences have an important role to play in reducing the ecological footprint through reducing the tendency for cities to transfer environmental costs to its surroundings, reducing resource use and reducing waste.

There is a need for technologies and sciences that provide healthy, clean, sustainable urban environments (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012). Air pollutant emissions are likely to increase dramatically when cities expand step by step. Measuring and understanding air pollution presents us a sound scientific basis for its management and control. Scientific approaches and technological advances need to be designed in developing low cost, developing urban environments and sensor networks for monitoring atmospheric pollutants (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018; Teitelbaum, 2007). It is underlined in the above report that this transformation must be coupled with converting greenhouse gases with high global warming potential to less harmful products and improving catalysts for destroying pollutants. Also, added that the technological transform required to reduce the burdens placed on food,

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energy, raw materials and water are covered in their respective sections. The role of the chemical sciences in reducing the pressures that buildings and transport place on the ecological footprint of cities were analaysed in this study.

Waste is a serious issue for cities (IPCC, 2009). The chemical sciences have an essential role to play in reducing, recycling, re-using and disposing of waste. Recycling plastics is difficult due to the wide variation in properties and chemical composition among the different types of plastics. Valuable materials could significantly reduce this burden with adopting current and evolving technologies in pyrolysis, catalytic conversion, depolymerisation and gasification for recycling plastic waste into fuels (http://ec.europa.eu/environment/waste/index.html., available at 23.06.2018). Population and affluence are directly connected to waste generation and high-income countries generate more waste per capita than low income countries. According to European commission reported that The EU generates 1.3 billion tons of waste each year, equivalent to 3.5 tons of solid waste per capita. Also, it is added to this report that most of all waste is deposited in landfill sites. We deal with the following subjects to explain the role of chemistry for home or city construction;

- Construction materials
- Energy generation at home
- Energy consumption at home
- Mobility

Construction materials

We need to use materials for construction, and confer additional benefits in their use, and may be used for new build and for reconstructing older buildings (Prest, 2009): Prest noted that Each year, 4500 million tons of materials are used in construction in the UK. The construction and demolition industries build over four times more waste than the domestic sector, over a ton per person living. (BWEA, 2008). According to Prest, the environmental impact of extracting, processing and transporting these materials and then dealing with their waste are major contributors to greenhouse gas emissions, destroying habitats and depleting resources.

Chemical science has an important role in developing construction materials such as for roads and buildings, which consume fewer resources in their production are used for new buildings and for reconstruction older construction. The technological support should modulated as bellow (international Energy Agency, 2016):

- developing recycling methodologies,
- developing superior building materials for designing new buildings and structures, and reconstruction of older buildings,
- developing intrinsically low energy materials

According to BWEA report, the chemical sciences contribute to the development and installation of energy efficiency measures in households. It is stressed in the report that these technologies must be coupled with innovations in developing superior building materials to make a significant step change. Eco-efficiency in the construction home will also be achieved with technological innovations in the following areas (BWEA, 2008):

- the development of flexible anechoic building materials to provide non-flammable sound insulation,
- functional textiles with superior energy balance,
- the development of building materials that are also modulated to offer additional benefits.

Energy generation at home

Most homes rely upon inefficient energy technologies (Schlögl, R. 2010). We need to develop new technologies and strategies for home energy generation. The projections for global carbon emissions from buildings is forecasted to rise from 8.6 $GtCO_2$ in 2004 up to 15.4 $GtCO_2$ by 2030, contributing around 30 percent of total emissions (RSC, 2009). Most homes rely upon inefficient energy technologies. According to RSC report, technological advances and resource management techniques have turned it out possible to cut energy consumption

by up to 90 per cent. Also noted in this report that it will be possible to reduce the environmental impact of homes to virtually zero if energy efficient buildings can keep down their energy from zero or low carbon technologies.

Superior battery technology and alternative energy storage approaches with high energy density optimization and flexibility will be required to maintain a continuous supply of energy (Doroodian and Boyd 2003). These authors also noted that the need for energy storage will increase by orders of magnitude with the wider use of renewable resources. Energy requires to be stored at times of high generation for release at times of high demand (Kulshreshtha, 1998) he stressed that the technological innovations required include superior electrodes, electrolytes and fuel cells. Developments in materials chemistry will also be pivotal in driving the breakthroughs needed for portable devices and for micro-sized batteries.

Some domestic energy generation technologies are tested to generate electricity such as using solar photovoltaic cells (HM Treasury, 2007). A range of renewable energy technologies already exist, including solar, offshore wind and geothermal energy. (NSW, 2009). However, technological opportunities exist for developing domestic versions of other alternative energies and innovations are required to maximize cost effective energy collection from the sun.

Energy consumption at home

Current technologies could significantly reduce the necessity of homes on energy consumption (BWEA, 2008). According to this report; space heating corresponds to about 30 percent of residential building energy use in both the US and China; and, in developing countries traditional biomass is still commonly used for heating and cooking and these uses represent 80 percent of global biomass use; moreover, in western countries the energy used to heat residential and commercial buildings alone represents around 43 percent of total energy use. Also noted in this report that a typical family with two children spends 70 percent of its yearly energy consumption in the home. Current technologies in energy use are central to efforts to decrease climate change and, can significantly reduce the necessity in the consumption.

The chemical sciences already contribute to developing and installing energy efficiency measures in homes. For this reason, technological innovations are required to make a significant change. These include (http://ec.europa.eu/environment/waste/index.html, last available 23.06.2018):

- the integration of intelligent information and computer technology components to flat lightweight displays, which are able to respond to changes in temperature and light intensity,
- photochromic coatings for glass,
- superior building materials,
- nanocoating for decorations.

Technologies such as LEDs based on conjugated polymers with nanoscale-controlled deposition on thin films will be effective solution. Prest (2009) noted that this will need to be partnered with improved energy efficiency of household, lighting, heating and cooling.

Mobility

City transport is fuel inefficient and environmentally damaging. Enormous societal benefits will flow from scientific and technological solutions to these problems (DEFRA, 2008). In this paper, it is noted that urban transport is fuel inefficient and environmentally damaging: for example, in 2004 transport made up 23 percent of global emissions, of which almost three quarters was produced by road transport. According to this report, total energy use and carbon emissions are predicted to rise to 80 percent more than current values by 2030. It is pointed out that one factor contributing to this rise will be the increased transport energy use of non-OECD countries, from 36 per cent to 46 per cent by 2030. According to DEFRA report, it is needed to flow scientific and technological solutions to these problems. There will need to be significant developments and advances in the materials and components used in conventional vehicle design to reduce emissions. The chemical sciences have an important responsibility to progress developments in lightweight and safe vehicles. For this aim, the technological innovations needed in this area noted as below (DEFRA, 2008):

- engine oils and additives that save fuel,
- developing improved sensor technologies for engine management,
- developing innovative elastomeric and thermoplastic products for structural parts,
- ceramic engine technology that reduces engine wear and friction.

Finally, we need to add that eco-efficient hybrid vehicles will have new energy storage systems that provide energy recovery during breaking and power peaks during acceleration.

Result

There is an essential need for technologies that provide healthy, clean, sustainable city environments. Measuring and understanding air pollution provides a sound scientific basis for its management and control. Technological advances require to be made in developing low cost. This must be partnered with improving catalysts for destroying pollutants and converting greenhouse gases with high global warming potential to less harmful products.

The growth of fake products, which are of inferior quality and are potentially dangerous, have threat to people. Novel technologies are required to identify fake products. This needs advances in analytical and materials chemistry. In addition to developing technologies for detecting and preventing environmental and security threats, the chemical sciences have a role in developing high performance protective materials.

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CHEMICAL TECHNOLOGY FOR STUDENTS CHEMISTRY CURRICULUM*

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Abstract. Global competition has leaded to the world textile industry to modernize and become cost competitive because developing nations have turned out that exporting textile products to the world is an attractive way to enhance their economic growth. Their work standard costs have pressured domestic producers into replacing manufacturing equipment with automated, efficient and technology machinery. The sector has focused on reducing costs, improving quality and developing quick response scenarios. Engineers focused to improving quality and efficiency make up the rest. The technical knowledge is in the form of supplier technical bulletins. A few is in written form, and what does exist, is not easily accessible to others needing the knowledge.

In this study, many chemical technology courses are analysed for incorporation in a flexible curriculum in a traditional chemistry vocational school degree. The courses should prepare future chemistry education and learning for their possible incorporation in working life and industry giving students a far superior technical base than that normally obtained last experiments.

Keywords: *chemistry, chemical technology, Industry*

Introduction

In last years, an interesting expansion in chemical information with the promise that chemistry may bring positive and meaningful changes in the society and solve the problems that they turned out in this century. This situation is be possible if the chemical industry succeeds in promoting inventions from the laboratory into new products in the marketing sector. The future chemist will need to have obtained the technical skills to successfully undertake the new challenges that expected for new technological life (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012). Main point for all the necessity is the formation of the chemistry graduate or technical education which presently continues to lack the necessary technical suitability for this area.

Wei (2008) stayed that chemistry has always been considered as the basic locomotive for innovation and developments in science area. According to him, the European chemical industry will need support from the governing bodies in order to achieve the continent's future growth, competitiveness and green world targets in the environment of imminent worldwide recession. Industrial chemists studied little time doing science and they need exhaustive background knowledge (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018; Lawton, 1997). He noted that "chemistry departments are very good at teaching students to do scientific experiments; they also produce graduates with wide chemical knowledge. So, many graduates leave college feeling that their course has failed to prepare them for work".

The chemical community in Europe is represented by five organizations, which promote in complementary ways chemical sciences and technologies in areas of basic and applied research, and education and training (Alkan at all, 2009; Durak at all, 2015; Genel at all, 2016; Genel at all, 2013; Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Matris and Prashars 2015). This teamwork stayed that the organizations have come together to create the Alliance for Chemical Sciences and Technologies to coordinate their activities to promote chemistry and chemical engineering. Also, they underlined that to save our chemical education we must accept that we are all if we can collaborate with a single purpose. Another perspective about this situation is stayed by Clifford (1997) that "Technology will not replace teachers, but teachers who use technology will replace the teachers who do not".

Chemistry in Vocational Schools

The Chemistry in vocational school of European countries has been setup by the European Chemistry Thematic Network Association to determine reference points on an international basis and guarantee quality for chemical

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degrees in all countries (http://www.ectn-assoc.org). In this program, chemical technology is classified as a semi optional course. The many competences could be further enhanced by teaching the traditional subject.
Chemistry undergraduates and vocational school level need to add in their programs industry-oriented modules offered by chemical engineering departments. Another approach proposed by Whitfied (2012) that was to attract experienced industrial chemists to teach at universities and vocational schools for short periods. In this method, students can also be made aware that they can develop skills outside their university or vocational schools.
Matris and Prasharş (2015) gave a view that the reference in an environmental application of chemistry to real everyday problems and constitutes the best educational example: they stayed that it will surely attract the student's attention and give applicability to the supplied knowledge. Lecturers could add more practical elements to theoretical courses.

The Role of The Technology in the Chemistry Courses
Translating a scientific idea into a production-scale process needs an understanding of underlying chemical processes, conceptual ways of the concepts and an awareness of related areas such as environmental issues, equipment, control systems and other connected sectors (Kucuk at all, 2005; Genel at all, 2012; Sener at all, 2010; Yesilyurt at all; 2005; Mills, 2002). Mills also stayed that the business implications and timescale of each project also need to be considered as a basic component. According to Mills skills and abilities of students are often developed in hands, especially in vocational schools, on experience in industry rather than through formal study and this will surely be supported and enhanced by understanding of chemical technology.
Scientists and engineers in the chemical departments cannot continue to exist and work in a single discipline or at one functional area (Whitfied, 2012). He underlined that chemists should be more flexible, operating at a multidisciplinary interface to create new production. Matris and Prasharş (2015 presented some examples for technology applications in vocational school chemistry courses;

- One of the applications of thermodynamics principles is in the heat balance of a process which is of economic importance
- When examining the kinetics of a chemical change, the teaching of the principles of chemical reactors would certainly be helpful
- An exothermic chemical reaction, if conducted in a comparatively large catalytic packed bed needs care to be taken to avoid explosion. Alternatively, multistage systems may be used with appropriate heat exchange
- The efficiency of gas-liquid mass transfer depends to a large extent on the bubble behavior in the medium that must be examined
- The hydrodynamic effects are studied mainly with animal cells, because of the turbulent shear damage while mixing
- There is a difference in the production of one gram of a substance and a few tons of the same material.

Chemistry Curriculum with Chemical Technology
An efficient chemistry curriculum with chemical technology content was proposed by Matris and Prashar (2015). The main line of the program;

A. Part of the core course:
   - Introductory principles of chemical technology; 5 ECTS, i.e. one hour theory, two hours tutorial and one hour laboratory (this course to be pre-requisite for advanced chemical technological subjects), with proposed content:
     Measurements and calculations in chemical technology, data processing and diagrams, systems of units and their conversion, mass and heat balances, fundamentals of fluid flow and heat transfer, introduction to physical processes and process selection, porous materials and catalysis, treatment and use of water in the chemical industry, health and security issues; certain laboratory exercises for the above.
B. Semi-optional course:
   - Separation processes; 10 ECTS, i.e. 2 hours theory, 3 hours tutorial and two hours laboratory, with proposed content:
     Study of the main separation techniques (unit operations), distillation, solvent extraction, leaching, gas adsorption, size reduction, filtration, sedimentation, sorption, cooling tower, drying, crystallization, etc.; tutorial and laboratory exercises on the above.
C. Optional courses:

- Chemical processes: Principles of chemical kinetics and thermodynamics, batch reactor, ideal continuous chemical reactors and their design, simple and multiple chemical reactions, recycle reactor, heterogeneous reactions, effects of temperature and pressure, solid catalyzed reactions, packed bed reactors.
- Bioprocesses: Applications to biological systems of mass and heat balances, and transport phenomena (fluid flow and mixing, heat and mass transfer), kinetics, downstream processing and separations, bioreactors.
- Advanced chemical technology: Elements of chemical drawing for chemists, flowsheets, energy requirements of physical and chemical processes, renewable energy sources and heat recovery, process evaluation, cost estimation and evaluation, University-Industry relations.

D. Other possible chemical technology optional courses:
   - Transport phenomena
   - Industrial organic chemistry
   - Industrial processes
   - Organic chemical technology
   - Polymers technology
   - Environmental chemistry
   - Environmental pollution control
   - Conservation of food
   - Materials technology
   - Nanotechnology
   - Applied electrochemistry
   - Biotechnology
   - Green chemistry

Conclusions

Chemistry is usually referred to as “the central science” due to its interconnectedness with other fields as science, technology, engineering, and math fields (STEM). Chemistry and the language of chemists play important roles in biology, medicine, materials science, forensics, environmental science, and many other fields of science
In the developing world by the effect of technology, chemistry graduate or application studies in vocational schools needs many abilities and multiple functional perspectives in order to struggle with the new challenges of the modern society. We believe that chemical technology has key role to accomplish this target. Finally, chemistry curriculum study in vocational schools is necessary to change the situation.

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DEFINING CLOUD COMPUTING AND SETTING UP YOUR OWN CLOUD COMPUTING SERVER / CLIENT SYSTEM*

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Abstract: With the development of computing technologies that have been at many points in our lives, cloud computing technology has begun to be used in a wide range of environments from a portable computer to a server computer. Accessibility is easy, cloud computing is at the top of the reasons for preference. Big companies in information technology (Microsoft, Google etc.) are leading the cloud computing services. It is thought that the installation of the cloud computing system is a big financial budget. However, a cloud computing system can be installed even in our home or office computers.

Accessibility is easy, cloud computing is at the top of the reasons for preference. Cloud computing facilitate access to data greatly. However, it should be known that the data are collected on the servers of the cloud computing service provider. In terms of importance, more or less important data are stored in cloud computing servers. It is important not to forget that in the event of a corruption of trust relations it will have serious results.

The aim of this work is to explain the installation steps of our own cloud computing server and client system on a virtual or real server system. It is to explain that a cloud computing system is easily installable. A cloud computing system can be set up in short steps and at low cost. In this way, contributed to the growth of national software works. The data is stored in cloud computing servers, one or more national and reliable institutions.

Keywords: *Cloud Computing, Server, Linux Operating System, Open Source Software, OwnCloud, Cyber Security*

Introduction

1. Cloud Computing System

While it is not known exactly when the term cloud computing is known (Estimated 1950s), this concept is the most generic name given to the Internet-based information services that can be shared among users by using the server computers and similar devices connected to the Internet. It is about the provision of services to be taken by using software at minimum level without the need for service infrastructure by the user (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). Cloud computing provides services based on three basic models. These are Software as a Service, Platform as a Service, Infrastructure as a Service.

With cloud computing, data, applications and many other information services are stored in the server systems of the provider or organization (Abut and Akca; 1988; Asadi at all, 2011a; Asadi at all, 2011b; Asadi at all, 2011c). Ease of use is one of the great benefits. Google Drive, Microsoft OneDrive, cloud services are the obvious. With mobile, tablet, laptop or desktop computer access, data can be accessed continuously wherever an Internet connection is available. While cloud computing has good sides, it also has bad sides (Aydin at all, 2017; Kocaman and Abut, 2015; 2015; Kocaman, 2013). The presence of data in a server system that is unaware of the user can lead to unpredictable results if the trust agreement is compromised. For example, cloud computing is one of the

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bad results that the country has cut off its support on a country or company basis. In terms of security, countries must have their own cloud computing server systems.

Advantages;

Variable cost instead of capital investment: Instead of making large investments in data centers and servers that you don't know how to use, you can only pay for the resources it uses and the time you use it.

Benefit from the advantages of large-scale use: You can benefit from low usage costs that you cannot reach yourself by using cloud computing. With hundreds of thousands of customers in the cloud, large service providers can reach more affordable costs on large scales, which reduces pay as you go.

Stop capacity estimation: Stop anticipating the capacity needs of your infrastructure. If you determine the capacity before you distribute the application, you may have to pay high wages for the resources you have paid, or you may have to manage with insufficient capacity. Cloud computing eliminates these problems. You can access the desired size of resources and increase or decrease the scale as required by just a few minutes in advance.

Get faster and more agile: In the cloud computing environment, new IT resources are just a click away. This allows you to reduce the time it takes to deliver these resources to software developers from a few weeks to a few minutes. This significantly increases the agility of the organization as it pulls down the costs and time required for testing and development.

Stop running data centers and spending money on maintenance: Focus on projects that will make a difference for your business, not infrastructure. With cloud computing, you can focus on your customers rather than server staging, editing, and infrastructure provisioning.

Turn to the world in minutes: Deploy your app to different regions around the world in just a few clicks. This allows you to easily and cost-effectively reduce latency and offer a better experience to your customers.

Disadvantages;

Security: Cloud companies are becoming an open target for attackers because many companies or customers receive service. The cloud computing firm must maximize its security level.

Privacy: The firm or customers receiving services from the Cloud Computing Company register their data on the server computers. These data should not be available to unauthorized persons.

Continuity: The service provided by the cloud computing company should be continuous. Any interruption in service will affect the workflow of all customers.

1.1. Cloud Computing Service Models

Software as a Service (SaaS): A software deployment model that hosts software (SaaS) as a service and delivers them to users over the Internet. It also includes the application of services over the cloud. For example, the Microsoft Office application runs online through the cloud.

Platform as a Service (PaaS): The platform as a Service (PaaS) is a complete cloud computing environment for development and deployment that includes resources that allow us to distribute everything from simple-based applications to cloud-enabled advanced enterprise applications. However, we can purchase the resources we need from a cloud service provider based on the price you pay, and access resources through a reliable Internet connection.

Infrastructure as a Service (IaaS): Infrastructure as a Service (IaaS) is an instant data processing infrastructure provided and managed over the Internet. IaaS supports our cost and complexity of purchasing and managing our own physical servers and other data center infrastructure. Each resource is offered as a separate service component, so we can only rent what we need and for the time required.

Figure 1: SaaS

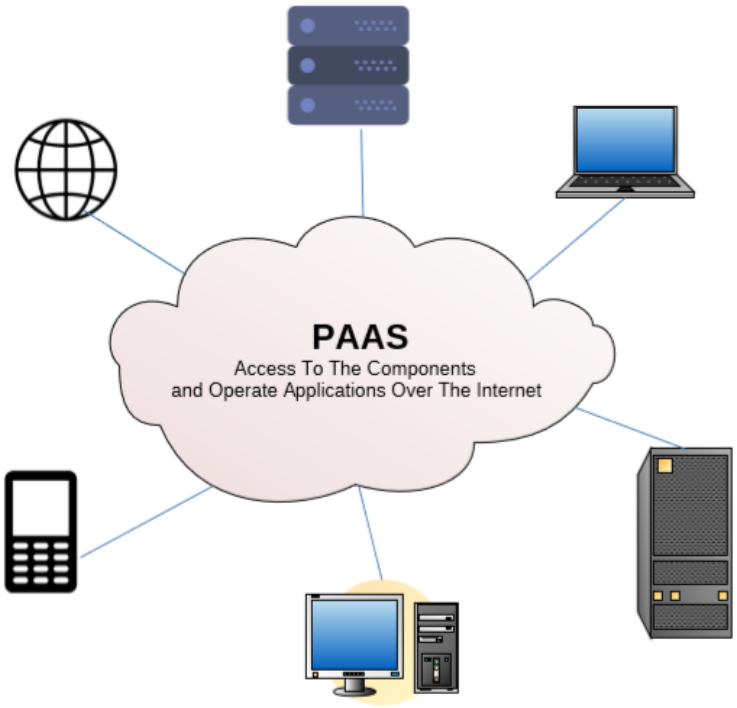

Figure 2: PaaS

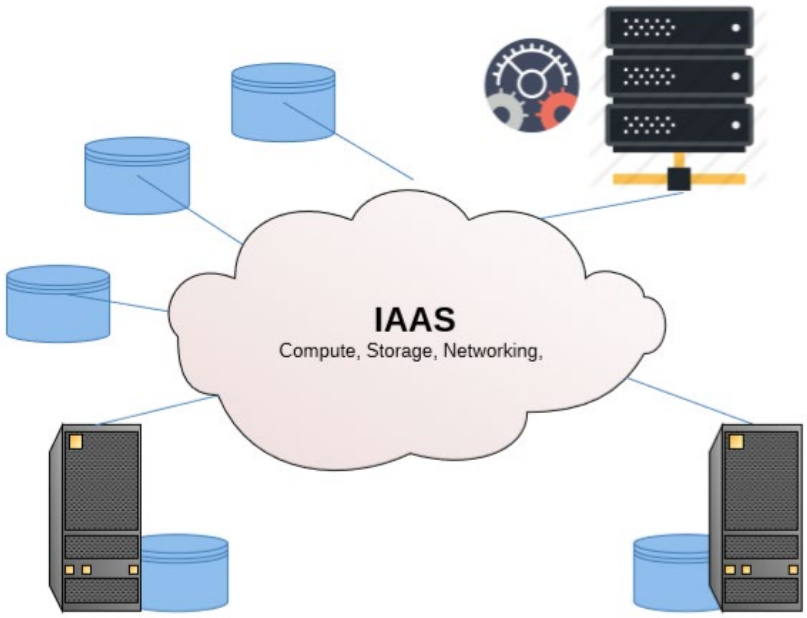

Figure 3: IaaS

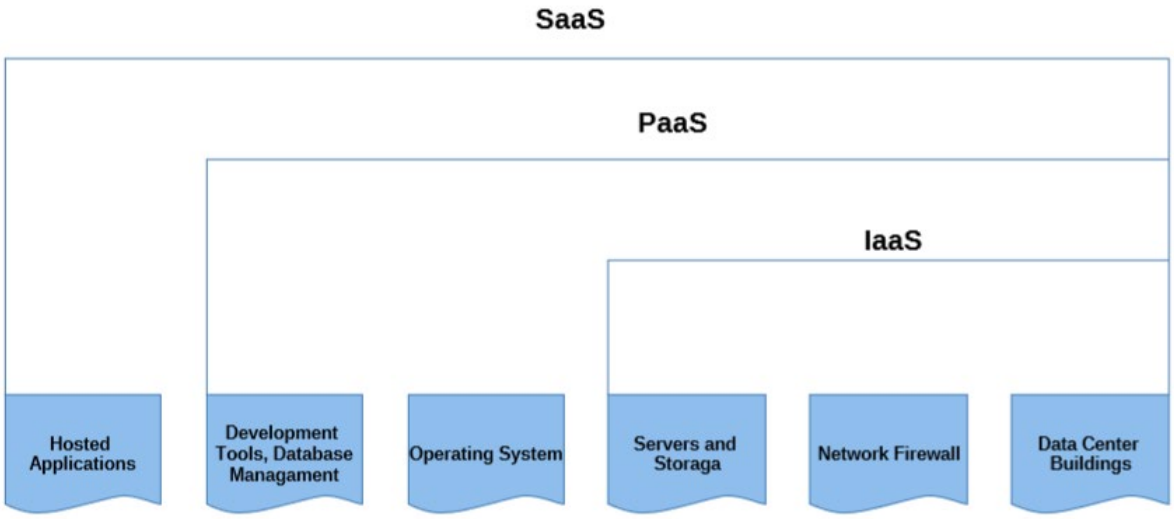

Figure 4: Cloud Computing service models

2. Cloud Computing Server Installation

We can turn a Linux-based computer into a cloud computing server. A cloud computing system can be prepared with ownCloud, which is open source and free. Official site is www.owncloud.org. ownCloud is the most simple way to file or document share data. With ownCloud all your data is where ever you are; accessible desktop or mobile devices, any time. You can install ownCloud Community edition.

ownCloud required one of them Linux distributions.

- Centos Linux 6 and 7
- Debian 7 and 8
- Fedora 27 and 28
- Red Hat Enterprise Linux 6 and 7
- SUSE Linux Enterprise Server 12 with SP1, SP2 and SP3
- openSUSE Tumbleweed and Leap 15.0, 42.3

- Ubuntu 16.04 and 18.04

It required Apache 2.4 Web server and Php 5.6 or above. Database can be one of them;

- MySQL or MariaDB 5.5+
- Oracle 11g
- PostgreSQL
- SQLite

We will use Ubuntu 16.04 Linux to install ownCloud.

ownCloud installation steps on Ubuntu 16.04 are below;

Step 1: Apache2 Install (Web Server)

sudo apt install apache2

After Apache2 installation run this command

sudo sed -i "s/Options Indexes FollowSymLinks/Options FollowSymLinks/" /etc/apache2/apache2.conf

Next run commands

sudo systemctl stop apache2.service
sudo systemctl start apache2.service
sudo systemctl enable apache2.service

Step 2: MariaDB Install (Database)

ownCloud requires a database server software.
Run this command

sudo apt-get install mariadb-server mariadb-client

After MariaDB installation run this command

sudo systemctl stop mysql.service
sudo systemctl start mysql.service
sudo systemctl enable mysql.service

After that, run the commands below to give security information of MariaDB server.

sudo mysql_secure_installation

Give database password and other informations.

Run with this command to start database server

sudo systemctl restart mysql.service

Step 3: Php and related modules install

PHP 7.1 isn't available on Ubuntu default repositories. In order to install it, you will have to get it from third-party repositories.

Run the commands below to add the below third-party repository to upgrade to PHP 7.1

sudo apt-get install software-properties-common
sudo add-apt-repository ppa:ondrej/php

Then current Php upgrade to PHP 7.1
sudo apt update

Run these commands install PHP 7.1 and related modules.

sudo apt install php7.1 libapache2-mod-php7.1 php7.1-common libapache2-mod-php7.1 php7.1-mbstring php7.1-xmlrpc php7.1-soap php7.1-apcu php7.1-smbclient php7.1-ldap php7.1-redis php7.1-gd php7.1-xml php7.1-intl php7.1-json php7.1-imagick php7.1-mysql php7.1-cli php7.1-mcrypt php7.1-ldap php7.1-zip php7.1-curl

After install Php 7.1 edit config file with nano

sudo nano /etc/php/7.1/apache2/php.ini

Then make the change the following lines below in the file and save.

file_uploads = On
allow_url_fopen = On
memory_limit = 256M
upload_max_filesize = 64M
max_execution_time = 360

Step 4: Create your OwnCloud Database

Now that you've install all the packages that are required, continue below to start configuring the servers. First run the commands below to create OwnCloud database.

Run the commands below to logon to the database server. When prompted for a password, type the root password you created above. You will open MariaDB command console.

sudo mysql -u root -p

Then create "owncloud" database. Database name is owncloud

CREATE DATABASE owncloud;

Create a database user called "owncloud user" with new password. Example : own12345

CREATE USER 'owncloud user'@'localhost' IDENTIFIED BY ' own12345*';*

Then grant the user full access to the database.

GRANT ALL ON owncloud. TO 'owncloud user'@'localhost' IDENTIFIED BY 'own12345' WITH GRANT OPTION;*

Save your changes and exit

FLUSH PRIVILEGES;
EXIT;

Step 5: Download OwnCloud Latest version

Download OwnCloud free copy latest release from site to /tmp folder. The community edition will be download. It may take some time according to your internet speed.

cd /tmp && wget https://download.owncloud.org/community/owncloud-10.0.3.zip

Unzip downloaded zip file. If unzip command not found then install unzip. (sudo apt-get install unzip)

unzip owncloud-10.0.3.zip

Move folder new location

sudo mv owncloud /var/www/html/owncloud/

Then run these commands below to set the correct permissions for OwnCloud to function.

sudo chown -R www-data:www-data /var/www/html/owncloud/
sudo chmod -R 755 /var/www/html/owncloud/

Step 6: Apache2 configure

Configure your Apahce2 site configuration file for OwnCloud. This file will control how users access OwnCloud content. Run the commands below to create a new configuration file called owncloud.conf

sudo nano /etc/apache2/sites-available/owncloud.conf

Then copy and paste below content

```
<VirtualHost *:80>
    ServerAdmin admin@your_domain_name.com
    DocumentRoot /var/www/html/owncloud/
    ServerName your_domain_name.com
    ServerAlias your_domain_name.com

    Alias /owncloud "/var/www/html/owncloud/"

    <Directory /var/www/html/owncloud/>
      Options +FollowSymlinks
      AllowOverride All
      Require all granted
        <IfModule mod_dav.c>
          Dav off
        </IfModule>
      SetEnv HOME /var/www/html/owncloud
      SetEnv HTTP_HOME /var/www/html/owncloud
    </Directory>

    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined

</VirtualHost>
```

Step 7: Rewrite Module and Enable the OwnCloud

After configuring the VirtualHost above, enable it by running the commands below

sudo a2ensite owncloud.conf
sudo a2enmod rewrite
sudo a2enmod headers
sudo a2enmod env
sudo a2enmod dir
sudo a2enmod mime

Step 8 : Reload Apache2

We're reloading the Apache2 service for the changes to take effect.

sudo systemctl restart apache2.service

The installation can now be started for your ownCloud. An SSL certificate can be created with LET'ENCRYPT if you wish.

Open your web browser and open url
http://your_ip_addres_or_domain_name or
http://your_ip_addres_or_domain_name/owncloud

ownCloud installation screen will be seem.

Figure 5: ownCloud installation screen

After installation open ownCloud url on your web browser.

Figure 6 : ownCloud login page

After login ownCloud administration page will be open.

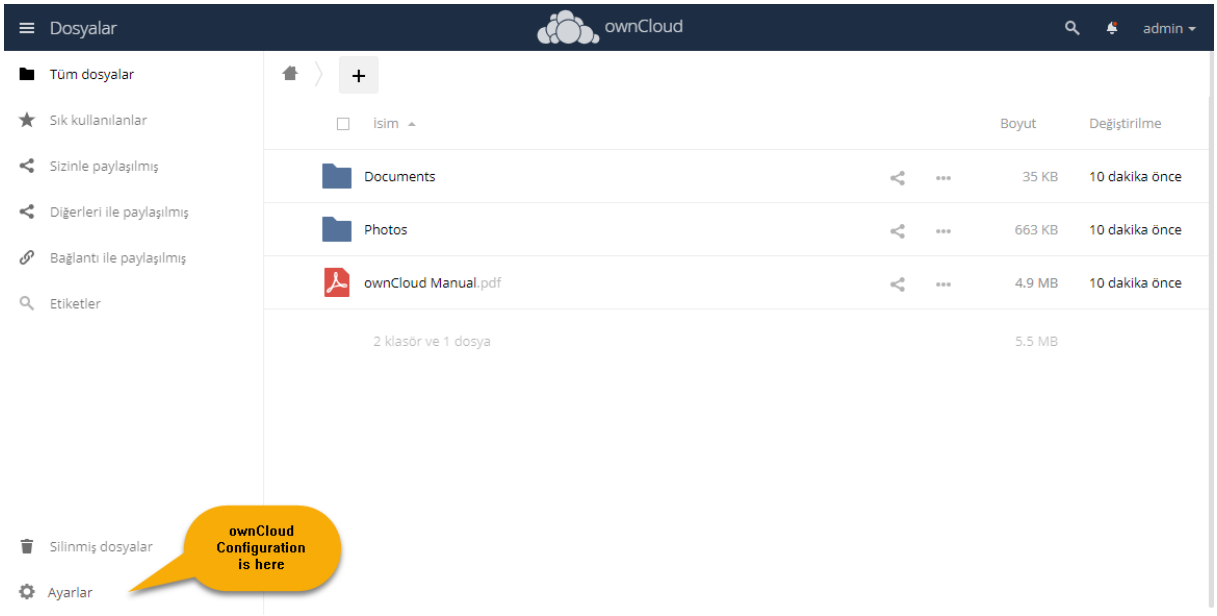

Figure : ownCloud main page

Conclusions

With the ownCloud system, small or medium sized companies can install their own cloud systems. It is enough to install the public version on their servers. In this way, they can share their files securely. Files can only be accessed from their network. The philosophy of general public license (GPL) responds to many needs without paying any price. ownCloud system is one of them. There is always no need to pay a large amount for a good information system. Sometimes a free software can do a lot more work. In a few steps as described above, we were able to establish our own cloud computing system.

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ENERGY AND ECONOMY: TECHNOLOGY AND DIFISSION*

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Abstract. The link between economic growth and energy consumption is key to energy policies. It is recognised that energy consumption and economic growth are directly related, but the direction and level of this relationship is not always clear. It is a changeable factor when a country's economic growth stimulates energy consumption. And, the related components are not always the same when increased energy consumption of a country promote its economic growth. An increasing share of renewable energy in the energy mix of a country can provide meet the growing future demand for energy while influencing economic development. Renewable energy sources can increase diversity of energy sources, contribute to energy security and to the long-term availability of energy supply. Renewable energy sources are the main factor to promote regional development. They can be used in less developed areas without conventional energy sources. Finally, renewable energy could reduce costs associated with climate change.

The basic factors of energy demand are economic activity, population, and technology. Longer-term trends in economic growth for a particular economy depend on underlying productivity trends, which in turn reflect population growth, productivity growth and capital accumulation. It is well-known reality that countries' energy needs, and superiorities change. The evolution of demand at different stages of economic development changes. The composition of economic activities changes with energy intensity tending to decline over time. The general approach is to adopt more efficient technologies for the provision of energy services.

Keywords: *energy, economy, finance, renewable energy*

Introduction

The energy system is planned by the demand for energy services. This mean that it is driven by population and demographic trends, by the level of economic activity and income, and by technological and structural changes. Energy is not an end but rather the means for providing energy services (Arthur, 2009). According to Arthur, providing energy services involves investment, operating costs and fuel costs. Espey (1998) stayed that the economy is also the financier of energy systems and of its components and energy flows. He focused the determination of energy level which help to economies need to function smoothly and to support the social developments.

Serious attention to incorporating energy efficient technologies has the critical potential to address the major energy related challenges addressed (Goldemberg et al., 1985). They pointed out that the evolving energy system characterizes technology change and innovation. Technology is the crucial subject between the energy system and the economy, especially the 21th century economy. Energy and economy are a partner group that technology defines which energy carriers and services the system can provide and which the economy can demand (Ekholm at all., 2010). They noted that the industrial revolution was supported by coal, which provided industries with a much more concentrated fuel. So, this turned out to be a higher productivity with respect to wood fuels and which boosted economic progress and urbanization. According to them, abundant access to coal increased productivity and stimulated economic development in the nineteenth century. Access to modern forms of energy or rather secure, clean, affordable energy carriers fundamentally defines the modern economy in this century.

Electricity is most compatible with the needs of the modern economy. It is more than an energy carrier in the strict physical sense (Modi et al., 2005). They noted that electricity enables all kinds of transactions: from information exchange to transportation. The factors contributing to income disparities within and between countries can be traced to many reasons that vary across countries. According to us, a lack of access to modern energy carriers and services is one of these contributing factors. Tomlinson at all., (2008) pointed out that providing access to energy services involves the conversion of primary energy resources and construction of required technologies. The

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activities take material from the environment and inevitably split them into desirable products and wastes of various forms. They added that these came back to the environment, increasingly at levels beyond the carrying capacities of ecosystems, and threatens to have environmental damages.
The demands of a changing energy paradigm have many institutional implications (UNDESA, 2011). The institutions constructed over the past several decades are struggling to remain relevant in the face of profound economic changes. Another words, new institutional frameworks more suited to the needs of today are urgently needed. These institutions would need to support the delivery on the goals of access to affordable modern energy carriers, energy security, climate change and environment. According to us, the required energy system transformation will be difficult to accomplish without some transformation of the world economy: a process that will be complex and characterized by marked clashes of interest. This transformation will require a broad vision and sustained cooperation among a large array of diverse stakeholders at both the national and international level.

Technology and Diffusion

The Intergovernmental Panel on Climate Change have also called for reductions of 50% or greater in global greenhouse gas emissions to keep the concentration of these gases below 450 ppm (IPCC, 2007). According to the International Energy Agency, achieving this objective would need "major improvements in efficiency and rapid switching to renewables and other low carbon technologies, such as carbon capture and storage" and "deployment and development of technologies still under development, whose progress and ultimate success are hard to predict" (IEA, 2008). For this aim, it is noted that "if achievable, would certainly be unprecedented in scale and speed of deployment". Moreover, The World Bank pointed out that that addressing climate change "it requires widespread diffusion of renewable energy technologies and breakthroughs in technologies from batteries to carbon capture and storage" (World Bank, 2010). From all these approaches, we can say that there is a general recognition that new technologies will need to be developed for a transition to a less energy-intensive and emissions intensive world.
According to the data World Bank (2010), the energy-related figures pale in comparison to estimates of required research and development (R&D) expenditures in the order of US$100–700 billion a year. Also, within the OECD, Japan spends 0.08% of GDP on R&D, compared with the 0.03% of GDP average for the high- and upper middle-income members of the OECD. Weiss and Bonvillian (2009) pointed out that total energy R&D now accounts for less than 1% of the annual revenues of the US energy sector. They suggest several explanations for this situation:

- deregulation of energy markets, which has increased competition in discretionary expenditures, including R&D,
- an extended period of relatively low energy prices,
- a mature and cost-competitive sector, which has generally tended to potential competitors.

Rogner (2010) stayed that the process of technology deployment and adoption is widely seen as the technical aspects and performance of some piece of equipment. According to us, this is especially true in developing countries, where many factors influence technology adoption and where capacity building will be crucial to enable developing countries to adopt new technologies. Rogner underlined that technology diffusion then covers the process of understanding, using, and replicating technologies, adapting them to local conditions and integrating them with other technologies. The increasing importance of investment flows to promote technology is the focus of current research to promote climate-friendly development (Tomlinson et al., 2008). Most of the global investment and technology diffusion take places via the private sector in the form of corporate R&D.
Research studies assessing technology transfer and diffusion in developing countries have noted that openness to trade is a necessary prerequisite for successful transfer (O'Neill at all., 2010). One of basic factor for facilitating technology transfer to relate easily to the incentives for private firms is intellectual property rights. They defined intellectual property rights as that stimulate technology transfer from abroad, licensing new technologies, and investing in domestic enterprises abroad.
The World Bank (2010) assigns a role for high-income countries in ensuring that:

- excessive industry consolidation in the renewable energy sectors does not reduce incentives to license technology to developing countries,
- national policies do not prevent foreign firms from licensing publicly funded research for clean technologies of global importance,
- the transfer and innovation of clean technologies are considered in international treaties such as those of the World Trade Organization.

The importance of the R&D effort for developing new low-emissions technologies proposes that there is an ongoing role for government in this area The role of countries is extends beyond energy R&D (Riahi at all., 2007):

- in general support for knowledge creation mean that education, support for international science and technology cooperation,
- in supporting applied energy technology R&D via direct public R&D expenditures and creating and maintaining appropriate incentives,

- creating favorable market deployment incentives and removing existing barriers for the adoption of cleaner energy technologies.

Investments in Energy

Investments are important for energy resource extraction, energy conversion to usable fuels, transmission and distribution systems (Taylor at all., 2008). According to them, here are two major categories of investments:

1. investment in the expansion of technologies and infrastructures under competitive or regulated market conditions,
2. investment in innovation, development, and commercialization, including market formation.

While the first category is important for supporting energy system growth: from mobilizing upstream exploration and resource extraction to energy conversion and supporting access to energy services. They noted that the second category is also dependent on policy support, especially market formation. It is a general approach that market formation investments include public and private investments in the early stages of technological diffusion. We know that these investments include policies with respect to certain technologies and public procurement. They also include private investments that may take advantage of markets created by government policies, such as renewable performance standards or price instruments(Taylor at all., 2008).

Markandya at all. (2010) stayed that market-formation investments in the energy sector and the ways of measuring market-formation investments are not yet synchronised internationally. They also noted that investment in infrastructure growth and innovation are interlinked. In this position, investment in innovation is a prerequisite for the development of improved and better-performing technologies and processes. According to Markandya and his friends, using the natural rate of capital turnover for the introduction of innovative technologies has lower transaction costs. Energy sector investment time horizons are long-term strategies (Lutz at all., 2010): investments are made over periods of up to fifteen years before the first revenues are received, and capacities are built to last for 15–60 years and more. They also pointed out that the long lifetime of energy sector capital means a slow turnover of its capital stock.

Nationalistic policy solutions focusing on the short is operating without a global vision such as of energy system transformation or a global international environmental agreement (Markandya at all., 2010). So, the risk premium on such investment lead to higher energy prices until additional investment is forthcoming. They stayed that the share of capital formation allocated to the energy sector is estimated at about 4–8% of total investment. This excludes energy-related investments at the end use of the energy system such as buildings, heating systems, cars, refrigerators. The meaning of that are delivering the energy services that consumers demand.

These are complex, integrated technological systems with energy conversion technologies at their core (Wang at all., 2008). These energy-conversion components are configured within their corresponding technological system to allow a useful service to intermediate users such as fuel distributors, pipeline and shipping companies. Wang and his friend added that the demand-side analogues are the aircraft, vehicle, refrigerator and home heating systems. Each of these technological systems similarly has an energy conversion technology at its core such as the jet engine, internal combustion engine, compressor and refrigerator. According to Wang and his friend, each of them is configured to provide a useful service to customers.

Investments and performance of end-use technologies are dependent on investments in associated infrastructure, such as airports, roads, and buildings (Taylor at all., 2008). According to Taylor and his friends, it can be meaningful to quantify the investment cost of a home heating system without quantifying the investment cost of the home and the insulation level that determine the dimensioning of the home heating system in the first place. The end-use technology able to consider the furnace or the building. In this stage, we think that the problem on the demand side is that the same approach would result in a sum of the total investment costs in all building structures, roads, railways, airports, industrial machinery and equipment. Also, Taylor's study team underlined that a pragmatic pathway out of this system boundary ambiguity is to provide a range of estimates for a range of system boundaries of energy end-use technologies.

Result

Energy is not an end in itself but a prerequisite for economic development including and for the achievement of growth. Energy is vital for the necessary transition to a more equitable and sustainable world and one where all have access to the energy services required for comfort and for a secure livelihood. Energy service demand is a function of population and income, as well as technology. More affluence may lead to a demand for more energy intensive services and it could lead to a demand for cleaner energy carriers.

A powerful economy is necessary to ensure that the energy demands are met. The investments and infrastructure work are carried out and that resources to meet the needs and requirements for a sustainable future. Finally, most clean technologies are capital-intensive. But, they also lower energy demand and fuel consumption. Proper incentives and financial schemes to promote their development are essential.

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GROUP EXPLORER IN ABSTRACT ALGEBRA: VISUALIZATION ON A_4 AND ITS EFFECTS IN THE CLASS*

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Abstract. Group Explorer can be used to make easy teaching and learning of the abstract algebra. In this paper, we used a famous group A_4 to check whether it is an abelian group or not, but some of the more difficult concepts can be illustrated to make lecture presentation more colorful. Then, we explore the student's idea to understand to positive effect of this application.
The visual nature of Group Explorer in representing concepts in group theory is a good helper to use this software in the classroom. Twenty-two participants in an undergraduate course taking Abstract algebra lecture were surveyed regarding their experiences using Group Explorer. For the effect of this application, all participants believed that the A_4 group explorer with visualization was beneficial to their learning and described their attitudes regarding the software in terms of using the technology.
Keywords: *Visualization, group theory, Group Explorer, abstract algebra, perceptions, technology*

Introduction

One of the most important features in the teaching and learning of abstract algebra in universities is students' difficulty in weak points of the abstract nature of the course and its concepts. Many researchers have determined the ways to teach these concepts (Dubinsky, Dautermann, Leron & Zazkis, 1994; Hazzan, 1999 and Edwards & Brenton, 1999) with most of the attention with how students concretely to understand the concepts such as groups, subgroups, and quotient groups.
We remember that normal subgroups and quotient groups have near relation. Using this relation, we describe a visualization with the dynamic nature of *Group Explorer* that can help the student's concrete understanding of what a quotient group is. We manipulate an ordinary Cayley diagram of the group A_4 into a more useful diagram for visualizing the quotient of A_4 by a subgroup isomorphic to V_4, the Klein 4-group, which is isomorphic to $\boldsymbol{Z}_2 \times \boldsymbol{Z}_2$.
Before the course, our students learned normal subgroups, and our aim is illustrating the concepts, to give students some visual intuition to associate with this concept. We shortly remember that, normal subgroups are those subgroups that allow you to form a quotient group; that is, H is a normal subgroup of G just when you can form a quotient group G/H.
If instructors consider using this tutorial in class, they might want to ensure that their students know that A_4 has a normal subgroup H isomorphic to V_4 ($H \cong .V_4$). In fact, they may get the students to discover this by assigning them the task of drawing a subgroup lattice for A_4, and identifying which subgroups are normal. In this point, the "effective" feature of *Group Explorer*'s views can be used by students to help them find and identify normal subgroups.

The lecture Details

In this lecture, we are using a nice visualization of A_4 fashioned by Carter and Emmons (2005). They presented their visualization step by step as below;

1. Let's begin by opening the rectangular Cayley diagram for A_4: your diagram should look like figure1. We aimed *Group Explorer* to arrange the lines in a rectangle.

* A brief version of this article presented at ISTEC 2018

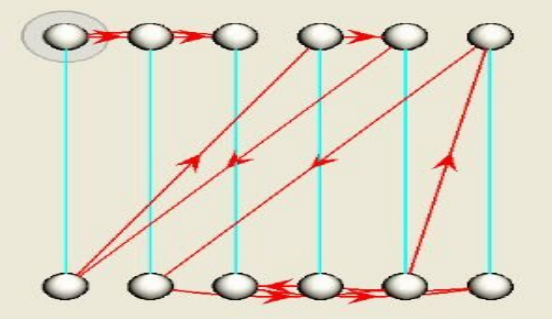

Figure 1: rectangular Cayley diagram for A_4

2. We confirm this diagram to organize it around the subgroup isomorphic to V_4. The portion of the Cayley Diagram window that corresponds to the definition of H look like figure 2. And, we switch over to the tab so that we will use of the subgroup H (figure 3).

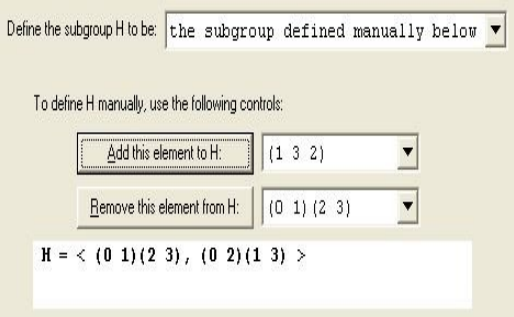

Figure 2. Actions to show an order-4 subgroup

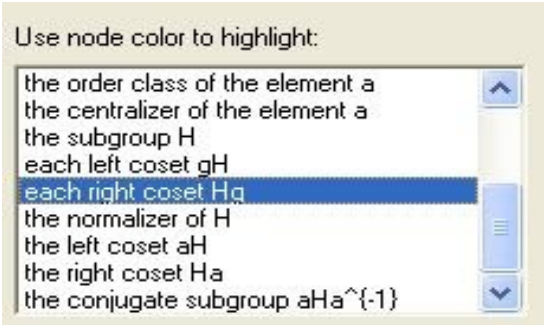

Figure 3. Finding of the right cosets of H

3. Finding cosets of Subgroup. three distinct classes. Three distinct classes by color, each color representing a right coset Hg of the subgroup H in A_4 (figure 4).

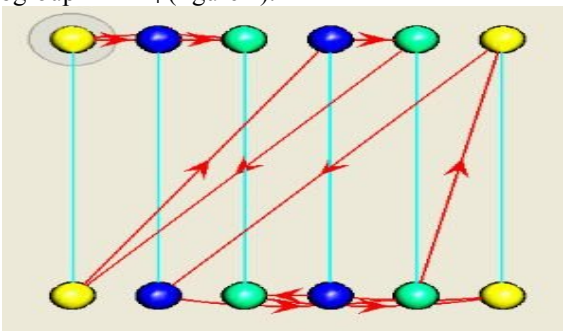

Figure 4. Cosets of A_4

4. We, now, exhibit separately the structure of the group with respect to these cosets. For this aim, we rearrange the diagram according to our colorization (figure 5).

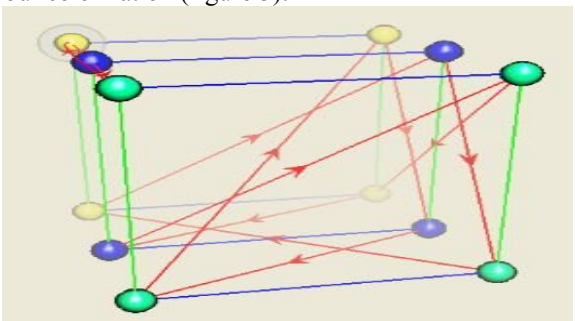

Figure 5. 3-dimensional shape of cosets.

5. Let's exhibit our cosets in columns views: Cosets are still a bit difficult to see as figure 4. For this aim, we spin this shape a bit to the right, then, we line up in our view in columns (figure 6).

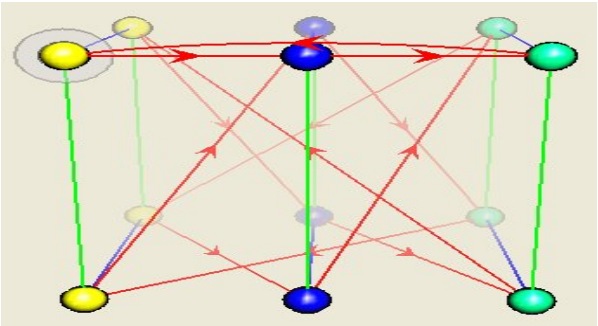

Figure 6. Column view of the cosets.

6. we see the quotient group structure of A_4 more clearly. For this reason, we choose a different assignment of axes (figure 7).

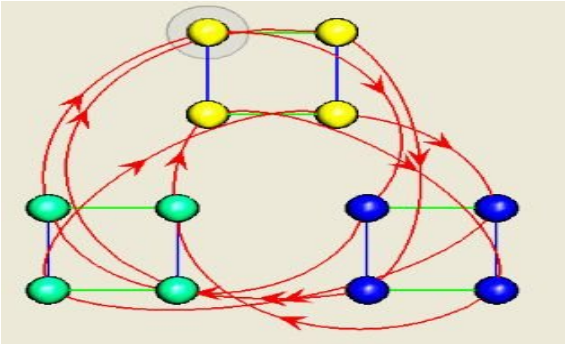

Figure 7. A planar representation of Cosets

Our Student's Views

At the end of the 3-hours lectures, the students were surveyed about their experiences with the software and technology in general, and their understanding of how to use the technology to answer specific questions about a few of the concepts mentioned above. Participants' descriptions of their likes and dislikes about Group Explorer were collected. Two categories of responses that emerged in describing what participants liked about Group Explorer were *Technology* and *Learning*. In the *Technology* category, participants referred to;

I. the ease of using the technology,
II. the easy access to group characteristics,
III. its dynamic capabilities.

"we tested how easy Group explorer was to understand and to use. It was useful that anything to know about groups. I didn't have my book to find the everything what I look for. Everything I want to find was on Group explorer" (Student 3).

"It is very nice to see visually what you were focusing to determine in class. It made it easier to see why certain rules are learning and why certain concepts refer to certain problems" (Students 7).

"I liked manipulating cosets of group A_4 Generating and highlighting cosets was also very entertaining and helpful". (Participant 12).

"before this course, it was boring for me to participate to Algebra course. But now, I turned out to a student who like the course, more familiar with a lot of the concept of the course" (Student20).

Conclusion

The results of this study show that students' ability was an important factor in determining concept understanding at the end of the course. Our lectures' method and effects to the students suggest that they were highly willing to follow the course and using Group Explorer. Almost all the students in this study identified with visual learning as a positive aspect of Group Explorer.

Technological tools in the mathematics classroom provide a more meaningful experience to the learner. We need the underlined the importance of visual representations heavily. Two powerful effect is that visualization is an important tool that helps students to organize their thinking, and good visualization can help teachers represent abstract concepts in a more concrete and simple way.

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HORIZONTAL BUILDING CONSTRUCTION I: RAPID CONSTRUCTION*

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Abstract. The construction industry is continuously seeking better and more efficient methods of design and construction. There has been a strong push for efficient methods in accommodating environmental requirements. The number of research activities in horizontal construction is large and growing. The potential of benefiting the horizontal construction world in the areas of construction-ready design documents and all-inclusive insurance policies are developing step by step.

Int this stud we pointed out the study for a construction project to meet the new challenges. We are focusing on the construction solution for an environment while integrating certain design parameters, creating least disturbance, applying modern construction engineering techniques and management to limit the structure erection.

Keywords: horizontal building construction, construction project, construction robotics

Introduction

It has been many discussions between the vertical construction industry and the horizontal construction industry showed that there is a major distinction, which is to a great extent related to the public sector-private sector divide (Yahya, M.A and Mohamad, M.I, 2011). The key points that affect the ability of the vertical construction industry and the horizontal construction industry to introduce innovation are the motivations and the regulations that drive and govern these two worlds, and they are basically different in point of project, design and construction.

In the primarily public horizontal construction industry, the typical motivation of the owner is to be a good keeper of the public funds (Kocaman and Abut, 2015; 2015; Kocaman, 2013). Because public funds are being spent, the prevailing legal framework requires the decomposition of the project delivery process into three phases – design, bid, and build – and contract award to the lowest bidder (Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). Risk is typically avoided by both owners and contractors, and there is an absence of visible rewards (Fu, X at all. 2012).

In this study, we are analysing three design parameters;

- farming resource utilization
- rapid construction
- on site, off site logistics

Of course, it is found difficult to fully integrate these parameters in a unique horizontal building construction. So, to show details of the parameters, we selected different construction models.

* A brief version of this article presented at ISTEC 2018

The first phase of the study, we focus on design criteria to meet the modern day needs of building construction in a city area. This includes the study of three design parameters and their applications. Then, we analyse the problems confronted to integrate these parameters in building construction. Finally, a new approach is presented for horizontal building construction.

Farming resource utilisation

This construction design encourages to make use of on-site available resources and harvesting the one' own farm at his location. Vertical farming is a good solution of farming to implement in metropolis. According to Arshad (2011), there are different options for this farming like aeroponics - process of growing plant in air or mist environment without soil, wall system -mounting panels to the wall with required quantity of water supply and hydroponics -growing plants using mineral nutrient solution. Arshad stayed that different technologies had implemented pertaining to the options like aero-farm, parabienta, verticop and omega garden (figure 3).

Figure 3. Vertical hydroponic design system to grow strawberries in Zimbabwe

(https://zimbabwebookproject.weebly.com/hydroponics-etc.html)

Rapid construction

Yahya and Mohamad (2011) noted that rapid construction is a design concept to improve efficiency of construction process flow by time restriction to ensure the successes of project delivery in a limited time of contract and meets customer satisfactions. They stressed that the rapid construction can be resulted on time through the basic principle focusing on eliminating waste.

The four pylons of spectacular mega bridge in Bankog, Industrial Ring Road, rise 173 m into the sky. For the realization, the ACS climbing system ensured rapid construction system. The PERI formwork solution with the ACS self-climbing system allowed efficient construction of the demanding pylon geometry with complicated three-dimensional intersections due to forward and reverse inclinations as well as tapering cross-sections along with chamfered edges.

The pylons were divided into 3 sections with complicated transition areas. The continuously adjustable brackets of the ACS V climbing system ensured horizontally-positioned platforms at all times for safe and ergonomic working operations (figure 5).

Figure 5. Mega bridge, industrial ring road in bankog ensured rapid construction system

(www.peri.co.th/projects/civil-engineering/mega-bridge-industrial-ring-road.html)

On-site & off-site logistics

Manufacturing processes characteristics similar production home building possesses as the construction of similar houses repeatedly and a growing demand for mass customisation of homes (Bashford at all., 2005). They pointed out that because of these similarities, larger constructers often try to view their production system as an assembly line process.

Just in time (JIT), a Japan grown management philosophy applied in practice since the early 1970s, is a management system and a production strategy that focuses to improve a business return on investment by eliminating in process inventory and associated carrying costs (Ashford, 2014). According to Ashford, "Just in time" inventory systems expose concealed cost of keeping inventory. The company must apply a new method to manage the consequences of the change at solving the problem (figure 7).

Figure 7. some companies using JIT applications from all over the world

(www.slideshare.net/RahulIyerMSEMechEngE/what-is-just-in-time-jit-manufacturing)

We can give the "Pit stops" application of Formula 1 for JIT. In Pit stops application, the many functions are performed to a racing vehicle in few seconds like refueling, tires change, repairs and mechanical adjustments. The age of the modern pit stop renewed when changes were made to the sporting regulations to allow fueling during the race. Later, By the time refueling was banned again, a driver's visit to the pits had become "breathtaking" in its speed and efficiency (www.formula1.com/en/latest.html).

Arshad (2014) focused detailed another vertical delivery system that Cranes are typical to be used for on-site material logistics. He noted that Japanese automated construction systems are utilizing robotized cranes and vertical delivery system by making use of modularity and pervasive technologies in construction. Arshad gave a good example of this system that "Kiva Systems". This system, which uses game-changing automation technology for distribution centers, helps companies simplify operations and reduce costs while increasing strategic flexibility; using hundreds of autonomous mobile robots and sophisticated control software, the Kiva Mobile-robotic Fulfillment System enables extremely fast cycle times with reduced labor requirements, from receiving to picking to shipping (www.kivasystems.com/aboutus-the-kiva-approach/). The simple explanation of the system is a construction that is quick and low-cost to set up, inexpensive to operate and easy to change anywhere in the world. Finally, we note that Fast company magazine has announced Kiva system as world's 23rd most innovative company (http://www.fastcompany.com/most-innovative-companies/2012/).

Figure 8. the most innovative company in 2012; Kiva systems

(www.google.com.tr/search?q=Kiva+Systems&rlz)

Result

The concept of a new construction robot is demonstrated which performs horizontally. We can say that it is not far to receive the stack of building elements from a suitable starting point. Also, it will move horizontally on the rails to reach at required location for placement. These rails are the structural members of the building as well. We believe that this will set a new paradigm of horizontal building construction in the future, but now still there is plenty of room for improvement pertaining to robotics. Finally, at this stage, its prototype can be developed to make it a part of a robotics construction system.

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HORIZONTAL BUILDING CONSTRUCTION II: U-CITY DESIGN*

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Abstract. The construction industry is continuously seeking better and more efficient methods of design and construction. There has been a strong push for efficient methods in accommodating environmental requirements. The number of research activities in horizontal construction is large and growing. The potential of benefiting the horizontal construction world in the areas of construction-ready design documents and all-inclusive insurance policies are developing step by step.

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In this study, we are analysing three design parameters;

- decentralized energy generation
- life-work integration
- U-city design

Of course, it is found difficult to fully integrate these parameters in a unique horizontal building construction. So, to show details of the parameters, we selected different construction models.

The first phase of the study, we focus on design criteria to meet the modern day needs of building construction in a city area. This includes the study of three design parameters and their applications. Then, we analyse the problems confronted to integrate these parameters in building construction. Finally, a new approach is presented for horizontal building construction.

* A brief version of this article presented at ISTEC 2018

Decentralized energy generation

Many practiced energy resources were studied along with related physical factors, technologies, disadvantages, storage and the efficiency in order to provide a decentralized energy generation. Different types of energy resources are in use all over the world such ass wind, waste, sunlight, heat, kinetics and water (Kocaman and Abut, 2015; 2015; Kocaman, 2013;.Hasegawa, 2010). We know that wind power is one of the renewable energy resources to make useful energy by windmills or sails. It also has less environmental impacts. Many Countries in the world as Germany, Turkey and China and others are using wind power for power generation.

Malakahmed at all. (2011) stayed that organic waste is a resource that needs to be tapped and not to be wasted into landfills or reduced to ashes. According to them, the renewable energy produced from anaerobic digestion process can be accepted as a good reason for many communities to start transformation of our valuable resources. They also pointed out that electricity production and the usage in internal combustion engine are the common examples of biogas. Our famous source of energy sunlight is another widely recognized renewable source of energy which is free of cost and clean energy with negligible environmental impacts. Malakahmed and his team stressed that we can utilize for power production using different technologies like photovoltaic panels and artificial photosynthesis.

We note that kinetics is another energy resource used many different areas. For example, human movement can also be used to produce energy by piezoelectric effect (figure 1).

Figure 1. UK-based Pavegen company makes electricity-generating flooring
(www.futureentech.com/2016/05/pavegens-power-generating-floor)

Water can also be used for power generation by using water splitting, turbines or pumped hydro storage technologies. High rise building can produce power from rainwater as it falls from almost 200m in a 50-floor building (figure 2).

Figure 2. Water pumped Hydro Hawaii's Energy Storage
(www.google.com.tr/search?q=water+pumped+hydro+storage+technologies&rlz)

Life-Work integration

In modern and economic life, it is a tendency of having a selection for a lot of employees to have different options available to choose about working hours, location and decision considering the needs out of work as sport centers,

restaurants. Arshad (2014) give a similaritiy that "this is something like juggling the five balls at once; work, family, friends, health, spirit" (According to this story, if you drop one of glass balls, it will be damaged and will never be the same as it was before). Arshad stayed that this parameter can be integrated in organisations to provide the facilities for the workers with infrastructure.

Some employers presents flexible working hours, job sharing and flexible spending cost for child care. "Beddington Zero Energy Development" is an environmentally friendly housing development in Hackbridge, London, designed by the architect Bill Dunster to support a more sustainable lifestyle (Wikipedia, Beddington Zero Energy Development) (figure 4).

Figure 4. BedZED organisation with a construction of life-work integration

(www.greenroofs.com/projects/pview.php?id=547)

"One of BedZED's unique community considerations is its take on transportation. A green transport plan promotes walking, cycling, and use of public transport. BedZED's target is a 50% reduction in fossil-fuel consumption by private car use over the next 10 years compared with a conventional development. A "pedestrian first" policy with good lighting, drop curbs for prams (strollers) and wheelchairs, and a road layout that keeps vehicles to walking speed[22]. The concept of life-work integration is expressed in the building project. Work area and residential area are integrated into one building volume. Residents are encouraged to work within the community. However, there are only small numbers of residents employed within the community" (Wikipedia.com).

U-city design

Lee at all. (2008) stayed that the aim of U-city is to create a built environment where any citizen can reach any services anywhere and anytime through any Information and Communication Technology (ICT) devices. Very much speeding in ICT development has brought the conventional city in terms of intelligence, innovation and evolution to U-city. They noted that many cities around the world have constructed the digital infrastructure under "smart city" or "intelligent city" projects like Philadelphia.

U-City in Korea has the world best level of wired and wireless infrastructure and ubiquitous IT technology is developing rapidly. About 20 local administrations are promoting actively U-cities in cooperation with national communication service providers, the Korea Land Corporation and the Korea National Housing Corporation. The objective is to construct urban environments as intelligent services through IT and ubiquitous IT.

Projects are focusing on local economic activities by selecting specialized industries that fit to the features of the region. Cities construct safe and convenient living environment through u-City projects and promote specialized business in relation to the social and cultural features and the industrial development strategies of each region.

Figure 6. U-City: New Trends of Urban Planning in Korea

(www.urenio.org/2010/09/26/u-city-new-trends-of-urban-planning-in-korea)

Result

The concept of a new construction robot is demonstrated which performs horizontally. We can say that it is not far to receive the stack of building elements from a suitable starting point. Also, it will move horizontally on the rails to reach at required location for placement. These rails are the structural members of the building as well. We believe that this will set a new paradigm of horizontal building construction in the future, but now still there is plenty of room for improvement pertaining to robotics. Finally, at this stage, its prototype can be developed to make it a part of a robotics construction system.

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ON THE BINOMIAL RELATION BETWEEN ENERGY AND ENVIRONMENT*

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Abstract. Energy and environment are closely related issues along the whole world. The uncontrollable use of fossil fuels has promoted adverse effects on environment as pollution of underground and superficial waters. Many researchers observed that the international reserves of crude oil are declining, and some authorized references talk about an important detriment in the annual oil availability for next 30 or sixty years. The necessity of developing novel sources of energy, and specially fuels from sustainable sources is a compulsory step needed to be taken because of this unhappy situation. Alternative sources of energy such as wind, solar and hydraulic are potential renewable sources capable to change the paradigm of productive activities all around the world. In many of the cases, the energy production processes include resources commonly available or even the use of materials considered as wastes.
Processes included in the generation of renewable energy may not only positively impact the environment but also may cause harm on the surrounding in spite of all the desirable characteristics involved. A few works have been published carrying out this type of environmental cost-benefit analysis as a base of this knowledge. The aim of this paper is to provide with the information to carry out such type of analysis: a review of the state-of-the-art on the development of renewable energies, their main environmental advantages and disadvantages and the emerging procedures for site remediation to be applied if necessary.
Keywords: *energy and environment, pollution, renewable energy source*

Introduction

Discussing energy problems without using adequate concepts and proper terminology makes as little sense as disregarding the universal laws of nature. It is virtually impossible to make a sensible contribution to energy development without reference to quantitative issues. This is well understood by scientists and engineers, but there are many more disciplines to contribute to the diverse problems of energy development. The same applies to some extent to issues of the natural environment (Aydin at all, 2017; Corzo-Rios, 2012). Energy and Environment are two interpenetration words that can hardly be separated. In 2018, general problems of the world are at the dramatic level such as accelerated demographic growing, lack of sufficient food and health for all the inhabitants, environmental disasters including global warming and energetic crisis. From this point of view, we can say that energy and environment problems are quite considerable and are linked in many ways. The use of fossil-derived energetics has become in a serious problem due to the production of greenhouse gases and the subsequent global warming effect (Cervantes, 2007). He also noted that production of goods for human life has led to the generation of liquid, solid and gaseous residues which contaminate the matrixes of water, air and soil pollution.
Sustainable energy development needs methods and tools to measure and compare the environmental impacts of human activities for various products (Farhad at all., 2008). According to they, consumption of fossil fuels is dramatically increasing along with improvements in the quality of life, industrialization of developing nations, and increase of the world population. The excessive fossil fuel consumption not only leads to an increase in the rate of diminishing fossil fuel reserves. Also, it has a power adverse impact on the environment, resulting in increased health risks and the threat of global climate change all over the world (Sims, 2003). Everybody know that changes towards environmental improvements are becoming more politically, especially in developed countries. Unfortunately, big societies are slowly moving towards seeking more sustainable production methods, waste minimization, reduced air pollution from vehicles, distributed energy generation and conservation of native forests (Fridleifsson, 2001).
To meet the developing world's growing energy needs, increasing consumption of fossil fuel to meet our current energy demands alarm over the energy crisis has generated a resurgence of interest in promoting renewable

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alternatives (Youm at all., 2000). Overdone consumption of fossil fuels has caused global warming by carbon dioxide; therefore, renewable promotion of clean energy is eagerly required (Hall, 1991). Nielsen (2009) stressed that an agreement was made with the overall pollution prevention targets to monitor emission of these greenhouse emissions according to the objectives of the Kyoto Protocol agreement.

Connection to the energy consumption

If we go back to the origin of sustainable product design, we can see a good balance between sustainability, functionality and the user context. Also, a designer wants to see this perfect balance, he should be aware of the environment and incorporate ongoing trends. One of these new technological trends is the application of sustainable energy technologies (Haque, 2009).

World energy production rose 42% between 1980 and 2000 and will grow 150-230% by 2050 (Boons at all., 2011). Renewable resources like solar and wind account for only 11,5% of current consumption. The Western world consumes much more energy per capita than do developing countries. For example, the electricity consumption per capita: It can be observed almost a factor of 30 in difference in use of electricity between the high and the low-income countries (Fridleifsson, 2001).

A continuous increase in use of energy consuming products is a today's world realty. Therefore, one of the real problems will be how to optimize the electrical power consumption of these products at the moment and in the future. At this moment, we can say electrical energy is obtained from the mains, primary and secondary or rechargeable batteries (Bergman, 2008).

In last years, there is an increasing mobility trend in the consumer and professional market of the exploding products. We believe that rechargeable energy storage media have an efficient role in all these products. Bergman noted that "there is a necessity to recharge these storage media, not to be limited by the availability of a mains socket". Also, he added "many consumer electronics products nowadays function on low voltage DC (8-20V) instead of the 220 (or 110) V AC". As a result of this change, the number of used batteries and adaptors are increasing rapidly.

Renewable energies

Renewable energy technologies like biomass and hydro-power have their application usually on a system level. Other renewable energy technologies like photo voltaic, and human power are also being applied on a product level (Kumari at all., 2012). The application of renewable energy technologies can be a more sustainable alternative source. The application of the new energy technologies into product design is moving from an experimental phase towards a special area in industrial design.

Renewable energy systems can be distinguished into grid-linked systems and stand-alone systems (Bargmann, 2008); he pointed out that in the case of a grid-linked system there is a connection between the renewable energy system and the local electricity network. They can be used to meet part of the needed electricity. According to Bergmann, stand-alone systems are independent of the local electricity network. Also, these systems are often used in areas without a local electricity distribution net or to make a product independent of the electricity project.

"Human power" uses the physical energy of the user to support the electronic function of the product (Mathews at all., 2011). There are two ways of generating electricity by means of human interaction:

- thermal
- physical

Mathews pointed out that "the physical human power of the users can be transferred by piezo technologies (0-0,5 Watt), linear (0,5-5 Watt) and rotation (0,5 –50 Watt) induction into electricity. This can be done e.g. by pushing, shaking, pulling, turning a part of the product which is connected to the electricity generating technology". So, the level of produced energy depends on the power, frequency and period of the movements of the user and the efficiency of the applied energy conversion technology. He noted that the generated energy is stored between the energy generation and use in rechargeable batteries or mechanical storage systems.

"Solar Power" is produced by the conversion of sunlight into direct current electrical power using cells (Reveles, 2010). The cell is modular, and light have no direct impact on the environment, and require minimal maintenance. They present many potential advantages compared with more conventional power generation systems such as long life and durability and low operating costs. Reveles note that "the cells were originally developed in 1970s, at the time they were expensive and quite inefficient. Since then, power using cell technology has been further developed to improve the efficiency and to reduce costs".

To develop "fuel cells" there has been a huge global effort in the last fifteen years (Sokka, 2011). Fuel cells are an important potential option for improving the sustainability of energy consumption driven by the prospect of improved electrical efficiency and of improving air quality in urban and indoor environments. They are reducing emissions of greenhouse gases and reducing emissions in energy use in sectors like transport or portable electronic products. According to Sokka, Fuel cells are electrochemical devices similar to primary batteries except that the fuel and oxidant are stored externally (Figure 1).

Figure 1. Renewable Hydrogen Fuel Cells
(www.google.com.tr/search?q=fuel+cells&rlz)

Result

A comprehensive analyse of main renewable energy gadgets for industrial applications such as solar water heaters, solar cookers, dryers, wind energy, biogas technology, biomass gasifiers, and improved cookstoves was conducted. The results give an overview of the development and scope of CO2 mitigation for clean and sustainable development. The use of solar drying of agricultural produce has good potential for energy conservation. The necessity of developing novel sources of energy, and specially fuels from sustainable sources is a compulsory step needed to be taken because of this unhappy situation. Alternative sources of energy such as wind, solar and hydraulic are potential renewable sources capable to change the paradigm of productive activities all around the world. In many of the cases, the energy production processes include resources commonly available or even the use of materials considered as wastes.

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ON THE CHEMICAL ENGINEERING: REACTORS*

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Abstract. Engineering plays a major role in shaping the world today. The application of science, mathematics, and technology into engineering makes many advantages to people and confirms the world we live in possible. Most students are unaware of the advantages that engineering provides people in their daily lives. One of the more critical reasons most students are not interested in making careers in engineering is that they are not exposed to topics in engineering during their school life. Most teachers have not been changed their teaching methods to incorporate engineering and technology topics into their classroom lessons and there is a lack of high-quality curricular materials in these areas.
Operational methods, processing techniques and substantial equipment give high level improvements. These developments may conclude in the disappear of some traditional types of equipment. In this paper, we discuss on process intensification and its structure, review recent developments in process intensifying devices and methods.
Key words: *chemical engineering, technological development, curricular material, intensifying*

Introduction

Engineers at many universities are working on efficient techniques that could transform the concept of chemical plants (Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016; Stankiewicz, 2002). He stayed that these developments use a common focus on process intensification which is an approach that has been emerged as a special discipline of chemical engineering at many universities (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012). Georgius Agricola (1556) illustrated the process of retrieving gold from gold ore. He modified the resemblance between some of the devices, for instance, the stirred vessels O and the stirrers *S* and the basic equipment of today's chemical process industries is striking. We can say that Agricola's modifying represents that process intensification. This modifying has not had much impact in the field of stirring technology over the last years.
Ramshaw (1983), defined process intensification as a strategy for making dramatic reductions in the size of a chemical plant so as to reach a given production objective. According to him, these reduction processes can come from shrinking the size of individual pieces of equipment and from eliminating the number of unit actions. So, the degree of reduction should be significant to be a matter of discussions. we think that the attributes of a drastic step change should be approached as process intensification.
Process intensification works on novel methods and equipment by the necessity for breakthrough changes in operations (Kocaman and Abut, 2015; 2015; Kocaman, 2013; Thonon, 1995). Thonon stressed that these operations have been applied on a restricted scale at least in comparison with their capacity and have not yet generally been known as standard by the chemical engineering community. Also, the exchangers have been used for a long time in the different industries especially food industry (Alkan at all, 2009; Durak at all, 2015; Genel at all, 2016; Genel at all, 2013; Koparan at all, 2018; Of at all, 2017; Tola at all, 2017). Thonon also added that process developers still often chose for conventional tube units in the chemical industry in which spiral heat exchangers could be worked.
For process intensification capacity, Philips at all (1997) explained that it consists of the development of novel apparatuses and techniques that substantially decreasing production capacity rate and energy consumption are developable technologies. So, any chemical engineering development which turn out to be a substantially cleaner, and energy efficient technology is process intensification (Kucuk at all, 2005; Genel at all, 2012; Sener at all, 2010; Yesilyurt at all; 2005; Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018). The research team figurate that the whole field generally can be divided into two areas as shown below (Figure 1).

* A brief version of this article presented at ISTEC 2018

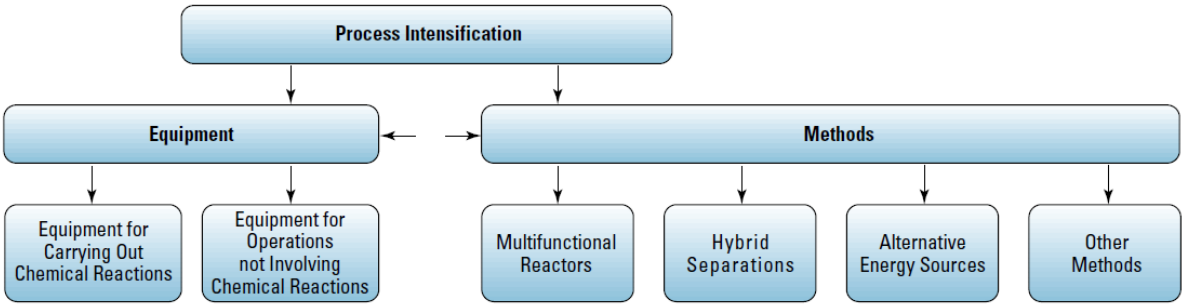

Figure 1. Process intensification and its parts.

Process Equipment

When we examine the Agricola's woodcut systems, we say that progressing of little stirring technology is not completely real. The technology of stirring has been mainly intensified during the last two decades. Karayiannis at all. (1997) expressed that this was achieved not by improving mechanical mixers but, by abandoning them in favor of static mixers. These efficient devices are god models of process-intensifying equipment. This research team proposed energy-efficient method for mixing fluids and, they are using different functions. For example, static-mixer reactor of Winterthur is mixing elements made of heat-transfer tubes. This reactor can be applied in processes of mixing as neutralization reactions (Figure 2).

Figure 2. Proprietary reactor-mixer is a model of process-intensifying equipment.

Microreactors

Even higher values of heat-transfer coefficients can be obtained in microreactors (Irandoust at all., 1998). Microreactors are chemical reactors of extremely small dimensions that usually have a structure consisting of a few layers with micromachined channels. The research team stayed that the layers perform various operations, from mixing to catalytic reaction and heat exchange. Integration of the operations within a single unit is one of the most important advantages of microreactors. According to them, the very high heat transfer rates reachable in microreactors get for operating highly exothermic processes: "very low surface-area ratios make microreactors potentially attractive for processes involving explosive reactants". In this system, the processes using batteries of multiple microreactors become economically and technically feasible at the scale.

Stringaro at all. (1998) gave an exploratory information that the geometrical configuration of microchannel heat exchangers similar that of the cross-flow monoliths, although the materials and fabrication methods used different way (Figure, 3). They stayed that the channels in the plates of microchannel heat exchangers are around 1 mm or less wide and are fabricated via silicon micromachining.

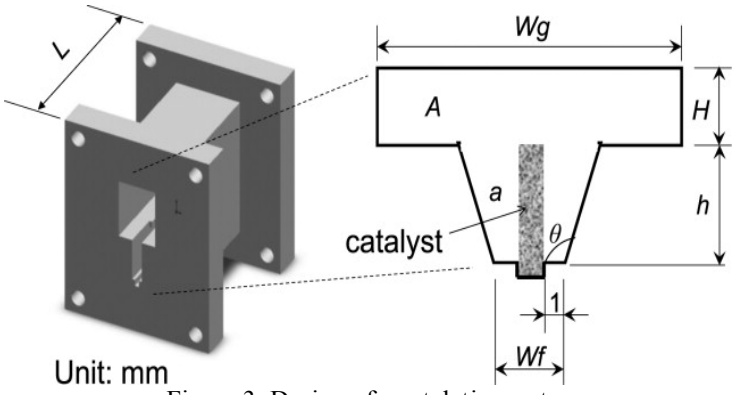

Figure 3. Design of a catalytic reactor

Multifunctional reactors

Matros and Bunimovich (1996) stayed that to enhance the chemical conversion taking place and to achieve a higher degree of integration can be described as reactors. As an example, they stayed integrating reaction and heat transfer in a multi-operational unit is the reverse-flow reactor. For exothermic processes, they proposed that "the periodic flow reversal in such units allows for utilization of the heat of reaction by keeping it within the catalyst bed and, after reversion of the flow direction, using it for preheating the cold reactant gases". Also, they expressed that reverse- flow reactors have been used in three industrial processes: SO2 oxidation, total oxidation of hydrocarbons in off-gases, and NOx reduction. The reverse-flow principle also has been applied in rotating monolith reactors used industrially for removal of undesired components from gas streams.

Having god usefulness for reactive distillation, the catalyst is integrated into a fiberglass and wire-mesh sup porting structure, which also provides liquid redistribution of vapor (Stadig, 1987). According to Stadig, the advantages of catalytic distillation units consist of reduced energy requirements and lower capital investment. Also, it has the continuous removal of reaction products. Moreover, the combination of reaction and condensation (called reverse process) has been operated for benzene oxidation to cyclo hexane and for methanol synthesis (Halloin, Ben Armor and Wajc, 1996). Stadig added that the number of processes in which reactive distillation has been implemented on a commercial scale is quite restricted.

The other types of combined reactions and separations are researched such as reactive extraction (Minotti, Doherty, and Malone,1998), reactive crystal lization (Kelkar, Samant, 1997), and integration of reaction and sorption operations (Meurer at all., 1997)) and periodic separating reactors (Vaporciyan, and Kadlec, 1989).

Result

In this paper, we have mentioned a variety of equipment and techniques that have a significant and efficient role in the intensification of chemical processes. This is a restricted group of the materials. We hope that new developments will come from researchers worldwide. For an example, combinations of reactions and one or more-unit operations (called hybrid operations) will play an active role in the future of sustainable chemical Process Industries.

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ON THE COMPUTER TECHNOLOGY: THE ROAD MAP OF THE DEVILOPMENTS*

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Abstract. Computer technology uses the computer to gather, process, store and precede information. A long way, it has been reached in the history of wireless. Wireless technologies have undergone massive growth. Computer technologies have followed different evolutionary lines aimed to unified objective that performance and efficiency. This technology presents us different form information used for different purpose like video, conferences and research. Computer technology, also, is study of skills. Modern world is characterized by rapid growth and development of this technology resulting in more dependence of the society, in a wider sense, on the individual knowledge and competence of a person in this area. Computer technology has great potential to improve excellence, quality, efficiency and effectiveness.
In this study, we deal with the basic lines of the computer technologies focusing the future possibilities. We also focus the evolution and development of computer technology. It is related to the information and communication technology. Communication technologies extends around the world faster than most other technologies in current centuries.
Keywords: *communication technology, development of computer, computer industry*

Introduction

We have satisfied rapid growth in the performance and capability of computer systems for over last decades. The theme of this interesting success can be summarized in two words: popularity and parallelism (Steane and Rieffel, 2000). They stayed that application demand has led the industry to need a wide range of computing solutions with increasing performance and capacity at. Also, applications correspond to the highest volume machines with the greatest number of computer users spend maximum performance of a computing system. Steane and Rieffel pointed out that type of popular applications, however, lead to the direction for the next generation computing infrastructure (Abut and Akca; 1988; Asadi at all, 2011a; Asadi at all, 2011b; Asadi at all, 2011c). In this point, we add that the demand for ever greater application performance is a familiar word to the ears of every computer designer. Responding to this demand, computers have evolved to perform multiple operations at once, in parallel, requiring a larger volume of resources on the same chip (Aydin at all, 2017; Kocaman and Abut, 2015; 2015; Kocaman, 2013). Computer applications and technology have always been evolving together with very strong interaction and future will be no exception in this regard (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). We need to analyze the directions in each of these three aspects of evolving computer technology to understand the future in computer technology.
Progress in computer technology has been outstanding level since 1980. Gordon Moore expressed his vision of progress simply in terms of the number of transistors that could be manufactured economically on an integrated circuit (Moore, 1965). We need to note that the means of achieving this progress was based principally on shrinking transistor dimensions, and with that came collateral gains in performance, power-efficiency. The semiconductor industry appears to be confident in its ability to continue to shrink transistors, at least for another decade or so, but the game is already changing (Furber and Wilson, 1987). So, we couldn't say that smaller circuits will go faster or be more power-efficient. As this technology approach atomic limits device variability is beginning to hurt, and design costs are going through the roof. Another words, this is impacting the economics of design in ways that will affect the all computing sectors.

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From Past To Future

When the Manchester 'Baby' computer first executed (June 1948) a program stored in its cathode ray tube memory to produce the correct result, this was interpreted the start of the modern era of computing (figure 1). We will be celebrating the 70th anniversary of this singular event later this year. Over those 70 years we have seen many developments in computer architecture that have made machines more flexible and easier to program, but these pale into insignificance alongside the progress in the technology used to build the machines.

Figure 1. A very big 'Baby' fills the room
(www.google.com.tr/search?q=Manchester+'Baby'+computer&rlz)

We need to compare some of the key characteristics of machines then and now to see how far computer technology has progressed over the last 70 years. The 'Baby' (more formally called the SSEM – Small-Scale Experimental Machine) occupied several post-office racks of electronics based on thermionic valves – vacuum tubes in American English – and executed 700 instructions per second while consuming around 3.5 kW of electrical power (Anderson, 2009).

In 1985, the first ARM processor (ARM1) executed 6 million instructions per second and used 0.1 W. Today, a typical power-efficient embedded computer, such as the ARM968 that we will hear more about later, occupies 0.4 mm^2 on the surface of a silicon chip using a 130nm process (figure 2). The processor has as much capacity in its registers as the Manchester Baby's main memory. The ARM968 delivers about 200 million instructions per second on a power budget of 20 Mw (Furber and Wilson, 1987).

Figure 2: The first ARM (Advanced RISC Machines) processor
(www.google.com.tr/search?q=ARM1&rlz)

The basis of the different two energy efficiency, which is the computer equivalent to the 'miles per gallon' measure for a car is one way to compare these computing machines. Baby used 5 joules per instruction, ARM1 used 15 nanojoules per instruction, and the ARM968 uses 100 picojoules per instruction. The ratio of the Baby and ARM968 figures points to a staggering improvement in the energy-efficiency of computers over 60 years by a factor of $5x10^{10}$ (Furber and Wilson, 1987). We can say that this unbelievable progress is to drive today's explosion in consumer electronics and pervasive computing. Moreover, the market is growing so fast that the net contribution of electronics to global energy consumption is also growing despite the continuing improvements in energy-efficiency

The rapid progress in computer technology has become intimately associated with Gordon Moore's 1965 prediction that the number of transistors on an integrated circuit would continue to grow exponentially for a further 10 years (Furber andWilson, 1987). That "Moore's Law", as it has become universally known, continues to apply today is a testament to the transition from its original status as an objective extrapolation based on observation and inside knowledge to its present position as the central boardroom planning tool of the global semiconductor

industry, represented by its role in the Industry Technology Roadmap for Semiconductors (Borkar, 2005). According to Borker, "it has become a self-fulfilling prophecy; industry investment is set at the level required to make it happen". As an illustration of how far this has gone, the 128GB microSD card incorporates of the order of fifty billion transistors in a tiny package smaller than a finger nail and just a millimeter thick (figure 3).

Figure 3. 128 GB micro SD card
(http://www.globalsources.com/manufacturers/12GB-Microsd-Card.html)

There are negative ways of this exponential progress (Roy at all., 2006). They noted that the cost of building a manufacturing facility also grows exponentially, as does the cost of designing a state-of-the-art chip; the chip business has been highly profitable because of its almost limitless expansion potential as digital products become smaller, lighter, more functional and more affordable. According to them, exponential growth is ultimately unsustainable; some limit will be reached, going beyond which will require a technological change of a different order from that which has driven the computer industry over the last half century. We know that all technologies saturate, following an 'S' curve that starts with exponential growth but ends with asymptotically slow advances.
There are many possible reasons why progress in computer technology will slow, and every commentator has their favorite which device physics, economics, power dissipation, process variability. Stensaker at all. (2007) argue that the next improvement will be increasingly difficult, with design and manufacturing costs rising inexorably as the fundamental physics of very small devices renders their characteristics increasingly hard to control. All of these factors have the meaning that the future will not be simply an extrapolation of the past. It is time for designers to rethink the balances of what constitutes the optimal use of the available technology (Plana at all., 2007).

Microelectronic Engineering

Continuous changing in computer technology demands new and more visionary approaches from the microelectronics design community if the challenges presented by the technology are the performable for new types of design. The UK microelectronics design research community has identified a set of four Grand Challenges for work in this area that create an agenda for future progress (Furber, 2008):

- Batteries Not Included – minimising the energy demands of electronics: "as electronics becomes increasingly pervasive it is simply impractical to power it from batteries that constantly need changing".
- Silicon meets Life – interfacing electronics to biology: "retinal prostheses, implanted medical diagnostics, brain-machine interfaces – these are all promising life-enhancing technologies that require a much closer integration between electronics and biology".
- Moore for Less – performance-driven design for next-generation chip technology:
- "the drive for ever-higher computing power will continue, but much more attention must be paid to the costs of so-doing: costs to the environment, and design costs".
- Building Brains – neurologically-inspired electronic systems: "our brains are much more power-efficient than electronics, and much more tolerant of component failure. If we could gain insights into how the biological system functions we might learn how apply those lessons to novel computational systems, and how to build reliable systems on unreliable technologies".

According to our interpretation, these interesting detections want to say that how the research community sees the future development of computer technology. These also indicate a long-term research plan based upon the research community's insights.

Result

The first 70 years of computer technology has seen powerful progress, exemplified by the notable improvement in computer energy-efficiency. This progress provides a power base for the explosion in consumer electronics products that we see today. Much less reliable technology will follow, forcing further changes in architecture and design practice.

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ON THE DIGITAL COMMUNICATIONS SYSTEMS: THE EFFECT OF NEW TECHNOLOGIES*

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Abstract. Many new technologies with original control capabilities have been developed. But, it is not clear how these capabilities should be integrated in the system operation. New operation approaches change the traditional control architecture of power systems and it is necessary to identify requirements and functions. How can power system functions be specified independent of technology? What is the purpose of control in power systems? Transition of power systems today to the smart energy systems of the future has received much attention from industry in recent years. The need for replacement of old equipment and the necessity of new requirements associated with sustainability for future energy systems are the basic factor of the attention.

In this paper, we accept protection a control function such that it manages the system to automatically eliminate defective equipment from keep going service to the maximum number of customers. We also consider "control" to mean automated protection or system configuration function. In the past, electric power control systems made of operators in bowler hats standing in front of large knife switches. In the current climate, engineers design systems that utilize powerful microprocessor-based equipment capable of more technical protection and automated control. In the next generation of power control systems, electromechanical devices replaced human operators and changed with automated protection.

Keywords: *communication system, power control system, automated control*

Introduction

Major innovations in technology world motivate many systems redesign or reconstruct. For instance, in the electric industry, power electronics revolutionize the way energy flows can be controlled, both in power generation and transmission. A large number of technologies have been developed that enable a controllable generation of energy in general (Xu at all., 2009). Also, they note that another class of new technologies regards the supervisory control of power systems on the larger scale, such as PMU measurements and online state estimation. Control theory has modified potential for smarter power system automation, improving both stability and resource utilization (Ilic, 207). Information and communication technology (ICT) can be regarded as an enabling technology for many of the new concepts. An important issue for system integration is controllability of these technologies in the context of a complex power system. (Pudjianto at all., 2007). According to them, the efficient integration of these additional resources requires new concepts for control and supervision. We see that many new concepts have been developed in recent years that aim at tackling this challenge.

Most of the basic concepts can be classified as collection approaches as below (Linda 2007):

- Collection based on the physical location of resources
- Commercial aggregation concepts rather based on the generation patterns and capabilities resources

We add that the research in this area is usually rather technical nature. Linde at all. pointed out that the latter are striving for a profitable participation in energy markets, such that research in this direction focuses on the market-operation principles. It is generally difficult to evaluate and integrate such complex technologies, particularly when originating from different backgrounds. Electrical generation, distribution, and transmission turned out a problem before that it persists today (Braun and Strauss, 2008). They noted that while continuing to serve much possible the system must

* A brief version of this article presented at ISTEC 2018

analyse changing conditions of power demand, failures, and other negative conditions. In this situation, this necessity needs armies of operators or automatic systems to detect changes.
Us at all. (2008) pointed out that the degree to which you can get maximum performance from a system by eliminating the decision process or choosing the most effective control actions is a within limit. According to them, engineers have spent much effort refining decision methods and power system configurations in power system protection and automation. To change the collection and communication of system information to allow new protection methods can be one efficient way. We know that the old protective devices have had limited capability to transfer analog between protective devices. Us at all stayed that the communication technologies useable limited the capability to send information between devices. Last advances in the devices and communications protocols conformed with new communication technologies. In this paper, we analyse the communication of analog measurements between devices.

Communications systems
there are many ways to provide communications paths between protection devices. We can note the most popular ones as below:

- leased lines and pilot wires,
- digital point-to-point communications,
- digital communications networks,
- Power Line Carrier.

Leased Line and Pilot Wire: Some of the first analog data transfers for protection and control came through pilot wire systems (Schweitzer at all., 1997 and Demetrious at all., 1999). According to them, "a pilot wire system is a two-conductor wire that provides an uninterrupted path from one control device to another. New communications systems use direct fiber-optic cables as well as several types of wireless and digital network communications paths". Also, they noted that pilot wire systems are open to several problems that can go to mis-operations of equipment using the quantities transmitted on pilot wires (figure 1).

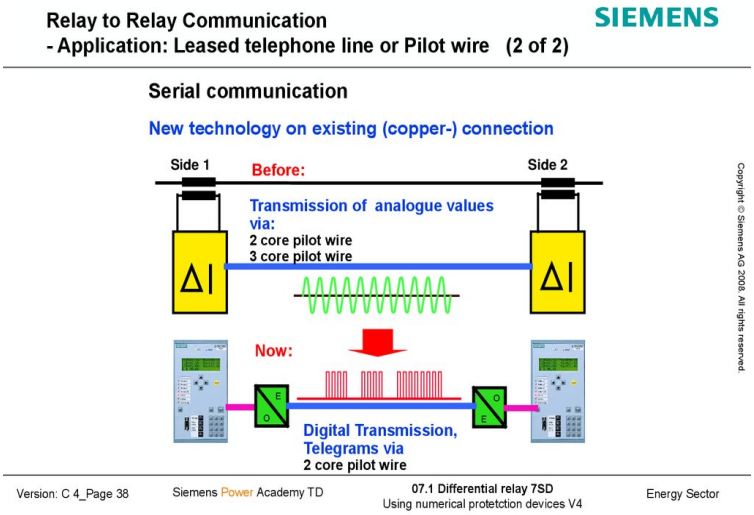

Figure 1. Lease line and Pilot wire communication mode (www.google.com.tr/search?q=Leased+Line+and+Pilot+Wire:&rlz)

They listed the subjects that can be related with pilot wire systems:

- Resistance matching of each leg
- Pilot monitoring systems to detect if a pilot is open, shorted or reversed
- Pilot wire protection from ground potential rise and induced voltages
- Maximum distance determined by loop resistance

Schweitzer at all. underlined that these items do not make it impossible to properly apply pilot wire communications, but careful calculations and design are required for successful application. Utilities have fewer engineering resources to expend on communications system design and protection in the electrical market. Also, digital systems allow a much more plug-and play approach that is amenable to fewer errors and much less demanding of engineering resources to understand and maintain the procedure.

Pilot wires are provided in one of two ways (Elmore, 2001); "first, the pilot wire is provided by the utility by including cable under-build on the line. Second, a local telephone carrier provides the pilot wire". According to Elmore, these systems are useless in long line situations because of the limitations on cable length or the difficulty of coordinating services. Also, he noted that utilities have well known that leased wire pairs are usually re-designed without notice so that the precise setup of the system is debased. A staf must work to assess the new communications path and register proper operation. Finally, Elmore stayed that utility companies are also finding that communication utilities are using much fiber-optic and digital systems and they spend extra motivation and energy to stop supporting leased pairs. Moreover, pilot wires are usually stay on the same poles or right of way as the power line they protect.

Digital Point-to-Point Communications: There are several forms for digital communications (Roberts, 2001). Fiber-optic cable and wireless are two of the well-known. We know that point-to-point connections can operate across networks. Fiber-optic cable be connected between substations to construct well-design fiber-optic systems. According to Roberts, this fiberoptic cable gives the communications path with simple transceivers at distances up to 80 or 90 km. And, the digital signaling methods gives communications paths from 9700 to 65.000 bits per second. Low-speed analog communications can work on slower links while the high-speed links communications for more demanding applications (figure 2).

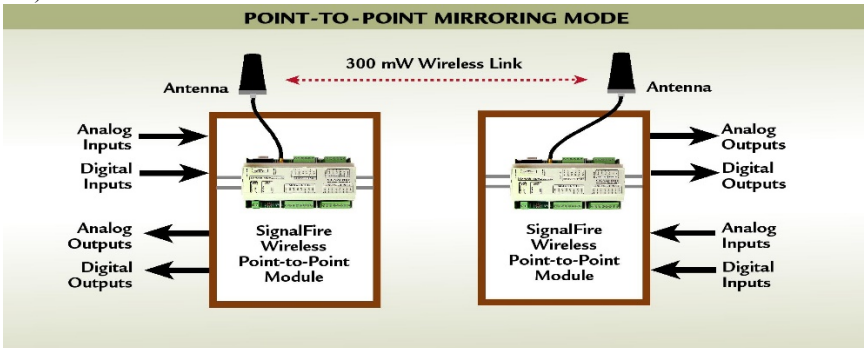

Figure 2. Digital point to point communication mode system
(www.google.com.tr/search?q=Digital+Point-to-Point+Communications&rlz)

Roberts underlined that point-to-point fiber may not have some of the problems of copper pilot wires, but care position should be taken to avoid the known point of failure. He also pointed out that it is possible to utilize wireless systems including microwave or spread-spectrum radios for point to-point communications. According to him, spread spectrum radios work in an unlicensed band in many parts of the world. And, this application, clearly, decreases design and deployment costs in this sector. In this situation, these technologies are very helpful where it is not easey to add or purchase a dedicated connection between two locations.

Digital Communications Networks: According to Schwitzer at all., (1998), digital communications networks provide point-to-point data transfer similar to point-to-point connections. In this mode, messages are lined from one point to another forming a virtual circuit or link. Schwitzer and his friends pointed out that the advantage from a communications perspective of this system is that communications networks are much more efficient than point-to-point networks because it is possible to significantly increase the utilization of the connections that combine to make the network (figure 3).

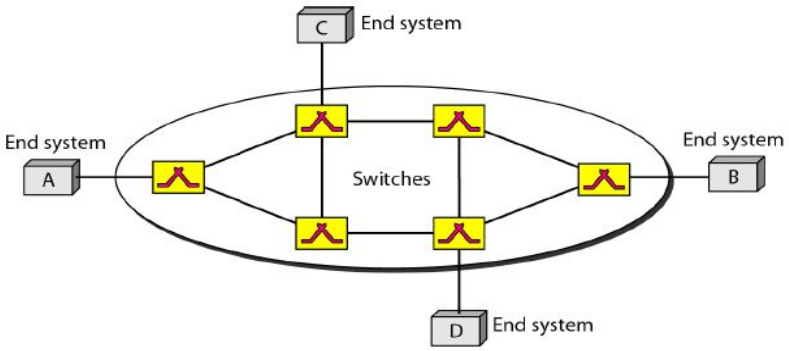

Figure 3. Virtual Circuit on a Digital Communications Network
(www.google.com.tr/search?q=Virtual+Circuit+on+a+Digital+Communications+Network&rlz)

In this network, switches and other network management devices are access points to virtual circuits that provide point-to-point data flow. Schwitzer noted that the physical construction of the network is a large number of point-to-point connections that each has logical connections; the actual data path can be complex when compared to the virtual circuit across the network. Many utilities have installed fiber-optic cables between substations. They are using the system as a digital network rather than a series of point-to-point connections. Today, digital communications networks have also replaced the backbone communications used by telephone operators. So, that calls using analog telephone equipment are converted to digital and are converted back to analog.

Finally, we need to give information about the main advantage of operating over a digital communications network: according to Schwitzer, the data path probably does not follow the path of the transmission or distribution line. And, the digital network has multiple paths available to create virtual circuits. Also, he added that it can automatically reroute traffic around failed sections of the network. But, Schwitzer pointed out that the main negative way of this system is paths can be changed by the network. So, the systems must be tolerant of changes in data transmission time.

Result

At the end of the analyse of the communication system, we conclude that existing pilot wire systems may require conversion to digital network communications. Also, we say that digital communications provide communication of more measurements without combining them into an operating quantity. Changes in the communications technology may require a fresh look at the protection algorithms to provide a system that is simpler. Innovation in the communication method takes advantage of increases in performance afforded by new communications techniques. Communications of analog data can extend operator system control actions and increase the speed of remedial action.

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ON THE MODULAR CONSTRUCTION SYSTEM: A SPECIAL DESIGN METHOD*

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Abstract. Generally, modular construction can be stayed as that is a constructional design in which a building is constructed off-site, under controlled plant conditions, using the same materials and designing to the same codes and standards as conventionally built systems. Additionally, buildings are produced in modules that when put together on site, reflect the identical design intent and specifications of the most sophisticated site without compromise.
In this study, we present a brief introduction to architectural construction of design management. One type of architectural construction is a modular building. Some special necessities may lead customers to select a modular building. We need to add that, designing a modular building is a highly complex process and could needs a systematic approach in a long time period.

Keywords: Modular Construction, Design Management

Introduction

Modular buildings are generally stronger than conventional construction as structurally, because each module is engineered to independently withstand the rigors of transportation. The buildings modules become one integral wall, floor and roof assembly, when they combined (Gray and Will, 2001). They noted that building off site could make guarantee for better construction quality management. Materials that are delivered to the plant location are safely constructed in the manufacturer's storehouse to prevent damage or deterioration from the elements of it (Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). Also, the team stressed that manufacturing plants have stringent programs with independent inspection and that promotes superior quality of construction.

Modular construction offers numerous other benefits to owners as well as quality management and improved completion time (MBS, https://brandondevelopment.com/wp-content); "Removing approximately 80% of the building construction activity from the site location significantly reduces site disruption, vehicular traffic and improves overall safety and security, so for schools, or other active businesses, reducing on-site activity and thereby eliminating a large part of the ongoing construction hazards is a tremendous advantage". According to the note in this web page, modular construction companies can work with levels of design and construction sophistication that will exceed all expectations.

In this step, we can say that modular construction is intrinsically a natural fit view because of their designers look for more sustainable designs for improved environmental impact values. Van den (2002) expressed that building in a controlled environment reduces waste through avoidance upstream rather than diversion downstream. According to him, the construction process with improved quality management and significantly less on-site activity naturally promotes accomplishedly (Kocaman and Abut, 2015; 2015; Kocaman, 2013).

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It is an acceptable situation that costumers sometimes have specific demands, such as a short delivery lead time, a particular location, a widespread service in the settled part or limited duration of use. The designer and builder of such a system have to bear these specific demands in mind. Moreover, they encounter the following challenges (Gassel and Martin, 2006):

- There is no personal client, but a largely poorly defined market,
- The establishment of a production plan involves a substantial number of assumptions,
- The term for the amortisation of mechanising investments is unknown,
- The client and society want safe, sustainable and attractive buildings.

We can say that to manage these challenges during the design process can be one of the tasks of the design manager. Gassel and martin determined the task as follow "to make sure that the organization of the design process is structured appropriately for the task at hand, and to ensure that there are sufficient integrative and coordinating mechanisms for the work to progress meaningfully". So, these the tasks of the design manager will also be to design the production process in a future time. They also noted that the design scope of such objects includes long-term observation and the involvement of a wide-range of design expertise.

Modular Systems

Van Gassel and Martin (2004) were defined the modular construction as "modular construction as a method of construction that 'utilizes pre-engineered, factory-fabricated structures in three-dimensional sections that are transported to be tied together on a site". We can say that the definition focuses on the production and form of material parts. Modular construction has a more widely manning. In this study, we are using the modular construction building characterised by (Van Gassel and Martin, 2006) as bellow;

- Modular construction involves modular parts assembled in the factory
- Modular parts have established grid dimensions
- The modular buildings are transported and installed by specially trained professionals
- The modular parts are connected using convenient dry-point
- The components of the modular parts and modules are kept in stock at the factory
- Modular parts and modules are manufactured according to customer specifications
- A modular building can be taken apart to create the same or another type of building

Modular construction system productions are shown below step by step (Figure 1).

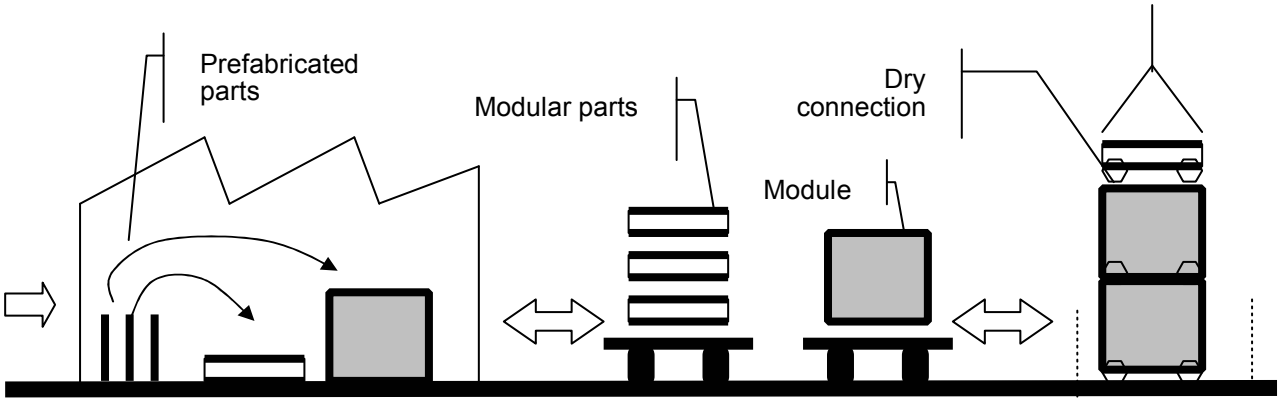

Figure 1. Modular construction system production scheme (Van Gassel and Martin, 2016).

We also exhibit some modular systems from allover the world that they have constructed according to their own systems;

Figure 2. Some models of modular construction systems.

A Special Design Method

Van Gassal and Martin (2006) stayed that, A modular builder, when designing a modular construction system, has to manage four processes;

- market research,
- product development,
- production,
- sales.

According to them, this method provides that the designing with the four processes exchange information. Also, they focused that the extended group works having a multidisciplinary approach are needed for process designers.

The research team presented a classification that the method's description of the production process design consists of two parts:

- the structure
- the content.

The structure;

Three design feedback tools are developed by Gassal and Martin: first, an object tree means that a structured description and detailed explanation of the system. Secondly, a guideline is that a four-step system analysis approach. Finally, a ranking system is definition of the decision-making criteria and of the presented as a colored filter

According to the authors, the object tree schematically shows the interrelationship of all building parts and determine where the parts will be set up. When we look the diagram, it looks like as a product-tree with boxes representing the building parts. The designer of the object tree assigned that individual components are presented on the lower end of the object tree. Then, they figurate, at higher up, the modular parts resulting from the assembly of individual components are presented. Finally, at even higher, the modular parts are combined into a three-dimensional object. The research team categorized the assembly locations as: assembly at supplier, assembly at the factory or on-site assembly (Figure 3).

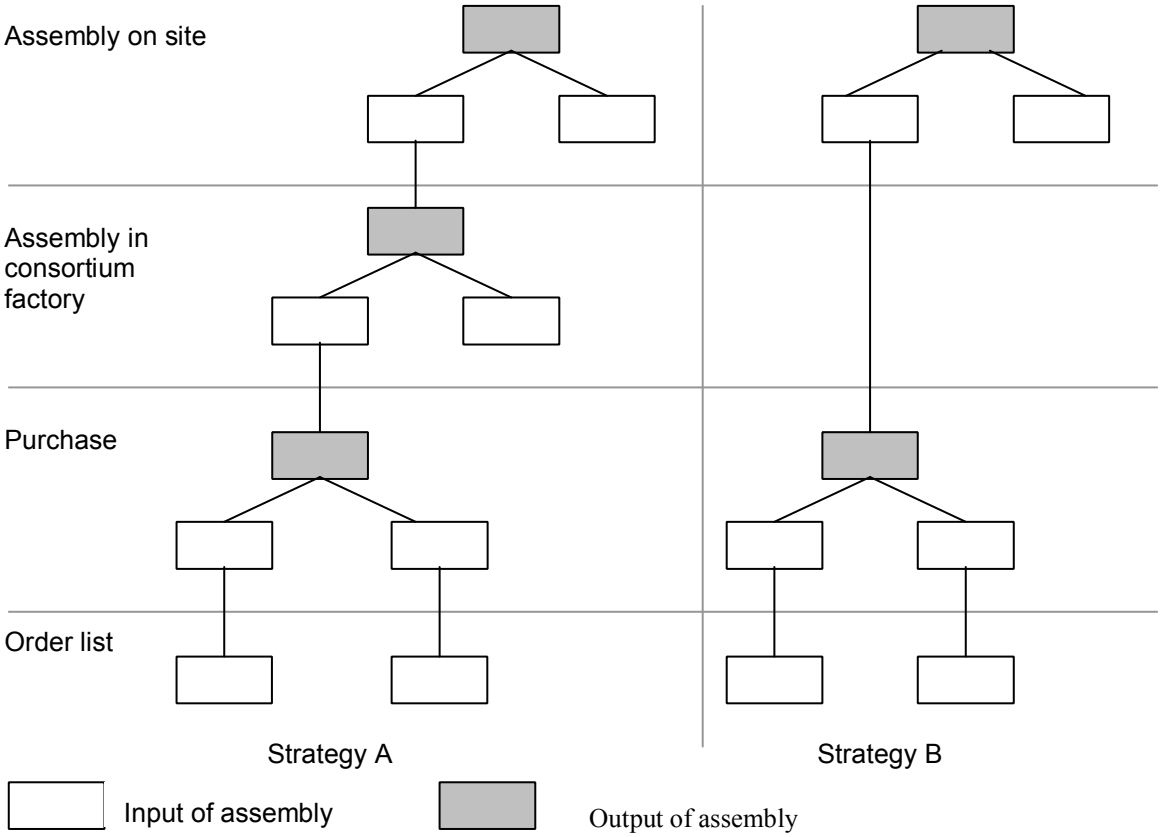

Figure 3. Two object trees. (Figurated by Gassal and Martin, 2006).

The content;

Many criteria can be defined as part of the method's structure (Van Gassel and Martin, 2006). According to them, this is directly connected with the using modular builder's strategy. Van Gassel and Martin also underlined that the market research, product development, production and sales processes each have their own priorities and restrictions. Van Gassal and Martin (2004) defined four steps to reach the solution spaces of the system as below;

- ✓ Step 1: Production typology
- ✓ Step 2: Client choices
- ✓ Step 3: Client choice
- ✓ Step 4: Production systems

A simple description of each step: Production typology means the selection from traditional to industrial construction processes. Client choices give us some offers of costumers as such production strategies as pure,

customised standardization level and pure customization. Client choice explain that levels such as construction, installation, finishing. And finally, production systems is flow or job-shop**.**

Result

In this study, we analysed a method modulated by Van Gassal and Martin (2006) based on the characteristics of modular construction. Many modular builders formulate construction systems, focusing on their market and production experience with other module systems or building products. This working system give them some advantages as that reducing the risk of failure.

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ON THE PREFABRICATED CONSTRUCTION: FROM 2-DIMENTION PRODUCTION TO 3-DIMENTION ONE*

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Abstract. The concept prefabrication is a development industry word used to express combinations that are fabricated under processing factory conditions and afterward transported to the construction site. In this study, we focus on a general literature study to get an overview of construction methodologies of prefabrication systems. Prefabrication systems could be divided according to materials, methods, structural configuration etc. There are numerous advantages connected with developing and combining buildings utilizing prefabrication construction frameworks. The main goal of prefabrication systems is to offer a way to get a well-designed building that is roughly planned to resident's needs. It could be stated that prefabrication systems in building construction have the most effect on time and cost reduction. Prefabrication systems could be used more in building construction if the disadvantages of prefabrication constructions are solved.

We present the degree of customization for the method, the type of relationship between the factory and the customer and the rules which control this relation by studying and analyzing the different types of prefabricated building construction methods.

Keywords: prefabrication, building production, construction industry

Introduction

In the general context, prefabrication is the concept of collecting segments of a structure in a manufacturing process or other assembling site and transporting complete elements to the development site where the structure is to be constructed (Limthongtang, 2005). He noted that the term is utilized to recognize this procedure from the more ordinary development routine of transporting the essential materials to the construction site where all get together is confirmed. There are different and effective technologies available worldwide for using prefabricated construction methods, almost all technologies try to reduce costs and time, prefabrication method gives possibility to the designers for assembling their structures in a short period of time. Designers are using different kinds of materials, they usually prefer to choose light weight ones. Wood and steel are the most practical materials in prefabrication construction. We also need to add that prefabrication technologies need high level of knowledge and experience and high quality of application on site.

The industrial revolution made a big change in the world economy by effecting all industries in every individual life from food and agriculture to health (Kocaman and Abut, 2015; 2015; Kocaman, 2013). Before the revolution, manufacturing was depending on tools and human work and it was so slow and costly for both side the manufacture and the customer (Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). But, after the integration of new technology, the work starts to be faster because it starts depending on machines and tools after the revolution. At the end of the 19th century, the market demand for products start to increase on the factories because of the

* A brief version of this article presented at ISTEC 2018

increasing number of populations specially in metropolis after the immigration of the people from superb to this place which is one of the resons of industrial revelation (Abulhaem, 2012).

In this period, some of the manufactures start to add more value for their products by introducing the custom-made products, this marketing strategy makes the customer to pay more for getting the product which satisfying his exact needs. Abulhaem noted that most of manufactures start to think more about the customer needs and step by step the customers start to be a part of the production progress. Then the mass production market determined a new strategy which called mass customization (Balamuralikrishna, 2005). According to him, this is fast adapting as a popular business strategy which focus on individual expressed needs. This strategy was applied to most of the industries from all over the world economy and had a positive feedback from the customers. Finally, we can say that, the old "mass customization strategy", today, is turning out to be "prefabricated building construction".

In this study, we analyse the different types of prefabricated building construction methods applying the principle of mass customization production such as linear production, 2-dimensiton production and 3-dimensiton production. Also, we point out the degree of customization for each method, the type of relationship between the factory and the customer.

Prefabrication Methods

There are three types of prefabricated building construction methods each one of them is specify for different kind of materials:

- linear production
- 2-dimension production
- 3-dimention production

We only deal with 2-dimention and 2-dimention production in this paper.

2-dimension production

A building consists of many components considered as 'products'. The word "services" consist of design, construction and marketing. These two concepts are involved with housing materials to generate a housing development. (Noguchi, 2003). Noguchi also noted that when viewed as a 'system' for designing, producing and selling a product, "mass customization" is impossible without customizable. According to him, at the design stage the customer should determines the configuration of their home from choices given by the factory by using a selection system to enable customers to easily choose from the many options. In generally, the customer can choose colors of the walls, materials which are used in the house, kitchen, toilets, lighting doors, windows and all other details which provided by the factory with full consulting service from the architects. After this step, construction engineers and designer be active to decide how many prefabricated building components they need. And, in the final step, they provided a customer relationship management which aim to make powerful its continuous contact with its long-term customers (figure 1).

Figure 1. The customers with the architect in the design stage

(www.framepool.com/en/shot/956832931-architect%27s-plan-customer-interview-architect)

3-dimension production

As there are numerous applications for 3-dimention city models with a wide range of model requirements regarding geometric accuracy and granularity, there is also a high demand for such models at different levels of detail. On the producer's side, a 3-dimention building model are generated and encoded as production rules. The former aspect, the way how models are generated is, however, not our concern in this paper. For a current and in-depth overview of 3-dimention building reconstruction approaches (Brenner, 2010; Haala and Kada, 2010). Another option is cartographic generalization where 3-dimention building models are geometrically simplified with regard to commonly recognized building regularities.

In this type of building prefabrication production, Japan is taking the lead as the most the advanced and industrialized fabrication systems in the world. prefabrication companies like Toyota is the best example to describe mass customization in 3D production (Bock, 2010). In starting a new with these processes, they could evaluate the short comings of the Ford model, with a new critical eye and develop their own process known as the "Toyota Production System" (figure 2). This system has been highly praised and received awards around the globe for its focus on people through mass customization and utilization of economies of scope (Liker, 2004). Liker stressed that this system made an extension of conventional marital information flows "Push production" in to a new concept based on current demands "Pull production " this new concept aim to make the factory output to be pulled by the customers instead of pushing (Fujimoto, 1999). Toyota has taken 5 principles used in automat factoring and applied them to the prefabricated housing market (Liker, 2004);

- Just-In-Time
- Jidoka
- Heijunka
- Standard Work
- Kaizen

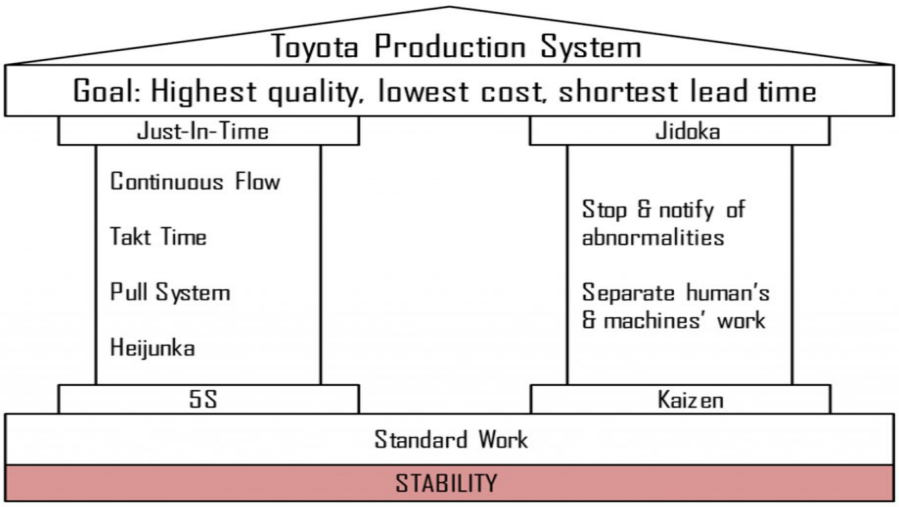

Figure 2. Toyota production system

(www.google.com.tr/search?q=Toyota+production+system)

According to Fujimoto 1999), Toyota performs Heijunka by manufacturing directly to customer order; "standard work allows for Toyota Home to keep a well-stocked supply of raw materials. The future owner of a home will go to the Toyota home park where they may browse many of the options and select specifics. The Toyota home website allows patrons to virtually apply a variety cladding, colors, exterior /interior ornament in a customizable environment to suit their needs and tastes. All these options are based on the same raw materials kept in stock so when the order is issued, they can be pulled off the shelves and go through the process of assembly to component to module to whole house erection on site. Not all of the elements that are compiled to make the Toyota Home modules and finally the completed structure are customized" (figure 3).

Figure 3. Module fabrication at Toyota

http://www.prefabmarket.com/ikea-toyota-and-muji-are-actually-prefab-home-manufacturers/

Result

We believe that some basic guidelines for building design could be adopted as standards in building mass production industry according to all the data and information acquired in this research after studying and analyzing the methods of prefabricated construction and the relationship between the customer and the factory;

The first of them is each prefabricated building construction methods have its own context that main structure, components and main frame or skeleton all of them related to the main core of the building. Secondly, the architects should have the main role at the design stage; they should provide two conditions for the customers that to choose

one of the readymade modules and give some changes by the customer to meet his own demands. The third is the factory should provide for the customer all the support which he will need to select his options. The final presentation is the factory should keep the customer updated in all production steps and keep ready for and kind of modification from the customer.

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ON ZERO DIVISOR GRAPH OVER RINGS: DETERMINATION OF THE EDGES AND THE ADJACENT ELEMENTS*

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Abstract. In this paper, we analyse the graphs of the sets of zero-divisors of a ring. We examine Ring Z_m to determine its graph and when its is graph is planar when it is complete and some other charters of the graph. Our second examination is on the ring coming from the power set of a nonempty finite set as R = T(X), with the operations, M + N = (M ∪ N) − (M ∩ N) and MN = M ∩ N. Finally, we are focusing on the well-known ring $R = M_2(S)$, the ring of all 22 matrices over a ring S with identity with respect to usual addition and multiplication of matrices.
Keywords: *ring, graph, zero divisor, planar*

Introduction

Many research studies conducted on zero divisor graphs with some special characteristic ways of the ring as finite or infinite, commutative or noncommutative (Anderson, and Livingston, 1999; Carter and Emmos, 2005; Redmond, 2004; Smith, 2002 and Tongsuo, 2005). In this paper, we modulate the graphs on the sets of zero-divisors of some special rings. We investigate such graphs and find their characteristic ways.

Definition 1: Let R be a ring. Let G be a graph with elements of R as vertices such that two non-zero elements a, b R are adjacent if ab = ba = 0 (Carter and Emmos, 2005).

We are focusing the following ring to determine graphs of them:

- $R = Z_m$, the set of integers modulo m with respect to addition modulo m and multiplication modulo m with the ring system $(Z_m, +_m, \odot_m)$; for a, b $\in Z_m$, the operation definitions as below,
$$a +_m b = (a + b)_m ,$$
$$a \odot_m b = (a . b)_m$$
- R = T(X), the power set of a nonempty finite set with respect to addition '+' and multiplication '.' with the ring system (T(X), +, .); for M, N ∈ T(X), the operations are defined as below,
$$M + N = (M \cup N) - (M \cap N)$$
$$M.N = M \cap N$$
- $R = M_2(S)$, the ring of all 22 matrices over a ring S with identity with respect to matrix addition '+' and matrix multiplication '.' of matrices with the ring system $(M_2(S), +, .)$; for $M = (m_{i,j})_2$, $N = (n_{i,j})_2 \in M_2(S)$, the operations are defined as below,
$$M + N = (m_{i,j})_2 + (n_{i,j})_2 = (m_{i,j} + n_{i,j})_2$$
$$M.N = (m_{i,j})_2 . (n_{i,j})_2 = (u_{i,j})_2 = U \in M_2(S), \text{ with } u_{i,j} = \sum_{k=1}^{2} m_{ik} . n_{kj}$$

All the above special rings are useful examples in abstract algebra as well as in elementary ring theory. For the definitions of a ring, a group, a subring of a ring, zero divisors, units, ideal, commutative ring, abelian group and other related concepts with examples, the reader should read one of the famous and basic abstract algebra books written by Hungerford (1986) or Herstein (1994).

Zero Divisor graphs in Ring Z_m

Z_m is a commutative ring with identity with respect to addition of integers modulo m and multiplication of integers modulo m.

* A brief version of this article presented at ISTEC 2018

For m = p, p a prime number; the graph has no edges as Z_m in this case is a field and has no non-zero zero divisors.
If m is not a prime number; we assume that

$$m = (\alpha_1)^{p1}.(\alpha_2)^{p2}...(\alpha_k)^{pk}, \qquad p_i \text{ prime numbers,}$$

so, the possible adjacent vertices are $(\alpha, t\beta)$ with $t\beta < m$ and $\alpha\beta = m$.
We illustrate for some natural numbers:

For m = 4, the only possible edge is (2, 2).
For m = 6, the possible edges are (2, 3) and (4, 3).
For m = 8, the possible edges are (2, 4); (4, 4); (4, 6).
For m = 9, the possible edges are (3, 3); (3, 6); (6, 6).
For m=12, the possible edges are (2, 6); (4, 6); (6, 6); (8, 6); (10, 6); (3, 4); (9, 4).
For m = 120, exemplified by Bhat at all. (2007), the possible edges are
(2, 60); (4, 60); ... ; (118, 60);
(3, 40); (6, 40); ... ; (117, 40);
(4, 30); (8, 30); ... ; (116, 30);
(5, 24); (10, 24); .... ; (115, 24);
(6, 20); (12, 20); ... ; (114, 20);
(8, 15); (16, 15); ... ; (112, 15);
(12, 10); (24, 10); ... ;(108, 10);
(20, 6); (40, 6); ... ;(100, 6);
(24, 5); (48, 5); ...;(96, 5);
(30, 4); (60, 4); ... ;(90, 4);
(40, 3); (80, 3).

By using similar method, it is easy to find for other natural number m. We note that if m = p, a prime number, in this situation, the graph is trivially planar.
For m = 4, 6, 8, 9, 12, 14, 15, 16, 18, 20, 21, 24 and 25, the graph is planar. For general classification, we need to use following theorem (Harray, 1969):
Theorem 2. Let m = pq, where p and q are distinct prime numbers. Consider the ring Z_m as above. Define in Z_m a graph as ('a' is adjacent to 'b' if ab = 0, where a, b ∈ Z_m). If the isolated vertices are ignored, then the graph is bipartite.
Proof. Here we see that n has only two prime factors. We arrange all multiples tp of p with tp < m in one row and all multiples kq of q with kq < m in another row. In this way we get a bipartite graph.

The Edges and the Adjacent element in the T(X) Ring

Definition 3: A ring R is called a Boolean ring if each element of R is an idempotent; i.e. $a^2 = a$ for all a ∈ R, (Mussuli, 1994)
Theorem 4: Every Boolean ring in a ring R is a subring of R, (Mussuli, 1994).
Let X be a non-empty finite set. Consider T(X) the power set of X. Define in T(X) addition and multiplication as

$$M.N = M \cap N \text{ and } M + N = (M \cup N) - (M \cap N)$$

for any M, N ∈ T(X). Then T(X) is a commutative ring with identity element X. The zero element of T(X) is φ, the empty set. In the Boolean rings, every element is idempotent; i.e. $U^2 = U$ for all U ∈ T(X). This ring is called a Boolean ring. According to the above theorem, every Boolean ring in this ring is a subring of T(X) for some X.
If we define a graph with non-zero elements of T(X) as vertices such that M is adjacent to B if MN = φ, the zero element of T(X) where M, N ∈ T(X). This graph is planar if number of elements of X is less than 4. For m = 4, 5, ... ; the graph is not planar but if we say that two sets M and N are adjacent if MN = φ, the zero element and M + N = X, the identity element. We conclude that

"the graph is planar as two sets will be adjacent if and only if they are complements of each other".

For m=4 and X = {a,b,c,d}, we find that

$$T(X) = \{ \{a\}, \{b\}, \{c\}, \{d\}; \{a,b\}, \{a,c\}, \{a,d\}, \{b,c\}, \{b,d\}, \{c,d\}, \{a,b,c\}, \{a,b,d\}, \{a,c,d\}, \{b,c,d\} \},$$

and the possible edges are
({a}, {b,c,d}); ({b}, {a,c,d}); ({c}, {a,b,d}); ({d}, {a,b,c}); ({a,b}, {c,d}); ({a,c},{b,d}); ({a,d},{b,c}).
To determine the adjacent element in the ring T(X) and whether a graph in T(X) is planar, we need the following theorem.
Theorem 5**:** Let X be a non-empty set. Define a graph with non-zero elements of T(X) as vertices such that

M is adjacent to B if MN = φ,

the zero element of T(X) where M, N ∈ T(X). This graph is planar if number of elements of X is less than 4.

Let m(X) = k.
For k = 1 is obvious.
For k = 2, consider X = {a,b}. T(X) = {{a}; {b}; {a, b}; φ }.
The possible edges are

({a}, {b}); ({a}, {c}); ({b}, {c}); ({a, b}, {c}); ({a, c}, {b}); ({b, c}, {a}).

For k = 4, consider X = {a,b,c,d}. Then
T(X) = Then T(X) = {{a}; {b}; {c}; {d}; {a, b}; {b, c}; {a, c}; {a, d}; {b, d}; {c, d}; {a, b, c}; {a, b, d}; {a, c, d}; {b, c, d}; {a, b, c, d}; φ}.
The graph contains a complete sub graph with four vertices

{a}; {b}; {c}; {d}.

The other possible edges are:
({a}, {b, c}); ({a}, {b, d}); ({a}, {c, d}); ({a}, {b, c, d}); ({b}, {a, c}); ({b}, {a, d}); ({b}, {c, d}); ({b}, {a, c, d}); ({c}, {a, b}); ({c}, {a, d}); ({c}, {b, d}); ({c}, {a, b, d}); ({d}, {a, b}); ({d}, {a, c}); ({d}, {b, c}); ({d}, {a, b, c}); ({a, b}, {c, d}); ({a, c}, {b, d}); ({a, d}, {b, c})

Clearly this graph is not planar.

Examining of a Special Ring of Matrices

Let S be a ring with identity 1_S. Let R = $M_2(S)$, the ring of all 2×2 matrices over S. In this case R is a non-commutative ring. Let G be a graph with nonzero elements of R as vertices such that two matrices M, N ∈ R are adjacent if MN = NM = 0, the zero element of R. Then, all the following sets are a ring (Bhat at all. 2007):

- Let T be the set of matrices with non-zero entry only at $(1-1)^{th}$ place and K be the set of matrices with non-zero entry only at $(2\text{-}2)^{th}$ place. Then MN = NM = 0 for any M ∈ T and for any N ∈ K. Therefore, the graph is a complete bipartite.
- Let U be the set of matrices with non-zero entry at $(1-2)^{th}$ place only. Then MN = NM = 0 for any M, N ∈ U. Therefore, we see that in this set every element is nilpotent ($M^2 = 0$ for all M ∈ U) and the graph with vertices as elements of U is thus a complete graph.
- Let V be the set of matrices with non-zero entry at $(2-1)^{th}$ place only. This set also has the same nature as U.
- Let L be the set of all matrices with zero entries in second column and U be the set of all matrices with zero entries in first row. Then L is a left ideal of R and U is a right ideal of R. Also, MN = 0 for any M ∈ L and for any N ∈ U. Here MN need not be zero but if we consider the graph as directed one and say that M and N are adjacent if MN = 0, then we have an edge from each element of L to each element of M. Thus, in this case the graph is a complete bipartite.

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OPPORTUNITIES FOR THE CHEMICAL SCIENCES - ENERGY I: ENERGY STORAGE, NUCLEAR ENERGY, HYDROGEN, WIND AND WATER*

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Abstract. Focusing global challenges means advancing fundamental scientific knowledge, supporting excellence in chemical science research. It needs an interdisciplinary approach and the Royal Society of Chemistry must build bridges between chemistry's sub-disciplines, and with other sciences and engineering. We believe that international active networks of this organization could be instrumental in implementing of the possible chemical solutions. The chemical sciences, according to our approach, can play a clear and an efficient role in pursuing sustainable development and in providing technological solutions to the challenges facing society today and in the future. The technologies that the chemical sciences engender will improve the quality of daily life, underpin prosperity and will increase our readiness to face the challenges of the future for a livable environment or for a health world.

Keywords: chemical science, energy, environment, supply

Introduction

Chemistry with its key targets of providing materials and processes for conversion of matter is at the center stage of the energy challenge and opportunities (Doroodian and Boyd, 2003). Most energy conversion systems work on chemical energy carriers and need for their use suitable process. Doroodian and Boyd noted that the enormous scale of their application demands optimization beyond the incremental advances of empirical discoveries. Knowledge-based systematic approaches are absolute to arrive at scalable and sustainable solutions. Optimization of these processes exeminied by catalysis for fuels and chemicals production.

An adequate and secure supply of energy is essential in almost every aspect of our lives, but this needs to be achieved with minimum adverse environmental impact. Global emissions are set to catch double pre-industrial levels before 2050, with severe impacts on our climate and the global economy (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012; British Wind Energy Association, 2008). Moreover, energy demand worldwide continues to increase, and the world's population grows, and the developing world economies are extending step by step. Our idea with the present policies that global energy demand will be more than 55 per cent higher in 2040 than today, with energy related greenhouse gas emissions around 60 per cent higher. According to scientific data, remaining reserves of fossil fuels will play a significant part in meeting the world's energy needs for the foreseeable future, and ways of reducing emissions must be found (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018; Prest, 2009).

Teitelbaum (2007) pointed out that scientists and engineers will be required to develop sustainable energy solutions and, to find more efficient ways of producing, refining and using fossil fuels during the transition as society moves

* A brief version of this article presented at ISTEC 2018

from an economy based on fossil fuels to a more sustainable energy mix. In this paper, we overview the challenges and the opportunities that exist and identifies the key R&D areas for the chemical sciences that are needed to support the sustainable development of energy supply, distribution and use, and to assist in the transition to a sustainable energy future. The main challenges are as below;

- Energy storage
- Nuclear energy
- Hydrogen
- Wind and Water

Energy storage

The performance of energy conversion and storage technologies as fuel cells, batteries, and electrolysis requires to be improved to enable better use of intermittent renewable electricity sources and the development of sustainable transport (HM Treasury, 2004). According to this report, cars and vans accounted for seven percent of global CO_2 emissions in 2000. Statistically, this proportion is rising as economic growth brings the benefits of widespread car use to the world's emerging and developing economies (HM Treasury, 2007).

According to this report, it is essential to search in renewable electricity generation technologies as well as technologies that allow transport decarbonization. The realisation of both aims depends on developing energy storage devices that balance intermittent supply with consumer demand and addressing issues associated with security and quality of source. Major technical challenges need to be met that require research into new different sections of science, especially in the chemical sciences.

The major challenge is therefore to improve the performance of energy conversion and storage technologies such as fuel cells, batteries and electrolysis to enable better use of intermittent renewable electricity sources and the deployment of sustainable transport. The main points that technology needed (International Energy Agency, 2016):

- fundamental advances in new cheaper and safer materials with better performance,
- improving power and energy densities,
- reducing and replacing strategic materials to ensure security of supply,
- developing material recycling strategies.

This agency pointed out that developments must be coupled with advances in the fundamental science of surface chemistry, electrochemistry and the improved modelling of thermodynamics and kinetics for continues advances.

Nuclear energy

Nuclear energy generation is an important solution approach to the energy challenges. The technical challenge is for the safe and efficient harnessing of nuclear energy, exploring both fission and fusion technologies (The Royal Society of Chemistry, 2009).

Nuclear power in 2005 determined 16 percent of global electricity generation (IPCC Fourth Assessment Report, 2007). In 2007 nuclear power accounted for 19 percent of the UK's electricity generation and 7.5 per cent of total energy supplies (IPCC Fourth Assessment Report, 2009). According to this report, nuclear energy generation is an important component of the energy mix. It is necessary to follow the below steps to improve further the efficient a nuclear fission:

- develop improved methods for spent fuel processing, including developing advanced separation technologies to allow unprecedented control of chemical selectivity in complex environments,
- study the nuclear and chemical properties of the actinide and lanthanide elements; and to improve our understanding of radiation effects on polymers and ion exchange materials,
- undertake research to advance the understanding of the chemical effects of radiation on material fatigue, and corrosion in nuclear power stations.

The new generation of advanced reactors have the potential to deliver step-change benefits. Opportunities exist in the design and demonstration of these new reactors. According to scientific data, nuclear fusion is still at the

development stage. Despite some progress, the challenge in fusion research is to generate more energy from fusion than is put in.

Radioactive waste needs to be reduced, safely contained and opportunities for re-use explored. The UK has a large variety of nuclear waste due to the different legacy reactors that were built across the country. It includes spent nuclear fuel, plutonium, uranium and general radioactive waste from running and decommissioned nuclear power plants (British Wind Energy Association, 2008). Using waste form chemistry, which contains the fundamental science of materials used in controlling nuclear waste, could help solve several waste management issues. We think that and improved methods and new nuclear waste in the intermediate and long term are required. Storage strategies will demand producing new materials. They will also require a greater understanding waste - cement interactions (NSW, 2011).

Hydrogen

The generation and storage of hydrogen are both problematic (Prest, 2009). According to him developing new materials and techniques so that we can safely and efficiently harness hydrogen.

He noted that hydrogen coupled with fuel cell technology gives an alternative to our current reliance on fossil fuels for transport and generating power. Prest pointed out that significant technical challenges are in developing clean and sustainable hydrogen production processes to provide a viable future hydrogen economy. Both generating and storing hydrogen are both problematic. The steam methane reforming process is used to produce nighty percent of all hydrogen extracted today and liberates up to six times as much CO_2 as it does hydrogen. Developing new materials and techniques so that we can harness and use hydrogen safely and efficiently will be required so that it can be used as an energy vector, appropriately scaled to different applications (www.supergen-bioenergy.net, last available 11.06.2018).

Producing hydrogen from water by electrolysis using renewably generated electricity is highly efficient as the process is clean and maintenance-free (Boole, 2008). He added that photocatalytic water electrolysis uses energy from sun to split water into hydrogen and oxygen. Also, Boole pointed out that R&D must focus on the energetics of the light harvesting system to drive the electrolysis and the stability of the system in the aqueous environment.

Developing new heat exchange materials will be necessary to meet the required stability conditions (The Royal Society of Chemistry, 2009). An improved understanding of fundamental high temperature kinetics and thermodynamics will be essential. According to this society, biochemical hydrogen generation is based on the concept that certain photosynthetic microbes produce hydrogen as part of their natural metabolic activities using light energy. The following steps are needed to reach an upper level (Prest, 2009):

- improving culture conditions for hydrogen production by fermentation,
- using microorganisms in microbial fuel cells to generate hydrogen from waste,
- discovering new microorganisms or genetically modifying existing organisms.

Hydrogen is the lightest element and concerns a larger volume in comparison to other fuels. It requires to be liquefied, compressed or stored in an advanced storage system to ensure a vehicle has enough on board to travel a certain distance. Technology innovations required for alternative storage options include developing advanced materials, such as carbon nanotubes.

Wind and Water

Effective energy supply from the natural world sources requires further development to minimize costs and maximize benefits, since power generation yields from tide, waves, hydro and wind turbines are intermittent and geographically restricted level (Royal Society of Chemistry, 2007). According the report of this society, more advances are required in the most developed ocean technologies including tidal barrages, tidal current turbines and wave turbines to exploit fully the possibilities of electricity production from wave sources. This must be coupled with creates in less developed technologies that rely on salinity gradient energy which work either on the principle of osmosis. This needs further developments that reduce the cost or improve the efficiency of membranes to significantly improve the economics of this process.

Like wind energy, corrosion is also a problem for wave and tidal energy. Also, to reduce maintenance costs and maintain operating life, it requires the continued development of advanced protective coatings (Kulshreshtha, 1998). According to him, materials science will clearly play an essential role in developing coatings, lubricants and lightweight durable composite materials in terms of wind energy. These materials are necessary for constructing turbine blades and towers that can withstand the stresses. He also noted that there is scope to develop embedded sensing materials which can monitor stability and damage. According to him, corrosion could be a problem for offshore turbines exposed to salt, air pollution and UV radiation. Finally, he underlined that the continued development of advanced protective coatings is necessary to reduce maintenance costs and maintain the operating life of wind energy devices.

Result

Chemistry is a tactical and critical science for solving the energy challenge. Through process design it provides central elements of sustainable energy supply chains based upon physical charge carrier separation driven by solar radiation. In all these processes as well as in the necessary intensification of fossil energy utilization, which was not discussed here, chemistry will have to provide functional materials. The controlled synthesis of materials another central task for chemistry in the energy challenge.

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Opportunities for The Chemical Sciences - Energy II: fossil fuels, biofuels and solar energy*

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Abstract. Chemical energy research must turn out the broadest possible way to capture many possible solutions. Focusing global challenges means advancing fundamental scientific knowledge, supporting excellence in chemical science research. It needs an interdisciplinary approach and the Royal Society of Chemistry must build bridges between chemistry's sub-disciplines, and with other sciences and engineering. We believe that international active networks of this organization could be instrumental in implementing of the possible chemical solutions. The chemical sciences, according to our approach, can play a clear and an efficient role in pursuing sustainable development and in providing technological solutions to the challenges facing society today and in the future. The technologies that the chemical sciences engender will improve the quality of daily life, underpin prosperity and will increase our readiness to face the challenges of the future for a livable environment or for a health world.

Keywords: chemical science, energy, environment, supply, energy efficiency, solar energy

Introduction

Energy research is an interdisciplinary topic. A large variety of fundamental approaches are proposed and actively pursued to address the different issues of sustainable and safe energy supply strategies. Chemical science can control the energetic "cost" of energy conversion as well as the cost of its utilization (Schlögl, 2010). Chemistry with its key targets of providing materials and processes for conversion of matter is at the center stage of the energy challenge and opportunities (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012; Doroodian and Boyd, 2003). Most energy conversion systems work on chemical energy carriers and need for their use suitable process. Doroodian and Boyd noted that the enormous scale of their application demands optimization beyond the incremental advances of empirical discoveries. Knowledge-based systematic approaches are absolute to arrive at scalable and sustainable solutions. Optimization of these processes exeminied by catalysis for fuels and chemicals production.

An adequate and secure supply of energy is essential in almost every aspect of our lives, but this needs to be achieved with minimum adverse environmental impact. Global emissions are set to catch double pre-industrial levels before 2050, with severe impacts on our climate and the global economy (British Wind Energy Association, 2008). Moreover, energy demand worldwide continues to increase, and the world's population grows, and the developing world economies are extending step by step. Our idea with the present policies that global energy demand will be more than 55 per cent higher in 2040 than today, with energy related greenhouse gas emissions around 60 per cent higher. According to scientific data, remaining reserves of fossil fuels will play a significant

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part in meeting the world's energy needs for the foreseeable future, and ways of reducing emissions must be found (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018; Prest, 2009).

Teitelbaum (2007) pointed out that scientists and engineers will be required to develop sustainable energy solutions and, to find more efficient ways of producing, refining and using fossil fuels during the transition as society moves from an economy based on fossil fuels to a more sustainable energy mix. In this paper, we overview the challenges and the opportunities that exist and identifies the key R&D areas for the chemical sciences that are needed to support the sustainable development of energy supply, distribution and use, and to assist in the transition to a sustainable energy future. The main challenges are as below;

- Energy efficiency
- Fossil fuels
- Biopower and biofuels
- Solar energy

Energy efficiency

Improvements are needed in the efficiency with which electricity is generated, transmitted and energy is used (International Energy Agency, 2016). According to this agency's report, it points to an energy shortfall of fifteen terawatts (TW) across the planet by 2050. Collectively, individuals are responsible for over 40 percent of the UK's energy use and CO_2 emissions. Also, it is noted in this report, through energy efficiency and behavioral measures to reduce waste, households could save a further nine million tons of CO_2 a year by 2020 and cut energy bills at the same time (Advancing UK bioenergy, 2009).

The chemical sciences have a role to play in improving the efficiency with which electricity is generated, transmitted and how the energy is used. Major opportunities exist for improving the conversion of primary energy for transport, industrial energy use and in buildings and domestic applications. Innovation in these areas will be supported by the chemical sciences. Materials chemistry has a significant role to play in meeting future requirements as noted below (Royal Society of Chemistry, 2009):

- developing better insulating materials and more efficient lighting for buildings,
- improving fuel economy and reducing CO_2 emissions by developing advanced materials and components,
- using nanotechnology to increase the strength to weight ratio of structural materials.

It is pointed out in this report that there are undoubtedly developments in materials use and processing where the chemical sciences will play an essential part in using energy more efficiently and improving manufacturing efficiency. Moreover, it was proposed "innovations will be required in optimization, process intensification and developing new process routes, including developing new catalysts and improving separation technologies".

Fossil fuels

Current fossil fuel usage is uncontrollable and associated with greenhouse gas production. More efficient use of fossil fuels and the by-products are required alongside technologies that ensure minimal environmental impact (HM Treasury, 2007). HM Treasury pointed out that the amount of the world's primary energy supply provided by renewable energy technologies will grow, but without further innovation in technology. Also, it is noted that fossil fuels will remain part of our energy mix for some time to come. The organization recommended that currently the world relies on fossil fuels for around 80 percent of its total energy supply. According to this report, it is very important to use fossil fuels and their by-products more efficiently, alongside technologies that will ensure minimal environmental impact, if some use of fossil fuels in the future is accepted.

Natural gas has a higher carbon ratio than oil or coal and emits less CO_2 for a given quantity of energy consumed (HM Treasury, 2007). According to report, the potential benefits for improving air quality are significant, relative to other fossil fuels. And, chemical sciences will have a strategic role to play in improving current systems, and in developing new technologies. We believe that technological innovations will be required in:

- developing advanced catalysts to improve combustion for emissions clean-up
- developing cost effective gas purification technologies,
- improving high temperature materials for enhanced efficiency and performance.

Crude oil is currently being produced from increasingly hostile environments (NSW, 2011). According to NSW report, enhanced oil recovery processes and the exploitation of heavy oil reserves need a detailed understanding of the chemical interactions between oil, water and rock systems. One of the main challenges facing the oil refinery industry is the cost-effective production of ultra-low sulfur fuels. Input from the chemical sciences is required to overcome this issue by developing improved catalysts and conversion processes.

Kulshreshtha, (1998) stayed that coal-fired generation should have a long-term role in providing energy diversity and security, providing ways can be found to reduce CO_2 emissions in the longer-term period. He recommended that research should be focused specifically on better materials for plant design, including corrosion resistant materials for use in flue gas desulfurization systems and a better understanding of specific processes such as corrosion and ash deposition. Another notification is that improved process monitoring, equipment design and performance prediction tools to improve power plant efficiency are also required. Finally, we underline that if we continue to use fossil fuels, it is important that some means of capturing and safely storing CO_2 on a large scale is operated.

Biopower and biofuels

Fuels and electricity must be produced from biological sources in a way that is economic, and environmentally (Boole, 2008). He noted that the proportion of solar radiation that reaches the Earth's surface each year is more than 10,000 times the current annual global energy consumption. Biomass is thought to contribute over 10 per cent of global primary energy and more than 80 per cent of this is used for cooking and heating in households (IPCC Fourth Assessment Report, 2009). We see that many developed nations are turning back to biomass as a fuel source to alleviate fossil fuel usage and CO_2 emissions. In this report, it is noted that crops such as sugar cane can grow very quickly and can fix sunlight with an efficiency of 2 per cent, 10 times higher than the planetary average for wild plants.

Biomass is any plant material that can be used as a fuel and can be burned directly to generate power or can be processed to create gas or liquids to be used as fuel to produce power (Boole, 2008). Using biomass is seen as one way of meeting EU targets for reducing CO_2 emissions and increasing the use of renewable energy (IPCC Fourth Assessment Report, 2009). From this data, biomass is a versatile and important fuel, and a rich feedstock for the chemical industry.

According to Boole, the drive to increase use of biomass and renewable energy sources has led to the bio-refinery concept in addition to biofuels. And, gasification and thermochemical technologies are also important methods of converting biomass to transport fuels. Also, he noted that the relatively low conversion efficiency of sunlight into biomass means that large areas of agricultural land would be required to produce significant quantities of biofuels using current technology. Prest (2009) pointed out that plants could be processed to produce appropriate waste products and high-value chemical products. Moreover, we understand that there could also be opportunities to develop methods of producing fuel from new sources such as animal or other waste forms. The chemical sciences have a significant role to play in improving bio-refinery processes by (IPCC Fourth Assessment Report, 2009):

- improving ways of hydrolyzing diversified biomass,
- advancing modelling and analytical methods,
- improving the flexibility of feedstock and output,
- developing thermochemical processes,
- improving the extraction of high value chemicals before energy extraction.

A fundamental understanding of the chemistry of biomass production and the tools to determine the impacts of biofuels over the entire life-cycle while there are significant opportunities, the challenges will require developing novel biomass conversion technologies.

Solar energy

Development of existing technologies to be more cost efficient and developing the next generation of solar cells is important to make the potential of solar energy. Harnessing the free energy of the sun can provide a clean and secure supply of electricity, heat and fuels (www.hydrogensolar.com/Paths.html, available at 25.06.2018).

"The sun is a source of energy many more times abundant than required by man; harnessing the free energy of the sun could therefore provide a clean and secure supply of electricity, heat and fuels. Developing scalable, efficient and low-intensity-tolerant solar energy harvesting systems represents one of the greatest scientific challenges today. The sun's heat and light provide an abundant source of energy that can be harnessed in many ways. There are a variety of technologies that have been developed to take advantage of solar energy. These include photovoltaic systems, concentrating solar power systems, passive solar heating and daylighting, solar hot water, and solar process heat and space heating and cooling" (Royal Society of Chemistry, 2008).

According to this report, solar cells provide an artificial means of utilising solar energy. The current generation of crystalline and amorphous silicon solar cells have efficiencies between 5 percent and 17 cents, but their fabrication is expensive and consumes a lot of energy. The innovations needed to improve the design of current first-generation photovoltaic (PV) cells include (Royal Society of Chemistry, 2008):

- developing base-metal solutions to replace the current domination of silver printed metallization,
- developing lower energy, higher yield and lower cost routes to silicon refining lower CO_2-emission process.
- more efficient or environmentally benign chemical etching processes for silicon wafer processing.

According to Prest (2009), the cost of photovoltaic power could also be reduced with advances in developing high efficiency concentrator photovoltaics systems. Also, improving the concentrated solar power plants used to produce electricity or hydrogen could be reduce the cost.

Result

Chemistry can provide sustainable solutions for energy supply concepts preventing us from having to use additional largescale experiments to global warming with any compartment of our natural environment. Chemistry is a tactical and critical science for solving the energy challenge. Through process design it provides central elements of sustainable energy supply chains based upon physical charge carrier separation driven by solar radiation. In all these processes as well as in the necessary intensification of fossil energy utilization, which was not discussed here, chemistry will have to provide functional materials. The controlled synthesis of materials another central task for chemistry in the energy challenge. It should be recognized that economic factors may not support a rapid disruptive technology change based upon an entirely new process.

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OVERVIEW OF RENEWABLE ENERGY TECHNOLOGIES: SOLAR-HYDRO-WIND ENERGY SYSTEMS*

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Abstract. In this paper, we present an overview and brief description, including fundamentals, of some basic different renewable energy technologies, solar, hydro, and wind energy. One of the first aspects that we need to consider is the cost of renewable energy technologies. We think that this is not an easy situation to determine because of many energy technologies, many factors affect cost and different sources of information use different condition for estimating cost. The environmental benefits of renewable energy technologies are not easy to consider in terms of cost savings through less damage to the environment. We believe that it is best way to take a life cycle cost approach when trying to calculate the cost of these technologies.
Keywords: renewable energy, energy technology, solar energy, hydro energy, wind energy

Introduction

Climate change is one of the great challenges of the 21st century. Many impacts may be avoided if efforts are moved to transform current energy systems. Renewable energy sources have a big potential to displace emissions of greenhouse gases from the combustion of fossil fuels to mitigate climate change. We believe that renewable energy sources can contribute to social and economic development, to a sustainable energy supply, and to a reduction of negative impacts of energy provision on the environment and human health if implemented properly (Hunt, 2001).

We deal with six renewable energy sources: bioenergy, direct solar energy, geothermal energy, hydropower, ocean energy and wind energy. Also, we will focus their integration into present and future energy systems. It considers the environmental and social consequences associated with the deployment of these technologies and presents strategies to overcome technical as well.

Solar Energy

Solar energy technologies can be divided into two categories:

- solar thermal systems
- solar electric or photovoltaic (PV) systems

Solar thermal systems: Solar thermal systems use the sun's power in terms of its thermal or heat energy for heating, drying, evaporation and cooling. Many countries have indigenous products such as solar water heaters and solar grain dryers. These are usually local rather than international products, specific to a country or even to a region (Hunt, 2001). The main solar thermal systems used in developing countries are mentioned briefly below:

"Solar thermal engines" use complex concentrating solar collectors to produce high temperatures. These temperatures are high enough to produce steam, which can be used to drive steam turbines generating electricity. There is a wide variety of different designs, some use central receivers whilst others use parabolic concentrator

* A brief version of this article presented at ISTEC 2018

systems (Hant at all., 2012). Many of the newer designs of solar thermal are still at the prototype stage being tested in pilot installations in many countries. Hant and his friends stayed that the global environment facility has supported the first planning phase of a project that is developing a concentrating solar power plant in Egypt in 2004. There are also projects in India, Mexico and Morocco that have been supported by the global environment facility as part of a strategy to accelerate cost reduction and commercial adoption of high temperature solar thermal energy technology.

"Solar water heating systems" may be used in rural clinics, hospitals or even schools. The principle of the system is to heat water, usually in a special collector and store it in a tank until required (Klugmann-Radziemska, 2011). Collectors are designed to collect the heat in the most efficient, but cost-effective way, usually into a heat transfer fluid, which then transfers its heat to the water in the storage tank. According to him, the two main types of collector are: flat plate and evacuated tube. The cheapest technology available and the simplest to install is a thermosiphon system, which uses the natural tendency of heated water to rise and cooler water to fall to perform the heat collection task: "As the sun shines on the collector, the water inside the collector flow-tubes is heated. As it heats, this water expands slightly and becomes lighter than the cold water in the solar storage tank mounted above the collector. Gravity then pulls the heavier, cold water down from the tank and into the collector inlet. The cold water pushes the heated water through the collector outlet and into the top of the tank, thus heating the water in the tank (figure 1).

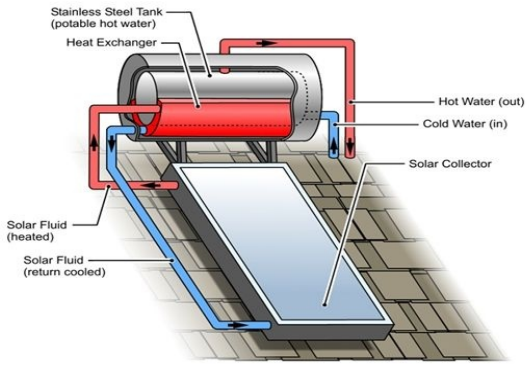

Figure 1. A thermosiphon solar water heating system

(www.google.com.tr/search?q=A+thermosiphon+solar+water+heating+system&rlz)

"Solar drying system", in the open air, has been used for centuries. Drying may be required to preserve agricultural/food products or as a part of the production process, i.e. timber drying. Solar drying systems are those that use the sun's energy more efficiently than simple open-air drying (Klugmann-Radziemska, 2011).

An "integrated solar dryer" is one in which solar energy collection and drying take place in a single unit. Cabinet dryers, rack dryers, tunnel dryers, greenhouse dryers, and multi-rack dryers fall under this category. Normally, these dryers are small in size and are stand-alone units. A solar dryer in which solar energy collection and drying take place in separate units is known as a distributed solar dryer. This type of solar dryer has two parts: (1) a flat-plate air heater and (2) a drying chamber. Air is heated in the flat-plate heater placed on the roof of the building or on the ground. Hot air from the air heater is circulated in the drying chamber with the help of a blower. These dryers can be designed in different sizes with various configurations, depending upon the temperature of hot air, airflow rate, types of products to be dried. solar dryer in which solar energy collection takes place in both air heater and drying unit, and drying takes place only in the drying unit, is known as a mixed-mode solar dryer. In this dryer, solar energy is collected through flat-plate solar collectors and also by the roof of the drying chamber. In large industrial drying systems, the solar-heated air is combined with air heated by conventional energy; this adds to the reliability of the system and at the same time helps in significantly reducing conventional energy consumption (www.vikaspedia.com).

"Solar cookers systems" can be important because of the increased scarcity of wood fuel and the problems of deforestation in many developing country regions. Solar cookers can also promote cleaner air where there is a problem with indoor cooking. There are basically two types of solar cooker: oven or stove type. As with conventional cooking stoves, solar stoves apply heat to the bottom of the cooking pot while solar ovens apply a general heat to the enclosed area which contains the cooking pot. However, there are important social issues related

to the effective use of solar cookers. There will always be some change of habits required and readiness to change is an important factor that affects the potential impact of this technology (Sovacool, 2009).

"Solar distillation system" is a solar enhanced distillation process to produce potable water from a saline source. It can be used in areas where, for instance, drinking water is in short supply but brackish water, i.e. containing dissolved salts, is available. In general solar distillation equipment, or stills, is more economically attractive for smaller outputs. Costs increase significantly with increased output, in comparison to other technologies which have considerable economics of scale (Willis at all., 2010).

Photovoltaic (PV) systems: this device converts sun light directly into electrical energy. The amount of energy that can be produced is directly dependent on the sunshine intensity. Thus, for example, PV devices can produce electricity even in winter and even during cloudy weather albeit at a reduced rate. Natural cycles in the context of PV systems thus have three dimensions. As with many other renewable energy technologies, PV has a seasonal variation in potential electricity production with the peak in summer although in principle PV devices operating along the equator have an almost constant exploitable potential throughout the year. Secondly, electricity production varies on a diurnal basis from dawn to dusk peaking during mid-day. Finally, short-term fluctuation of weather conditions, including clouds and rain fall, impact on the interiorly amount of electricity that can be harvested (Sovacool, 2009).

Hydro energy

Hydropower is the extraction of energy from falling water that from a higher to a lower altitude when it is made to pass through an energy conversion device, such as a water turbine or a water wheel. A water turbine converts the energy of water into mechanical energy, which in turn is often converted into electrical energy by means of a generator. Hydropower can also be extracted from river currents when a suitable device is placed directly in a river. The devices employed in this case are generally known as river or water current turbines or a "zero head" turbine. This module will review only the former type of hydropower, as the latter has a limited potential and application. Hydropower systems can range from tens of Watts to hundreds of Megawatts. However, there is no internationally recognized standard definition for hydropower sizes, so definitions can vary from one country to another (Sanguri, 2013).

Large hydropower schemes often have outputs of hundreds or even thousands of megawatts but function similarly to small hydropower plants, which use the energy in falling water to produce electricity or mechanical energy using a variety of available turbine types depending on the characteristics of the rive and installation capacity. On a smaller scale, used more often in rural and remote areas, micro-hydro schemes can have capacities up to 500 kW and are generally run-of-the-river developments for villages. On an even smaller scale pico-hydro systems tend to be between 50 W to 5 kW and are generally used for individual homes or clusters of households. Figure 2 shows a typical high head pico-hydro scheme, although this configuration is also typical of larger small-scale hydro schemes. Such small community-based systems demand a different approach to larger hydro schemes and require a broad understanding of all the diverse technical and social elements in order to contribute successfully to the energy needs of a rural community (Sanguri, 2013).

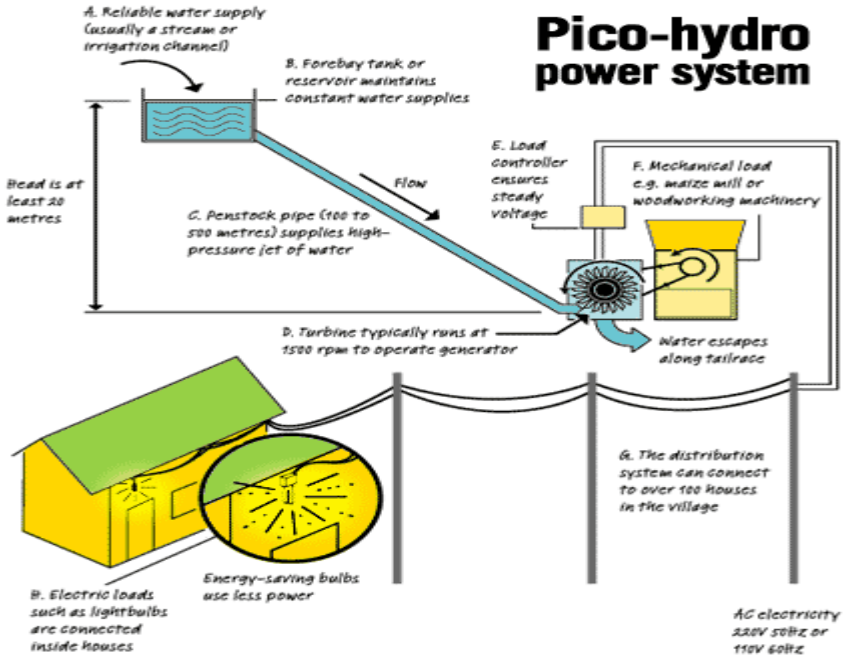

Figure 2. Schematic of a pico-hydro system

(www.google.com.tr/search?q=Schematic+of+a+pico-hydro+system&rlz)

Hydropower, under the right circumstances, can be one of the most reliable and cost-effective renewable energy sources. The applications of small-hydro facilities include base, peak and stand-by power production or stand-alone applications.

Wind energy

A wind turbine produces power by converting the force of the wind, which is kinetic energy, acting on the rotor blades, which is rotational energy, into torque, which is turning force or mechanical energy. This rotational energy is used either within a generator to produce electricity or, perhaps less commonly, it is used directly for driving equipment such as milling machines or water pumps (Levanthall, 2006). Water pumping applications are more common in developing countries (figure 3).

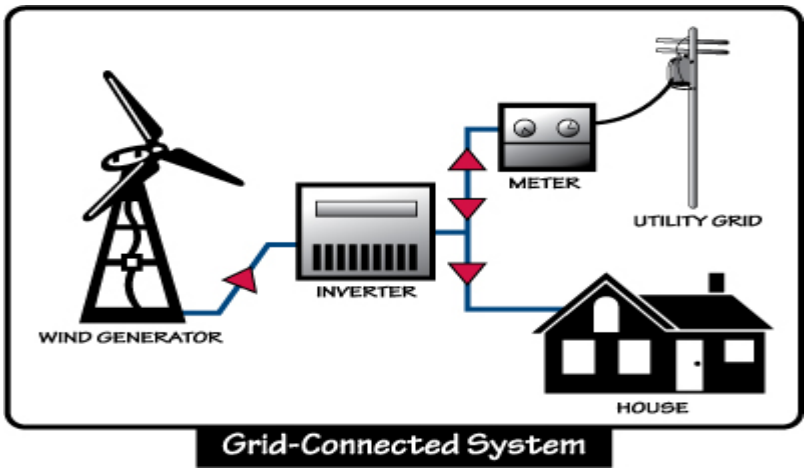

Figure 3. Wind energy system

(www.google.com.tr/search?q=Wind+energy+system&rlz)

Wind power by its nature is variable, therefore some form of storage or back-up is inevitably involved (Bearwald at all., 2008). This may be through:

- connection to an electricity grid system, which may be on a large or small (mini-grid) scale;
- incorporating other electricity producing energy systems: from conventional generating stations through diesel generators to other renewable energy systems;
- the use of storage systems such as batteries or, for mechanical systems, storage via water held in a tank.

"Grid-connected wind turbines" are certainly having a considerable impact in developed countries and in some developing countries, namely Argentina, China and India. This is mainly through large-scale installations either on land (on-shore) or in the sea on the continental shelf. In addition, in developed countries, more smaller machines are now being grid-connected. These are usually installed to supply power to a private owner already connected to the electricity grid but who wishes to supply at least some of their own power. This principle can be used in developing countries to contribute to a more decentralized grid network and to support a weak grid (Levanthall, 2006).

"Stand-alone wind turbines" electric system involves the use of a wind generator to maintain an adequate level of charge in an electrical storage battery. The battery in turn can provide electricity on demand for electrical applications such as lights, radios, refrigeration, telecommunications, etc., irrespective of whether the wind is blowing. A controller is also used to ensure that the batteries are not damaged by overcharging or excessive discharge, usually by sensing low voltage (Levanthall, 2006).

"Wind turbine for water pumping" uses the wind's kinetic energy to lift water. Wind pumps are typically used for water supply, small-scale irrigation or pumping seawater for sea salt production. Here we look at the two main uses which are irrigation and water supply. There are two distinct categories of wind pump, because the technical, operational and economic requirements are generally different for these two ends uses. That is not to say that a water supply wind pump cannot be used for irrigation, but irrigation designs are generally unsuitable for water supply duties (Bearwald at all., 2008).

Result

Renewables can be used for both electricity and heat generation. There is a wide range of renewable energy technologies suitable for implementation in developing countries for a whole variety of different applications. Renewable energy can contribute to grid-connected generation but also has a large scope for off-grid applications and can be very suitable for remote and rural applications in developing countries.

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PYTHON PROGRAMMING LANGUAGE: BASIC PROGRAMMING LANGUAGE FOR UNIVERSITY STUDENTS*

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Abstract: Rapid technological developments in the world of information have led to a rapid change of hardware and software. Hardware and software, which are inseparable pairs, have not changed at a parallel speed. In the hardware world, a faster development has been observed. But in the software world, they have not developed at the same speed.
Without a software, we know that a piece of hardware cannot sum two numbers. Therefore, the programming language, which is the main factor in the production of software, has a great importance. The most widely used programming languages are C, C ++, Java, C# programming languages.

There are a number of enhancements as well as a lack of script-based programming languages. The obvious features of coding are easy to understand and easy to learn. For the first time, students who will start learning programming languages have great benefits when starting with a language that is easy to learn. Especially Python and Ruby programming languages are simple to learn. However, these languages have quite advanced features.

The aim of this study is to make sure that the reasons that will enable university students to turn to scripting languages in their programming language teaching curriculum. It is to explain the basic features of the Python programming language and to explain that it is easy to learn. Python programming language to explain what can be done with examples.

Keywords: Programming Language, Script Programming Languages, Python Programming Language, Ruby Programming Language

Introduction

Python is a programming language written by a Dutch programmer named Guido Van Rossum. Python started its development in 1990. While many people think that the name Python comes from the python snake, this is not the case (Abut and Akca; 1988; Asadi at all, 2011a; Asadi at all, 2011b; Asadi at all, 2011c). Python developer Guido van Rossum inspired his programming language with the name of Monty Python's Flying Circus (Aydin at all, 2017; Kocaman and Abut, 2015; 2015; Kocaman, 2013), a British comedy group called The Monty Python. Although it is the case, the Python programming language has become a tradition.

Unlike Python language C - C ++, Interpreter is an interpretive language. Therefore, you can run without compiling and thus you can develop applications very quickly. If you know any programming language, the speed of learning Python will be very high. Using Python's simple syntax, it is much easier to write programs in Python or to read a program written by someone else than in other languages. Python can be run on many systems thanks to cross platform support. Many Linux distributions include Python 2.x or higher. Popular Linux distributions also use Python to develop various applications (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). (For example, Ubuntu Software Center) Python, Google, Youtube, Yahoo! used by companies to develop software. Google also provides business opportunities for people with advanced Python knowledge. Python developer Guido Van Rossum worked on Google from 2005 to 2012. Using Python, desktop programming, game programming, portable device programming, web programming and network

* A brief version of this article presented at ISTEC 2018

programming can be developed. Python optimizes your application's memory usage thanks to its Garbage Collector. It is capable of working with Python, Java and .NET platforms. Python is a free language.

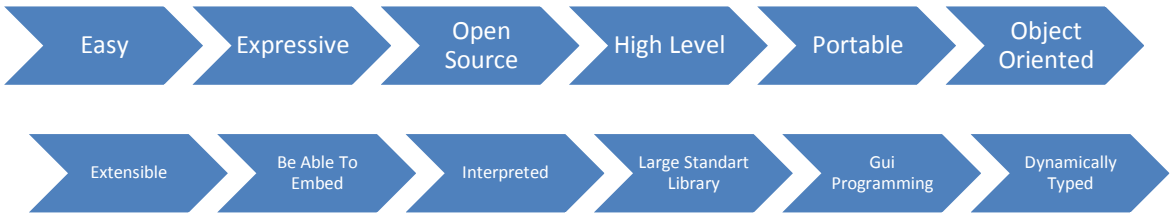

Figure 1: Python Features

1. Python Installation

The most up-to-date and current source code, binaries, documentation, news, etc., is available on the official website of Python https://www.python.org/

It can be download Python documentation from https://www.python.org/doc/. The documentation pages are available in popular document format. Python deployment is available for a wide variety of platforms. You can only download and install the distribution on your computer.

Windows Installation;

- Open https://www.python.org/downloads/ address in a web browser
- Click download windows installer link.
- Run MSI file (Your system must support Microsoft Installer). Install Wizard starts. Accept default settings.

You can check Python installation on Windows. Open command prompt and type it python –version

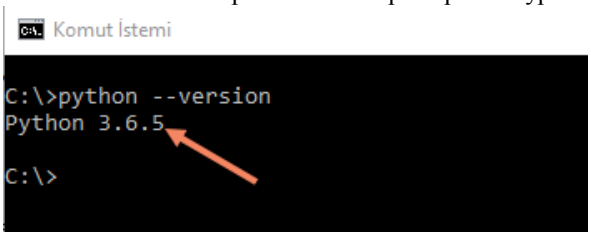

Figure 2: Learn Python version

Running Python;
In Linux/Unix
$ python
In Windows
C:\> python

```
C:\>python
Python 3.6.5 (v3.6.5:f59c0932b4, Mar 28 2018, 16:07:46) [MSC v.1900 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

Python is an interpreted programming language, this means that as a developer you write Python (.py) files in a text editor and then put those files into the python interpreter to be executed.
The way to run a python file is like this on the command line:
C:\> python helloapp.py
“helloapp.py” is the name of Python file.

1.1. First Python Program

You can use Integrated Development Environment such as Eclipse PyDev, PyCharm, Spyder, Thonny. We will use Eclipse on this article. You can download PyCharm in https://www.jetbrains.com/pycharm/ web address.

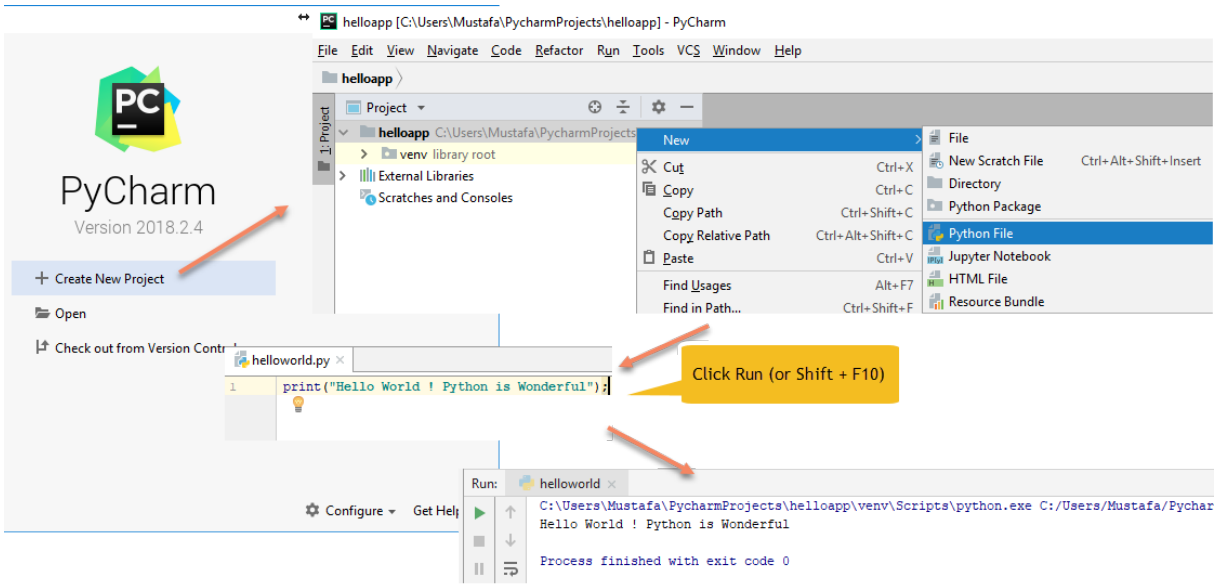

Figure 3: First Python program in PyCharm IDE

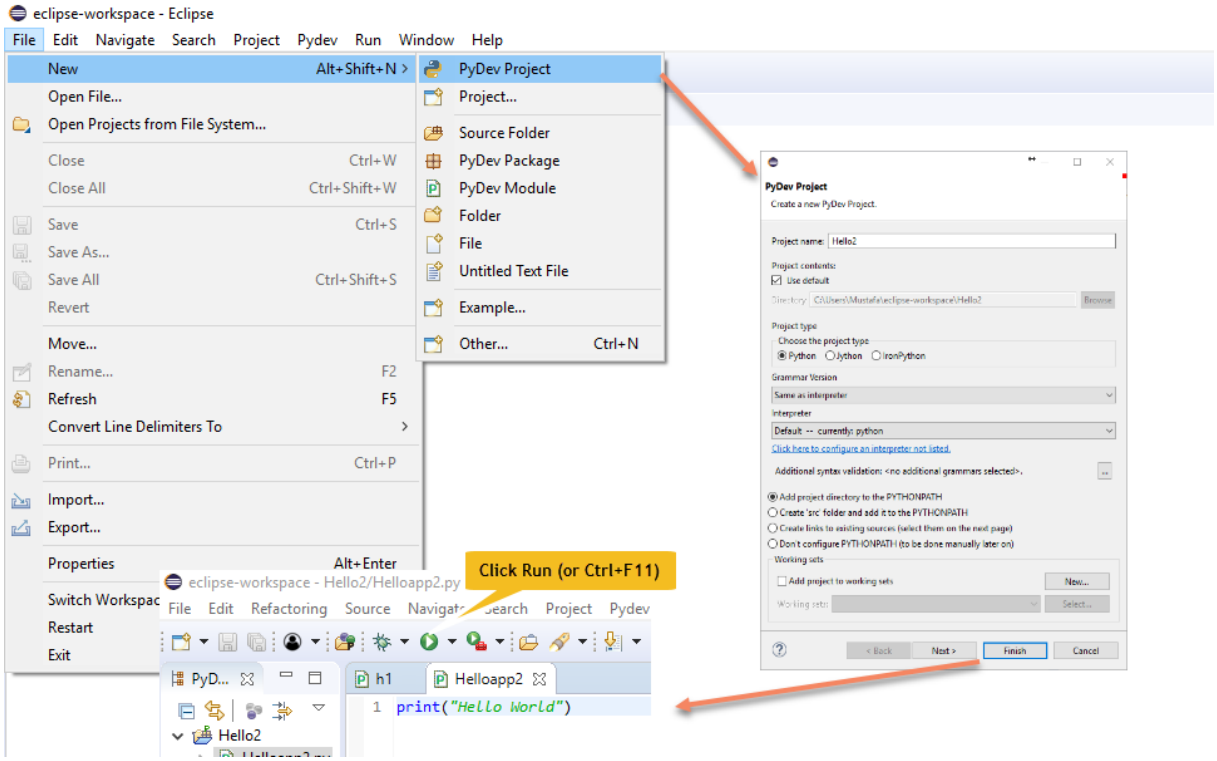

Figure 4: First Python program in Eclipse PyDev IDE

Python programs could be run with python command.
Example:
C:\>python.exe C:/Users/Mustafa/PycharmProjects/helloapp/helloworld.py
Hello World ! Python is Wonderful
*If Python command doesn't run check PATH environment variable with "path" or "set" command.

2. Python Programming Rules

As with any programming language, there are some basic rules of the Python programming language.
Syntax;
Where in other programming languages the indentation in code is for readability only, in Python the indentation is very important. Python uses indentation to indicate code block.
Example;

```
if(10 > 5):
    print("Ten is greater than five")
```

If you type an error occurs;

```
if(10 > 5):
```



```
print("Ten is greater than five")
print("Ten is greater than five");
    ^
IndentationError: expected an indented block
```

Comments;

```
# Comments
print("Hello Students")
```

You can use multi line comments with “””

```
"""
Comments Line 1
Comments Line 2
Comments Line 3
"""
```

2.1. Variables Using

Unlike some programming languages, there is no need to declare a variable. A variable is created you first assign a value to it.

```
d = 10 # d type is int
name = "Mustafa" # name type is string
print(d)
print(name)
```

Result:

10
Mustafa

You must follow these rules when determining variable names

- Variable name must start with a letter or underscore character
  Answer, _monthly_values
- Variable name can not start with a number
  Month1, Week2
- Variable name can only alpha-numeric characters and underscores (A-Z, 0-9 and _)
  Amount_products
- Variable names are case-sensitive
  section, Section, secTion (These are different variables)

```
department = "Computer"
Department = "Accounting"
departMent = "Chemistry"
print(department)
print(Department)
print(departMent)
```

Result:

Computer
Accounting
Chemistry

Python print command is used to output variable. When using multiple variables type “+” character between variables.

```
name ="Nihan"
print("Student's name is " + name)
school = "Kocaeli University"
department = "Computer Technology"
all = school + " " + department
print(all)
```

Result:

Student’s name is Nihan
Kocaeli University Computer Technology

```
d = 10
e = 20
print( d + e )
```


Result:
30

But if you type this; it seems an error
```
d = 5
name = "Eren"
print(d + name)
```

Result;
```
    print(d + name)
TypeError: unsupported operand type(s) for +: 'int' and 'str'
```

2.2. Numbers In Python

Python have three numeric types are;

- int
- float
- complex

Remember, there was no need to introduce variables in Python.

```
d = 5 # int
e = 10.2 # float
f = 2j # complex
print(type(d))
print(type(e))
print(type(f))
```

Result;
```
<class 'int'>
<class 'float'>
<class 'complex'>
```

int type;
You can use integer variables;

```
d = 5 # int
e = 450000666966 # int
print(type(d))
print(type(e))
```

Result:
```
<class 'int'>
<class 'int'>
```

float type;
```
d = 5.4 # float
e = 20.0 # float
f = -45.67 # float
print(type(d))
print(type(e))
print(type(f))
```

Result;
```
<class 'float'>
<class 'float'>
<class 'float'>
```



```
d = 5e3 # float
e = 10E6 # float
f = -45.6e10 # float
print(type(d))
print(type(e))
print(type(f))
```

Result;

```
<class 'float'>
<class 'float'>
<class 'float'>
```

complex type;

Complex numbers are written with a "j" as the imaginary section:

```
d = 5 + 4j # complex
e = 6j # complex
f = -10j # complex
print(type(d))
print(type(e))
print(type(f))
```

Result;

```
<class 'complex'>
<class 'complex'>
<class 'complex'>
```

2.2. Type Conversion

You may want to convert the type of a variable to another type. This can be done by the method called type conversion. Python is an object-oriented language and uses classes to define data types, including primitive types.

There are three functions to type conversion;

- int() : Convert any numeric values to integer values. (By rounding down)
- float() : Convert any numeric values to float values.
- str() : Convert any values to string values.

```
print("int conversion example")
d = int(5) # 5
e = int(3.6) # 3
f = int("5") # 5
print("float conversion example")
d = float(5) # 5.0
e = float(3.6) # 3.6
f = float("5.6") # 5.6
print("string conversion example")
d = str("a2") # 'a2'
e = str(10)   # '10'
f = str(7.5) # '7.5'
```

3. String Type Using

String literals in python are surrounded by ' ', or "" .

```
'Ali ' is same with this "Ali"
print("Ali")
```

Strings in Python are arrays of bytes representing unicode characters.


```
name = "Mustafa"
print(name) # 'Mustafa'
print(name[1]) # 'u'
```

name[1] is second character of name variable.

```
print(name[2:6]) # 'staf' from 2.position to 6.position
```

stript() method removes beginning or the end spaces

```
message = " Hello students    "
print(message.strip()) # 'Hello students'
```

len() method returns the length of string

```
message = "Hello students"
print(len(message)) # lengths is 14
```

lower() method returns the lower of string

```
message = "Hello students"
print(message.lower()) # hello students
```

upper() method returns the lower of string

```
message = "Hello students"
print(message.upper()) # HELLO STUDENTS
```

replace() method replaces a string with new string

```
message = "Hello students"
print(message.replace("H","M")) # Mello students
```

split() method splits into substrings by a separator

```
message = "Hello, students"
print(message.split(",")) # ['Hello', ' students']
```

You can input any string from command line

```
print("Enter your department")
department = input()
print("You are working in " + department)
```

Result:
Enter your department
Computer Technology
You are working in Computer Technology

4. Operators

We make various operations when working with variables. Arithmetic or logical operations. Operator symbol is a decision of this operation. In a Go program you will find operators are listed;

- Arithmetic
- Assignment
- Comparison
- Logical
- Identity
- Membership

- Bitwise

4.1. Arithmetic Operators

Python arithmetic operators are listed below

Operator Name	*Description*	*Using*
+	Addition	d + e
-	Subtraction	d - e
*	Multiplication	d * e
/	Division	d / e
%	Modulus	d % e
**	Exponentiation	d ** e
//	Floor division	d // e

```
d = 100
e = 10
f = d + e
print("Sum :" + str(f) )
f = d - e
print("Subtract :" + str(f) )
f = d * e
print("Multiply :" + str(f) )
f = d / e
print("Divide :" + str(f) )
f = d % e
print("Modulus :" + str(f) )
f = d ** e
print("Exponantiation :" + str(f) )
f = d // e
print("Floor Division :" + str(f) )
```

Result:

```
Sum :110
Subtract :90
Multiply :1000
Divide :10.0
Modulus :0
Exponantiation :10000000000000000000
Floor Division :10
```

4.2. Assignment Operators

Python assignment operators are listed below

Operator	**Using**	**Same**
=	d = 5	d = 5
+=	d += 3	d = d + 3
-=	d -= 3	d = d - 3
*=	d *= 3	d = d * 3
/=	d /= 3	d = d / 3
%=	d %= 3	d = d % 3
//=	d //= 3	d = d // 3
**=	d **= 3	d = d ** 3
&=	d &= 3	d = d & 3
|=	d |= 3	d = d | 3
^=	d ^= 3	d = d ^ 3
>>=	d >>= 3	d = d >> 3
<<=	d <<= 3	d = d << 3

```
d = 10
e = 20
d += 1
e += 1
print("Value:" + str(d) )
print("Value:" + str(e) )
d -= 1
e -= 1
print("Value:" + str(d) )
print("Value:" + str(e) )
d *= 2
e *= 2
print("Value:" + str(d) )
print("Value:" + str(e) )
d /= 2
e /= 2
print("Value:" + str(d) )
print("Value:" + str(e) )
```

Result:

```
Value:11
Value:21
Value:10
Value:20
Value:20
Value:40
Value:10.0
Value:20.0
```

4.2. Comparison Operators

Python comparison operators are used to compare two variables or values

Operator	Description	Using
==	Equal	d == e
!=	Not equal	d != e
>	Greater than	d > e
<	Less than	d < e
>=	Greater than or equal to	d >= e
<=	Less than or equal to	d <= e

```
d = 10
e = 20
print(d == e)
print(d != e)
print(d < e)
print(d > e)
print(d <= e)
print(d >= e)
```

Result:

```
False
True
True
False
True
False
```

4.2. Logical Operators

These operators combine more conditional statements.

Operator	Description	Using
and	True if both statements are true	d < 10 and d <20
or	True if one of the statements is true	d < 1 or d < 2
not	False if the result is true	not(d < 10 and d < 20)

```
d = 10
if(d>=10 and d<=20):
    print("Value is between 10 - 20")
e = 5
if(e>10 or e<20):
    print("Value greater than 10 or less than 20 ")
d = -5
if(not(d>=10 and d<=20)):
    print("Value is not between 10 - 20")
```

Result:
Value is between 10 - 20
Value greater than 10 or less than 20
Value is not between 10 – 20

4.2. Identity Operators

Identity operators are used to compare the objects, not if they are equal, but if they are actually the same object, with the same memory location

Operator	Description	Using
is	True if both variables are the same object	d is e
is not	True if both variables are not the same object	d is not e

```
d = ["car", "bike"]
e = ["car", "bike"]
f = d
print(d is f)
print(d is e)
print(d is not e)
```

Result:
True
False
True

4.2. Membership Operators

These operators are used to test if a sequence is presented in an object.

Operator	Description	Using
in	True if a sequence with the specified value is present in the object	d in e
Not in	True if a sequence with the specified value is not present in the object	d not in e

```
d = ["car", "bike"]
e = ["car", "bike"]
print("car" in d)
```

```
if("bike" in d):
    print("Your vehicle is bike")
```

Result:
True
Your vehicle is bike

4.2. Bitwise Operators

Operator	Logical Mean	Description
&	AND	Perform And operation in bit level
|	OR	Perform Or operation in bit level
^	XOR	Perform Xor (Exclusive Or. 1 Xor 1 : 0) operation in bit level
~	NOT	Reverse all the bits. 1 → 0 , 0 →1
<<	Left shift	Shift left by pushing zeros
>>	Right shift	Shift right

```
d = 5
e = 6
f = d & e # Bitwise and operation
print(f) # Decimal 4
f = d | e # Bitwise or operation
print(f) # Decimal 7
f = d ^ e # Bitwise Xor operation
print(f) # Decimal 3
f = d << 2 # d shift left 2 bit
print(f)
f = d >> 2 # d shift right 2 bit
print(f) # Decimal 1
```

Result:
4
7
3
20
1

5. Python Lists

There are four collection data types in the Python programming language. These are similar arrays.

- List is a collection which is ordered and changeable. Allows duplicate members.
- Tuple is a collection which is ordered and unchangeable. Allows duplicate members.
- Set is a collection which is unordered and unindexed. No duplicate members.
- Dictionary is a collection which is unordered, changeable and indexed. No duplicate members.

List;
Lists are used with “[ ]” characters

```
cars = ["Bmw", "Mercedes", "Toyota"]
print(cars) # ['Bmw', 'Mercedes', 'Toyota']

Access values
print(cars[1]) # 'Mercedes'

Change values
cars[1] = "Audi"
```



```
print(cars) # ['Bmw', 'Audi', 'Toyota']

Loop in List
cars = ["Bmw", "Mercedes", "Toyota"]
print(cars) # ['Bmw', 'Mercedes', 'Toyota']
for i in cars:
    print(i)
```

Result:

```
['Bmw', 'Mercedes', 'Toyota']
Bmw
Mercedes
Toyota

Learn list length
print(len(cars)) # 3
Add new item
cars = ["Bmw", "Mercedes", "Toyota"]
cars.append("Honda")
cars.append("Fiat")
for i in cars:
    print(i)
```

Result:

```
Bmw
Mercedes
Toyota
Honda
Fiat

cars.insert(2,"Seat") # ;Insert 2. position

Remove list item
cars = ["Bmw", "Mercedes", "Toyota"]
cars.append("Honda")
cars.append("Fiat")
cars.remove("Toyota")
for i in cars:
    print(i)
```

Result:

```
Bmw
Mercedes
Honda
Fiat

pop() method, remove the specified index. If index not gived, remove last object.
cars.pop()

del() keyword, removes given index
del cars[0]
```

Python Dictionary;

A dictionary is a collection which is unordered, changeable and indexed. In Python dictionaries are written with curly brackets, and they have keys and values.

```
person = {
    "name":"Mustafa OF",
    "department":"Computer Technology",
```



```
    "age":47
    }
```

If you print command
{'name': 'Mustafa OF', 'department': 'Computer Technology', 'age': 47}

Access item
```
name = person["name"] # “Mustafa OF”
```

Change item values
```
person["name"] = "Nihan Cemre"
```

Loop items
```
person = {
    "name":"Mustafa OF",
    "department":"Computer Technology",
    "age":47
    }
for i in person:
    print(i)
for i in person:
    print(person[i])

for i in person.values():
    print(i)

for i,j in person.items():
    print(i,j)
```

Result:
name
department
age
Mustafa OF
Computer Technology
47
Mustafa OF
Computer Technology
47
name Mustafa OF
department Computer Technology
age 47

Add new item
```
person["lesson"] = "Python"
```

Remove item
```
del person["lesson"]
```

popitem() method, remove last inserted item.
```
person.popitem()
```

6. Decision Keywords

if keyword;
You can use the if keyword for decision making. You can route the program's stream with the if word. If keyword use the condition statements.

Usage

if (contition): Command

if (contition):
Command or Commands

```
d = 100
e = 50
if(d > e ):
    print("d is greater than e")
```

if d is greater than e, write “d is greater than e” .

Python relies on indentation, using whitespace, to define scope in the code. Other programming languages often use {} for this goal.

elif keyword;

The elif keyword says "if the previous conditions were not true, then try this condition".

```
d = 50
e = 50
if(d > e):
    print("d is greater than e")
elif d == e:
    print("d and e are equal")
```

Result:
d and e are equal

else keyword;
This keyword run if any condition is not true.

```
d = 3
if(d == 1):
    print("d is One")
elif d == 2:
    print("d is Two")
elif d == 3:
    print("d is Three")
else:
    print("d is unknown")
```

Result:
d is Three

if d = 5 then print “d is unknown”

Conclusions

Developing a program is not as difficult as it is thought. Anyone with an analysis ability and who is in the world of computing can develop an application. Developing a software and running it is a really good feeling. Starting with high-level programming languages is much more reasonable. Using a good development environment (IDE), an application can be said to be a simple operation. In today's world the need for programmers is increasing day by day. Programming has become a profession with high income and can be used in all areas. Consideration should be given to the advanced features of the Python programming language, such as the easy structure and fast operation. Python is a language that can be used in various fields and is easy to learn. It is a language with a library according to the desired needs. Programming can be started with Python. Especially high school and higher level students must meet Python. According to research, students have shown more interest in simple programming languages. Python stands out with ease here.

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RESEARCHER IN CHEMISTRY: FREEDOM AND ETHICAL WAY*

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Abstract. Chemistry is probably one of the best sciences to feature in a series on the history of ideas. Maybe, most philosophers of science have taken physics as their favorite or the other sciences as by astronomy, engineering and mathematics. Chemistry has a kind of poor relation of physics but many secret models still waiting for good mathematical models cannot yet be applied fully to give us good formulas to make life richer and more colorful.
The scientific products of synthetic chemistry present us new substances that change our material world for the benefit of living. In this paper, we give some analysis of moral issues coming from chemical synthesis by help of the researches conducted on the subject, based on concepts of responsibility of human to world. We focused on the chemical weapons research, moral objections against improving material conditions of life by chemical means, and freedom of research. It is aimed at providing a basis for moral judgements of chemistry and a basic approach for chemists to reflect on the moral ways of their studies.
Keywords: *ethics, synthetic chemistry, responsibility, moral issues*

Introduction

Some chemist suggest that chemistry is probably the best science to study in the context of professional and scientific ethics (Alkan at all, 2009; Durak at all, 2015; Genel at all, 2016; Genel at all, 2013; Bunnett, 1999; Kovac, 2000; Holton, 1994). They stressed that chemistry has created the most to define itself as a profession in the same sense that medicine and engineering are professions. Chemistry has a rich environment arising from the work of scientific. As a special way, chemists should be close to experiment in a laboratory or in an open area. A famous word says that "chemists must think with their hands" much more than most other scientists that use paper and pencil studies. Also, many chemists work in a variety of contexts and naturally are confronted with some ethical problems. Because of that the chemical world is get into the fabric of society and to complex issues concerning the relationship of science and society (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Kovac, 2000).
Gordon at all. (2001) presented a philosophy of chemistry as a profession and to explore the relationship between professionalism and ethics. They characterized as a contribution to engineering ethics and the philosophy of a profession (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). According to them, "The Ethical Chemist" has the meaning that a collection of cases and commentaries for the teaching of scientific ethics to chemists. Also, this team tried to present the aspects of scientific ethics that go beyond the expectations of ordinary morality and the requirements of law. In this phrase, we can ask that what are the ethical standards of scientists? For this question, Kovac (2004) proposed a professional approach that "to understand the ethics

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of scientists we must understand science as a profession". As a scientist, we know that science is not a unique and unified subject; each scientific (sub)discipline has its own history and culture. By the nature of its scientific context, chemistry go on the blind spot of philosophers in ethics. Also, philosophers are aware of moral issues related to the subject, such as chemical weapons, environmental pollution and chemical accidents. But, it can be said that philosophers seem to be unable to relate these critical issues to chemistry (Kucuk at all, 2005; Genel at all, 2012; Sener at all, 2010; Yesilyurt at all; 2005; Kocaman and Abut, 2015; 2015; Kocaman, 2013). And, they focus the subject with the perspective of critical point such as warfare ethics, environmental ethics and medical ethics. It is vital to take chemistry seriously from an ethical point of view and to fill the large gap came from the technological world (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018; Bunnett, 1999).

The Responsibility

the concept of responsibility is given a different perspective by Kovac (2000) that "If *x* is responsible for *y* to *z*, we may distinguish between different types of responsibility according to different instances of *x*, *y*, and *z*. Usually *x*, the subject or agent of responsibility, is an individual person of sound mind." He explained this argument as, people hold corporations, responsible for something depending on the social structure of the corporation if all members share the same responsibility. Than he stressed that a chemist can be responsible as an individual responsibility and a member of the chemical organization, a chemical society, or a company as corporate responsibility.

According to the transitive consequences of Kovac, *x*'s actions are the *y* for which *x* is held *action responsibility*. For these actions it is required that *x* can operate otherwise that *x* has a free choice between options and that the decision is based on *x*'s preferences. In this step, responsibility construct a causal attribution of the *y* to an agent *x*. There is a difference between past consequences and future consequences, whereas future consequences is necessarily over to uncertain prognoses of possible consequences of some actions. Because of the criminal law is restricted to retrospective responsibility, prospective responsibility is a special field of morality and the topic of ethical applications. When the possibility of well-organasing is enough condition that something can be matter to care responsibility, it may be included more subject as social structures. The *z* in our phrase '*x* is responsible for *y* to *z*' is the university to which chemist are made obliged to justify his actions related to *y* in a moral environment.

In the cases of society responsibility, problems do not come quickly because orientating the standards of the moral discourse of the corresponding organization is usually part of a simple rules of combination that everybody must sign to become a part of this organization (Coppola and Smith, 1996). Now, we can turn to the famous question: should everybody take general responsibility to humanity in this organization? In this point Coppola and Smith stressed that "we have not any contract or definite standards of a moral discourse, but we have many different general moral systems. Hence, we go to the most important and difficult question that if everybody must to accept any general moral system.

The answer of Coppola and Smith is that "every general moral system of obligations, includes the general claim that everybody must to accept general morality, because their obligations are addressed to everybody and not only to members of particular groups, communities, or societies". This mean that demanding general responsibility is a general claim of all general moral systems of rules. Adaptation of this approach the Kovac's module is that "if *x* denied general responsibility, there is of course no way to convince *x* through general moral arguments, because x thereby rejects any general moral discourse whatsoever". So, cancelling general responsibility is a negative position that cannot be justified by general moral arguments.

On the other hand, Gordon (2001) stayed that "we have the strongest kind of moral justification possible in the realm of ethics, since holding everybody responsible to humanity is a justified claim in every general moral system". We can understand from above words holding chemists, responsible to humanity for the consequences of their actions is justified. Also, Gordon picked up only one sort of chemical actions, the synthesis of new substances, and analyze possible moral issues from the point of view of general morality. He stressed that before this step, the concept of a general moral system needs extra clarification.

A general moral system defines the standards, the values, norms, obligations, and rules of a general moral discourse that somebody accepts by taking responsibility to humanity (Kovac, 2004). He stayed that the standards must be theoretically developed done in the field of ethical theory, since there is not real moral discourse among all members of humanity. Rossi at all. (2008) formulated that there is much debate among ethical theoreticians about details resulting in different general moral systems. They stressed there are some general conditions that every moral system must meet to be considered a general moral system; this research team present three conditions as defining the base of general moral systems for guiding actions.

- The important value is the welfare of humanity, the *z* in our notion of general responsibility
- The moral norms and obligations must be related to the primary value
- The moral norms and obligations must be equally addressed to everybody

Rossi and his friends stressed that these minimal requirements are necessary to exclude interests for moral obligations of general morality and to guarantee general responsibility of everybody. Also, there is alternatives for extension to cover all major approaches of ethical theory.

Freedom for Research

Scientists sometimes refer to 'freedom of research' as a license to do what they want (Clark and Macquarrie, 2002). They stayed that taking freedom of research as a 'higher' value, researchers reject any claims of societies to the control of their research. if it is true that freedom of research is a 'higher' value than interests of societies, then it must have its justification on the general moral level. Clark and Macquarrie explained this situation that scientists referring to freedom of research as a 'higher' value accept general morality as acceptable standards of controlling scientific research. In this situation, it is clear to say that the topic 'freedom of research' allows summarizing the moral issues of the research study. Later, they focused on the freedom of research in synthetic chemistry is morally justified only on the grounds and to the extent of freedom of moral awareness.

In his philosophical study, schummer (1997) ask that "is freedom of research is a fantasy?" and "Does general morality require utilitarian research to be morally regulated even in the smallest detail?". According to his approach, freedom of research should be given as an independent principle that keeps scientists free for moral value. If that should be a moral argument, then freedom of research cannot be accepted as a morally independent principle. In this context, one could make some points saying that much restricted system is ineffective and that scientific creativity requires some freedom to develop. Schummer pointed out that does not allow scientists to violate fundamental moral norms during their researches.

A widely known idea about the subject denoted from Pojman (2005) that "accepting freedom of research as a higher value than those of particular groups, communities, and societies means accepting it as a value of humanity". For the academic world, this idea has a very clear meaning that scientists believing the value as the guidelines of the research, naturally takes general responsibility to humanity for the judgement of the research. The synthesis of new substances as an end cannot be checked on the base of general moral system without special contributions to information of general environment (Holdon, 1994). He argued that the research based on his model dosn't be justified by referring to freedom of research. Also, theese synthetic research based on producing substances which is unfavorable for humanity, for example chemical weapons research or productions turn out with environmental pollution, are to be judged morally wrong.

The general limit of freedom of research can be determined by the limit of objection in the general moral systems, which is have the same meaning to the scope of freedom of moral consciousness (Rossi, 2008). So, we need a moral justification of freedom of moral consciousness to justify freedom of research. This justification should have the limit containing the characters of general moral systems. General moral systems contain a prerequisite general responsibility of everybody (Clark, 2002). He stayed that the meaning of "contain" of the above argument is only if everybody has general responsibility and feels obliged to a general moral discourse ruled by the moral principles and the researcher is willing to accept it.

Result

Chemistry is a science and also, an employment. In this study, we tried to give a new perspective inspired by historical approaches that looking at chemistry as a profession, at least in the context of clarifying the ethics of science. As Kovac stressed that chemistry has played many important end effective roles from yesterday to today. Many scientific environments are talking that it is time for chemistry to play another efficient role, as the "paradigm" for scientific professions.

In synthetic chemistry, all harm to nonhuman living made by environmental pollution of new substances is morally related. Making a choice between particular moral systems is only a modification and not a solution, since general freedom of research is based on freedom of moral choice. Finally, chemists should reflect their moral options above and beyond the common basis of general morality.

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SCIENCE VALUES AND CHEMISTRY*

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Abstract. Scientific discoveries, academic researches and new technologies are basic to talk the world's most pressing problems. Technology, engineering and chemistry education can develop national capacity, but only if science and education systems focus attention on one of the most essential learning activities and exploring how the interaction of human values and beliefs affect national policy decisions. Unfortunately, national fixed targets with easily measurable outcomes is using too many academicians and educators. Instead of consequential academic success testing, we need consequential learning that prepares young people for life, work and human. To the level that science can determine what we should do, it is only by providing us with empirical information, which can be set into a moral reasoning. The base of such method can in no way be determined from the scientific method. They can be created from philosophy and common sense.
Key words: *science, chemistry, human values*

Introduction

Life and death power are interesting when the concepts generated by the evidence-based enterprises of science, technology and engineering correlation of beliefs and human values. There is no lack of controversial issues that demand consideration of that intersection, including global warming or global erosion (Kocaman and Abut, 2015; 2015; Kocaman, 2013). The production, quality, safety and distribution of the world's supplies of food, water and, lifesaving drugs are still widespread around the world. According to Earp, & Trafimow, (2016), "we have to sufficiently harness the potential for technology in the service of such values-driven issues as ending poverty"

Artificial photosynthesis is about the chemical processes by which green plants grow (Libby, 2004; Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). As chemists we stayed that they are beautifully designed and efficient. When we've fully understood them, there undoubtedly will be tremendous practical applications in raising the photosynthetic efficiency to even higher levels than nature achieves (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012). Also, Libby stayed that we see our way through the psychological effects of chemicals as drugs and control of mental processes and illnesses or other human health problems. Libby focused that this neverland is a dream with witchcraft and non-scientific way, but it begins to clarify, and it looks as though we can dream justifiably when some of our most mental illnesses will be medicable.

The enterprise of science needs the adoption of certain values that are adhered to by its practitioners with exceptional rigor (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Wrangham, Peterson, 1996). They explained that the values also provide the basis for enhancing human capabilities and human welfare. Truth and honor are of the utmost importance of life. According to Wrangham and Peterson, any scientist who manufactures data risks being ostracized indefinitely from the scientific community, and he or she jeopardizes the credibility of science for the larger society. A scientist may make mistake in interpreting data, but no one can accept the fabrication of data (copy of data). Group studies has become essential in most fields of science, and it requires that all the members of the group receive the recognition they deserve. Contributions are also cumulative, and each should be recognized for his or her contribution. It is a sentiment well captured in Isaac Newton's famous phrase that "if I have seen farther than most, it is because I have stood on the shoulders of giants".

Biochemistry and molecular biology are largely chemical in cast and substance. The interesting story of the unraveling of the deoxyribonucleic acid structure has moved us to home, the great importance of understanding the detailed chemical structure and behavior of the basic units out of which our bodies are constructed (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018; Libby, 2004). He underlined that "nothing gives more promise for our future than the understanding and development and revelation of the chemical basis of heredity". Another way, genetic changes can be made by chemical treatment at a future day.

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Some Famous Approaches

"It seems possible that our understanding of the deterioration of tissue may turn us as the protection of our substance from aging" (Dodd and Stem -Gillet, 1995). These are dreaming of the future but logical and credible possibilities. These are in biochemistry and molecular biology which we cite first because the field is so rich. In fact, present accomplishments in these areas probably have been small position as compared to those lying ahead in the future, although these in themselves have been extraordinary things. It is only one century since the first antiseptic was discovered by Pasteur and Lister. Only one century since man could protect himself against infections in wounds which broke the skin. And, only one century since the principle of antisepsis and antitoxins appeared. Dodd and Stem-Gillet stayed that "in one brief century we've come a long way toward freeing ourselves from dread diseases and scourges. Many remain still to be conquered".

It's a famous new idea and its gist is that" there is no way to reason from facts about the way the world is, to statements about the way the world should be, without smuggling in additional premises" on (Alkan at all, 2009; Durak at all, 2015; Genel at all, 2016; Genel at all, 2013; Earp, Sandberg and Savulescu, 2012). In a brief and certain way "you can't derive values from data". An interesting example to illustrate this idea were explained the authors: "It's a fact that rape occurs in nature among chimpanzees, and there are some evolutionary arguments to explain its existence in humans and non-humans alike. But this fact tells us exactly nothing about whether it's OK to rape people. This is because "natural" doesn't entail "right" (just as "unnatural" doesn't necessarily mean wrong), indeed, the correct answer is that it's not OK, and this is a judgment we make at the interface of moral philosophy and common sense: it isn't an output of science".

Every chemist know that chemistry is vitally important in the space programs. And, by the effect of this reality, we have come to realize that the space program has its significance for chemistry also in special new subbranches in chemistry. In his one paper, Pigliucci (2013) stayed that "once man leaves tire surface of the earth the environ mint changes. If he goes downward he comes to pressures. If he goes outwards he comes to a vacuum so extremely empty that nothing on the earth approaches it. And, of course, if he approaches the sun and the stars, temperatures far above anything attainable on earth are incurred". It is the development of the chemistry of the areas as being promising for the future technology and holding benefits which may be turn out to be a "very big and powerful value".

The chemical effects of pressures of a million atmospheres have been studied before. However, chemical effects of high pressures have been widely studied and are noticeable in value (Harris, 2011). He explained that "the first process to produce polyethylene was a high-pressure process using some two thousand atm to force the ethylene to fit into the growing polymer, and it is nothing derogatory against the high-pressure process that catalysts were developed later. Pressure causes matter to transform and to change its properties (Kucuk at all, 2005; Genel at all, 2012; Sener at all, 2010; Yesilyurt at all; 2005). Thus, we think it not unlikely that at the center of the earth iron may have significantly different chemical properties. We're quite certain that lighter atoms, such as hydrogen, would indeed be transformed and in fact would be metallic. We can predict with some confidence, that light elements would be metallic, and that at higher pressures still all forms of matter would become metallic".

Discussion

Science and Scientist need the freedom to enquire, to challenge, to think, to imagine the unimagined in every branch of it (Earp, 2016). He declared that "it cannot function within the arbitrary limits of convention, nor can it flourish if it is forced to shy away from challenging the accepted". Science and technology advances by overthrowing an existing paradigm, or at least substantially expanding or modifying it to connected knowledge or subject. This mean that there is a certain constructive traitorousness built into the scientific enterprise, as a new generation of scientists adds the positive contribution. Earp stayed "our respect and admiration for Newton are not diminished by the achievements of Albert Einstein. We can admire both. This constant renewal and advancement of our scientific understanding is a central feature of the scientific enterprise". So, in this perspective, it needs a positive association with the opposite view that is settled in disputes arbitrated by the rules of evidence.

Harris (2013) stayed that "you should never, ever, do it, yet his pretense in The Moral Landscape to be revolutionizing moral philosophy seems to me the very height of dishonesty. What he does in this book is what you might call "plain old" secular moral reasoning as profane philosophers have been doing for a very long time but he claims instead to be using "objective" science to decide what's right from wrong".

The science (chemistry, physics and biology) and engineering disciplines that gave us both life: "depriving" and "life-saving devices" (Libby, 2004). According to him, the processes are at their core evidence-based enterprises. However, he insisted the knowledge that is generated gets applied through the prism of values and beliefs. We understand from his approach that it is vital that the ways in which these contributors to decision-making influence one another are addressed explicitly in formal education. Also he added that "our failure to do so, either intentionally or to avoid conflict undermines democracy, permitting power, demagoguery and prejudice to rule".

Science needs rationality and promotes civility in discourse. Ad hominem attacks are not accepted (Kaufman, 2012). Science treats all humans equally. Scientists are concerned with the content of the scientific work, not with the person who produced it, or not the country that presented it. Science is open to all, regardless of nationality,

race, religion, country or sex. These values of science are universal values worth defending, not just to promote the pursuit of science but to produce a better and more humane society to create livable world.

Result

"Beauty is one of the great desires of the human heart" (Efron, 1987) can be accept as a nice statement of the balance between science and values. Most individuals respond to beauty in color, harmony, and form. It is one of the important functions of science or education to he1p the person to seek, to enjoy, and to treasure beauty throughout his life. True, it is easier to teach the student the chemical and physical properties of substances, chemical laws, and theories than to give him an appreciation for the beauty and grandeur of laws and properties. It is possib1e, however, and the authorities quoted are quite in agreement. Contact with the famous words of Deming (1987) that "chemistry offers opportunity for broadening one's horizon, stimulating one's imagination, deepening one's sympathy, heightening one's appreciation of the fine and the beautiful".

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SIMULATION APPROACHES IN CONSTRUCTION: DYNAMIC CONSTRUCTION VISUALISATION*

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Abstract. Visual simulation has turned out to be as a key planning tool for an intended built environment because it enables architects, engineers and project managers to visualize the evolution of a construction process before a project starts. The process system enables efficient construction, reducing time and cost through planning and controlling resources, machines and materials. Construction sector has evolved from traditional on-site building to offsite modern methods of construction. Very efficient and effective onsite planning and management processes are needed, and this would require implementing visual techniques in modern construction to provide a powerful management platform for planning and controlling projects. In this paper, we analyse some projects, focus on some critical points of those projects.

Keywords: construction-simulation, construction-visualization

Introduction

Construction industry has developed from traditional to modern method construction during last few years. Using on-site construction methods has changed toward industrial production line base instead of previous traditional on-site fabrication methods. The decision to build a project by new method construction is usually motivated in part by the need to meet deadline of schedule, to spend minimum cost, to decrease waste generation and to achieve high quality project production. In this way, traditional management methods like schedule bar chart may not be suitable for planning and controlling project resources (Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). Therefore, highly efficient and effective on-site planning and managing methods are needed and working in a well-planned operational environment can result in maximum potential of project resources (Rohania at all., 2013).

Mahbub (2008) stayed that "the conventional building construction process is replaced by more efficient industrialized form and the increasing globalization demands for short time consuming projects with quick return of investments. Since the degradation of quality, productivity to compete with other products in the market – the investors in construction sector looked for revolutionary change (Kocaman and Abut, 2015; 2015; Kocaman, 2013). The inclusion of automation and robotics aimed to accomplish the demand and can be said that could attain the goal into a satisfactory level". First, most of the researches focused on hardware and software development which are obvious in areas such as concreting and finishing works. The investigating the factors that affect the infiltration of these technologies into the construction work site and processes is little concentrations given.

Some researchers, as Abdu at all. (2010) thought that construction sites will become "intelligent and integrated" as materials, components, tools and equipment, so people become components of a fully sensed and monitored environment. They noted that automations of construction processes are about to replace manual uncertain labour tasks such as welding and high-steel work by wirelessly networked with sensors and communications technology based construction sites. According to them, this automated construction sites will provide risk free and less time-consuming tasks performed by the construction workers.

Many researchers sorted out some common project failures and the reasons of those failures (Abdu at all.,). The research group pointed out that simulation of projects is supposed to be an important solution to avoid the project failures and simulation can also help to run the construction work on schedule, because detailed works are closely and deeply monitored. Finally, they stressed that simulation technologies can set planning and analyzing

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construction operations performed in advance anticipating problems Therefore, simulation systems are used to design resources to supply in a construction work and analye an operation.

Construction Project simulation

Construction projects have many unique configurations and the unique nature of projects is very crucial to make planning decisions (Kamat and Martinez, 2001) noted that simulation systems allow the planners to overview the existing model and at the same time to make a quick glance into the real construction processes; when model system accurately represent the construction operations, the model complexity increases significantly. Designers sometimes add new necessities and usesul equipment to overcome the conditions they experience during the simulation of the model system. They can experience all kinds of conditions in their simulation system which they need to experience when the real construction work be active. Construction managers can develop strategies that may simplify the effect of the project's geometric configuration on the construction process because of the complexities found during the simulation process (Webster at all, 1996). According to them, the common practice is keeping the process plan at a high level and creating a detailed plan for shorter intervals as the project map.

The modeling of operations can be clarified by basing models on the special configuration and making effective use of simulation. Construction operations can better utilize process modeling and simulation approaches by configurating spatial effects, allowing various manipulations, transformations and analysis. The representation of the finished facility which can provide basic idea of the concrete construction work are drawn with 2-dimention presentation. By the 3-dimention presentation, geometric models of the elements of the project can be exhibited efficiently to provide better understanding of the construction processes.

Simulation systems for Construction Projects

There are many systems to simulate the construction operations in different way and approaches. The choice for application of a proper system directly depends on the degree of simulating the construction site, degree of complexity in construction and information necessary.

Dynamic construction visualizer: Kamat and Martinez (2001) determined that dynamic construction visualizer is intended to be used in conjunction with a wide variety of simulation tools using 3-dimention models created in an equally wide variety of Computer Aided Design CAD) modeling programs. They noted that It can be operated as a Microsoft Windows application and this application can operate files which are written in DCV language: "The DCV graphically illustrates the specific modeled construction operation based on the data taken from logged on simulation model. Simulation model creates DCV animation when they run. Simulation language must be simple enough to generate model trace file easily but at the same time it has to be strong enough to illustrate the dynamic operation of complex construction tasks". DCV is implemented as a "post-simulation" visualization tool which can provide the following services to the operator (Kamat and Martinez, 2001):

- It maintains a simulation clock whose speed can be controlled by the operator
- The operator can put himself in any vantage point of a 3-dimention virtual workspace
- One can jump into forward or backward to any desired position by specifying a past or future time value in the clock
- The operator can observe specific construction tasks through the animation

This system can show the real dynamic motion of construction equipment. The system cannot show the transformation states of simulation objects during visualisation. Also, it illustrates the simulation based on certain unclear stages, but it does not give the simulation of physical deformations of objects.

Augmented Reality Applications: The last development of computer technology and computer hardware allow for the integration of augmented reality in construction works in the sector (Webster at all., 1996). This system consists of a head worn display which is capable of overlaying graphics and sound of real activities. It can track users and objects in space and sends visual information. This system is written by C, and C plus.

Move over, Webster at all. noted that it gives opportunities the user's portions of a building which are hidden behind structural obstacles and enabling users to follow additional information of the hidden objects. The user can stand on

a position within a room and can see the graphical representation of a model prototype and tracks the orientation data. The speed of the construction and maintenance work increase rapidly. The augmented reality technology can develop the condition of construction, monitoring and renovation work. By the X-ray vision of such technologies can help workers to avoid secret features and structural concepts.

Steps for simulation of construction projects

Navigation based simulation technologies can give possible solutions for avoiding construction project failures due to poor communication, or maybe insufficient planning.

Planning stage**:** In this stage, project designers and decision makers along with the customer will searches the project site and make necessary planning for the construction design (Moore, 2010). According to Moore, Augmented reality system can be fruitful in this stage; customers make their demand and the designers justify the feasibility of the customers' demand according to the resources. After getting data from site and customer and processing the data designers can organise the project estimation and go to the final step.

Monitoring stage: In this stage, project supervisors and other observers can closely follow all real time construction work with details (Moore, 2010). He stayed that indoor positioning system and active badge system can help in this stage; the navigation can be used to set the accurate positioning of elements and active badges can help the project supervisors to monitor if the equipment are reaching and available at the desired location in correct position. This phase allows efficient real time data extraction and recording of the construction activities. Also, he added that individual construction tasks can be simulated by the DCV system. If this system active, Limitations can be enlarged by using data.

Correction stage: In this short stage, the data reached in project monitoring stage can be used to check any irregularity in the construction work instantly and enable the responsible persons to make immediate correction of the problems (Moore, 2010).

Result

Simulation or project monitoring approaches encouraged by indoor navigation systems. Also, the practice of simulation systems in construction works are very limited by the practitioners and the adoption of these systems are not rapid in the construction industries. The lack of enough number of researches in construction simulation systems, diversity of the construction models and lack of motivation to set models for simulation systems could make this situation possible.

In this paper, we reviewed and intended to combine few technologies and to suggest a possible system to make the construction task more collective. Of course, successful implementation of the suggested method can be tested to reach more effective results. Finally, we propose that more researches should be carried out to investigate more deeply into the utilization of the systems with new modern construction and manufacturing systems.

The proper visualization and simulation tools should be implemented to avoid some possible problems occurring in big construction projects Construction works, like other production industries, consist of common and repetitive tasks. In this point, the necessary systems should be developed to simulate these common tasks.

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SOME ANALYSE ON THE ZERO DIVISOR GRAPH OF A COMMUTATIVE RING: CENTER, MEDIAN AND CORE*

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Abstract. In ring theory, a branch of abstract algebra, a commutative ring is a ring in which the multiplication operation is commutative. The study of commutative rings is called commutative algebra. A nonzero element z in a ring is called zero divisor if there exists a nonzero element x such that zx = 0 and xz =0. Let Γ(R) be the zero-divisor graph for a commutative ring with identity. In this study, we focused and determined the center and the core of a commutative ring. Also, we noted the relation between the center and the zero-divisor graph in a commutative ring.
Keywords: *commutative ring, center of a graph, median of a graph, core of a graph*

Introduction

The conceptual definition of the zero devisor in a Ring is given as a nonzero element z in a ring is called zero divisor if there exists a nonzero element x such that zx = 0 and xz =0. Beck (1988) defined the zero-divisor graph of a commutative ring R coloring a graph with vertex set R, and two vertices are adjacent if their product is zero. Later, Anderson and Livingston (1999) modified the vertex set to $Z^*(R)$, the set of nonzero zero divisors of R, this graph is denoted by Γ(R).

Γ(R) and some types of graphs associated with rings, have been analysed by many authors (Anderson at all., 2011and Abu Osba, 2012). Abu Osba et al. (2011) introduced the zero-divisor graph for the ring of Gaussian integers modulo n, in which the number of vertices, the diameter, and the girth are determined. Finally, Nazzal and Ghanem (2012) presented the line graph of $\Gamma(Z_n[i])$ and $\Gamma(Z_n[i])$.

The set of Gaussian integers, denoted by, Z[i], is defined by

$$Z[i] = \{a + bi: a,b \in Z \text{ and } i= \sqrt{-1}\}.$$

Z[i] is a ring under the usual complex operations. A Gaussian prime integer is a unit multiple of one of the following: 1+i, or a prime integer q in Z which is congruent to 3 (mod 4), or a+bi, a−bi, where $a^2+b^2 = p$ and p is a prime integer in Z which is congruent to 1 (mod 4). In this paper, p and p_j denote prime integers which are congruent to 1 modulo 4, while q and q_j denote prime integers which are congruent to 3 modulo 4.

Let <n> be the principal ideal generated by n in Z[i], where n is a natural number greater than 1, and let $Z_n = \{0,1,2,3,4, \ldots ,n-1\}$ be the ring of integers modulo n. The factor ring Z[i]/<n> is isomorphic to $Z_n[i] = \{a +bi: a,b \in Z_n\}$. Obviously, $Z_n[i]$ with addition and multiplication modulo n is a ring. This ring is called the ring of Gaussian integers modulo n. The zero-divisor graph of a commutative ring R, denoted by Γ(R), is the graph whose vertex set is the set of all nonzero zero divisors of R, denoted by $Z^*(R)$, and edge set

$$E(\Gamma(R)) = \{xy: x,y \in Z^*(R) \text{ and } xy = 0\}.$$

The distance d(u,v) between two vertices u and v is the minimum of the lengths of all u−v paths of G (graph G). The eccentricity of a vertex v in G is the maximum distance from v to any vertex in G. The radius of G, rad(G), is the minimum eccentricity among the vertices of G. The open neighborhood of a vertex x in G is the set $N(x) = \{y: xy \in E(G)\}$ while the closed neighborhood of a vertex x in G is the set $N[x] = N(x) \cup \{x\}$. The minimum degree of G denoted by δ(G) is defined by $\min\{deg(x): x \in V(G)\}$.

In this article, we give a complete characterization for the center, the median, and the core of $\Gamma(Z_n[i])$.

The Center of $\Gamma(Z_n[i])$

The center of G is the set of all vertices of G with minimum eccentricity. For any vertex x of a connected graph G, the status of x, denoted by s(x), is the sum of the distances from x to the other vertices of G. The set of vertices with minimal status is called the median of the graph. The center of $\Gamma(Z_n[i])$ when n is a power of a prime is studied

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(Nazzal and Ghanem, 2012) where it was shown that the center of $\Gamma(Z_2m[i])$ consists of one vertex, namely $\{(1+i)2^{m-1}\}$ and the center of $\Gamma(Z_qm[i])$ is the set

$$\{aq^{m-1}+bq^{m-1}i: a,b \in U(Z_q)\}-\{0\}.$$

Also, we add that $Z_pm[i] \cong Z_pm \times Z_pm$, the center of $\Gamma(Z_pm \times Z_pm)$ is the set $\{(x,y): x,y \in Z(Z_pm)\}-\{(0,0)\}$. We will find the "center" for the general case. Let n and m be positive integers. Let $R = R_1 \times R_2 \times \cdots \times R_n \times F_1 \times F_2 \times \cdots \times F_m$ where each R_j is a commutative Artinian local ring with unity that is not a field and each F_j is a field. For each j = 1,2,... ,m, define the ideal $I_j = \{0\}\times\{0\}\times\cdots\times F_j \times\{0\}\times\cdots\times\{0\}$. Then the center of $\Gamma(R)$ is the set

$$C = J(R) \cup (\bigcup_{j=1}^{m} I_j) - \{(0,0,\ldots,0)\}, \text{ where } J(R)$$

is the Jacobson radical of R (Redmond, 2006).

If M_j is the maximal ideal of R_j, then $J(R) = M_1 \times M_2 \times \cdots \times M_n \times \{0\} \times \{0\}\times\cdots\times\{0\}$. Now, let us study the maximal ideals of the factors in the Artinian decomposition of $Z_n[i]$ where

$$n = 2^m \prod_{j=1}^{r} p_j^{r_j} \prod_{j=1}^{s} q_j^{s_j} \prod_{j=1}^{t} q_j$$

with $s_j \geq 2$. The maximal ideal in $Z_2m[i]$ is $<1 + i>$. For $Z_qm[i]$, the maximal ideal is $<q>$, while $Z_pm[i] \cong Z_pm \times Z_pm$ and the maximal ideal in Z_pm is $<p>$. Thus each $p_j^{r_j}$ in the decomposition of n gives rise to two factors in the Artinian decomposition of $Z_n[i]$. If the Artinian decomposition of $Z_n[i] = R_1 \times R_2 \times\cdots \times R_l \times F_1 \times F_2 \times\cdots \times F_t$, then $R_1 = Z_2m[i]$ if n is even. Otherwise, R_j is either of the form $Z_qm[i]$ or Z_pm and $F_j = Z_q[i]$ for some q. If l is the number of local rings in the Artinian decomposition of $Z_n[i]$, then $J(R) = \{(z_1,z_2,...,z_l,0,0,... ,0) : z_j \in Z(R_j)\}$. The following theorem is reached.

Theorem 1.1. If the Artinian decomposition of $Z_n[i] = R_1 \times R_2 \times \cdots \times R_l \times F_1 \times F_2 \times \cdots \times F_t$, where n is divisible by at least two distinct primes, then the center of $\Gamma(Z_n[i])$ is given by

$$C = \{(z_1,z_2,...,z_l,0, ... ,0): z_j \in Z(R_j)\}$$
$$\cup(\bigcup_{j=1}^{t} I_j) - \{(0,0,\ldots,0)\}, \text{ where } I_j = \{0\}\times\{0\}\times\cdots\times Z_qj[i]\times\{0\}\times\cdots\times\{0\}.$$

If n = p or $n = q_1q_2$, then $\Gamma(Z_n[i])$ is complete bipartite and ecc(v) = 2 for each vertex in $\Gamma(Z_n[i])$. Hence, the center of $\Gamma(Z_n[i])$ is V ($\Gamma(Z_n[i])$); i.e., in this case, V ($\Gamma(Z_n[i])$) is self-centered.

The eccentricity of each vertex in $\Gamma(Z_n[i])$, when n is a power of a prime, is determined by Nazzal and Ghanem (2012). If $n \neq q_1q_2$, and n is divisible by at least two distinct primes, then, diam($\Gamma(Z_n[i])$) = 3, this together with the above theorem give the eccentricity of each vertex in $\Gamma(Z_n[i])$ when n is divisible by at least two distinct primes.

Corollary 1.2**.** If n is divisible by at least two distinct primes, $n \neq q_1q_2$ and $v \in V(\Gamma(Z_n[i]))$, then

$$\text{ecc}(v) = 2, \text{ if } v \in C, \quad \text{otherwise ecc}(v) = 3,$$

where C is the center of $\Gamma(Z_n[i])$.

The cardinality of the center of $\Gamma(Z_n[i])$, when n is divisible by at least two distinct primes, could easily be computed using appropriate formulas for the cardinality of each $Z(R_j)$ (Abu Ash at all., 2008).

Corollary 1.3**.** The cardinality of the center of $\Gamma(Z_n[i])$ is

(1) 1, if $n = 2^m$,

(2) $q^2 - 1$, if $n = q^m$,

(3) $p^{2m-2} + 2p^{m-1} - 2p^{m-1} - 1$, *if* $n = p^m$, $m \geq 2$.

(4) $(\prod_{j=1}^{l} |Z(R_j)|)+(\prod_{j=1}^{t} q_j)-1$, *if* $\mathbb{Z}_n[i] = R_1\times R_2\times\cdots\times R_l\times F_1\times F_2\times\cdots\times F_t$,

where n is divisible by at least two distinct primes.

The relationship between the center and the "median" of $\Gamma(R)$ is investigated by Redmond (2006), who proved that if R is a finite commutative ring with unity that is not an integral domain, then the median and the center of $\Gamma(R)$ are equal if the radius of $\Gamma(R)$ is at most 1, and the median is a subset of the center if the radius is 2.

The median of $\Gamma(Z_n[i])$

Theorem 1.4**.**

(i) The median of $\Gamma(Z_2m[i])$ is $\{(1 + i)2^{m-1}\}$ and the median of $\Gamma(Z_qm[i])$ is $\{\alpha q^{m-1} + \beta q^{m-1}i : \alpha,\beta \in U(Z_q)\} - \{0\}$, $m \geq 2$.

(ii) The median of $\Gamma(Z_p[i])$ is $Z^*(Z_p[i])$.

(iii) if $n = q_1q_2 ...q_t, t \geq 2$ and $q_1 < q_2 < \cdots < q_t$, then the median of $\Gamma(Z_n[i])$ is the set $\{(u,0,0,... ,0): u \in U(Z_{q1}[i])\}$.

(iv) Let $Z_n[i] = R_1 \times R_2 \times \cdots \times R_l \times F_1 \times F_2 \times \cdots \times F_t$, $l \geq 1$, be the Artinian decomposition of $|Z_n[i]$.

Let $S = \{s: 1 < s < l, |Z^*(R_s)| \prod_{j\neq k} |R_j| = \max\{ |Z^*(R_k)| \prod_{j\neq k} |R_j|: 1 \leq j, k \leq l\}\}$.

If $Z_n[i]$ is not local, then the median of $\Gamma(Z_n[i])$ is given by

$$\{y : y = (y_j)_{j=1}^{l+t} \text{ where if } j \in S, \text{ then } yj = uz, u \in U(Rj) \text{ and, ann}(z) = Z(Rj), \text{ otherwise, } yj = 0\}.$$

Proof.

(i) If R is local, then $\Gamma(R)$ has a vertex or set of vertices each of which is adjacent to all other vertices (Redmond, 2006). Thus, in this case, the median is equal to the center. So, the median of $\Gamma(Z_2m[i])$ is $\{(1+i)2^{m-1}\}$, and the median of $\Gamma(Z_qm[i])$ is $\{\alpha q^{m-1} + \beta q^{m-1} i: \alpha, \beta \in U(Zq)\} - \{(0)\}$, $m \geq 2$.

(ii) If $Z_n[i]$ is not local, then from (Abu at all., 2011) the radius of $\Gamma(Z_n[i])$ is 2. Note that if x is in the center of $\Gamma(Z_n[i])$, then the eccentricity of x is 2. Hence, $s(x) = \deg(x) + 2(|Z^*(R)| - \deg(x) - 1)$, thus $s(x) = 2|Z^*(R)| - \deg(x) - 2$. Therefore, vertices in the median of $\Gamma(Z_n[i])$ are precisely those vertices of the center of maximum degree in $\Gamma(Z_n[i])$. Since $\Gamma(Z_p[i])$ is regular graph then the median of $\Gamma(Z_p[i]))$ is $Z^*(Z_p[i])$.

(iii) The proof comes by the argument in the proof of (ii) and the fact that vertices of maximum degree are vertices in the given set.

(iv) Since R_j is local, it contains an element z, such that $ann(z) = Z(R_i)$. Using the argument to the proof of (ii) and then we find vertices of maximum degree in $\Gamma(Z_n[i])$.

The Core of $\Gamma(Z_n[i])$

In his article, Abu Osba (2012) noted the chromatic number that "the chromatic number of a graph G, $\chi(G)$, is the minimum number k such that G can be colored using k different colors with no two adjacent vertices having the same color". Also, he added the definition of the clique number as "the clique number, $\omega(G)$, of a graph G is the maximum order among the complete subgraphs of G". it is a clear result from the definitions of graph, core and homeomorphism that "a graph G is a core if any homomorphism from G to itself is an automorphism". Finally, he presented in his article definition of a core of a group that a subgraph H of G is called a core of G if H is a core itself, and there is a homomorphism from G to H.

If R is a ring such that its chromatic number and clique number coincide, i.e., $\chi(\Gamma(R)) = \omega(\Gamma(R))$. Then, the core of $\Gamma(R)$ is the maximal clique in $\Gamma(R)$, (Cordova at all. 2005). On the other hand, $\chi(\Gamma(Z_n[i]))$, and $\omega(\Gamma(Z_n[i]))$, when n is a power of a prime are computed (Abu Osba at all., 2011). Furthermore, the maximal clique, when n is a power of a prime, is determined (Nazzal and Ghanem, 2012) comparing the results in the two papers, we conclude that, $\chi(\Gamma(Z_n[i]))$, and $\omega(\Gamma(Z_n[i]))$ are equal.

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SUSTAINABLE CHEMICAL PROCESS INDUSTRIES: PROCESS-INTENSIFYING METHODS*

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Abstract. The balancing social, environmental and economic objectives in companies' development has produced a growing awareness on the sustainable design. Many research studies had been devoted to extending current approaches to capture these objectives to provide long term sustainability. Inventory management, product design, control for remanufacturing, product recovery, and reverse logistics have focused more attention in the literature.

A great number of current industrial case studies, new developments from the chemical industry and experimental research studies are presented. As a production, many of them cover new chemistry, new process design and new equipment. In this study we focus to bridge any existing gap between academic world and engineering challenges needed to ensure chemistry research accessible a more sustainable future chemical industry. That industrial sustainable chemistry is not an emerging trend but is an efficient area with the application of engineering expertise.

Key words: chemical engineering, chemical process industries, equipment

Introduction

By the result of the escalating environmental compliance costs and environmental regulations, considerable attention on industrial operations has been made on minimizing the environmental impact of process design and development (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012; Bisschops at all., 1997). They added that focus on supply chain management has therefore transferred from a specific cost perspective approach to the broader adoption and development of sustainability.

Siirola (1998) stayed that the efficient way of balancing social, environmental and economic objectives in companies' sustainable development has produced a growing awareness on sustainable design and planning of supply chains. He also expressed that the research studies have been created an extending current approach to capture a broader range of business practices (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018). The combination of environmental management and supply chain management into a single framework has recently led to a new discipline known as Green Supply Chain Management.

Static mixers are relatively high sensitivity to clogging by solids (Stringaro at all., 1998). They stayed that their utility for reactions involving slurry catalysts is restricted. Structured packing has efficient static- mixing properties and that can be used as the support for catalytic material. One version is open-crossflow-structure catalysts which are used in some gas-phase exothermic oxidation. According to Stringaro's research team, open-crossflow-structure catalysts have very powerful mixing and radial heat-transfer characteristics (Figure 1).

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Figure 1. Integrated catalyst and monolithic catalyst

Monolithic catalysts

Monolithic substrates used for catalytic applications are metallic or nonmetallic bodies providing a multitude of straight narrow channels of organised uniform cross-sectional shapes (Adris and Grace, 1997). To control sufficient porosity and improve the catalytically active surface, Adris and Grace proposed that the inner walls of the monolith channels usually are covered with a thin layer of pelage. They stressed that the most important features of the monoliths are as below;

- very low pressure drops in single-and two-phase flow,
- high catalytic efficiency,
- exceptionally good performance.

Rotating devices

An interesting example for rotating devices was given by Boodhoo, Jachuck, and Ramshaw (1997). High heat-transfer coefficients are achievable in the spinning disk reactor in the unit (Figure 2). They stayed that the unit primarily is planned at fast liquid reactions with large heat effect, such polymerizations; In spinning disk reactor, a very thin layer of liquid moves on the surface of a disk spinning. At very short residence times, heat is powerfully transferred from the reacting liquid at heat-transfer rates.

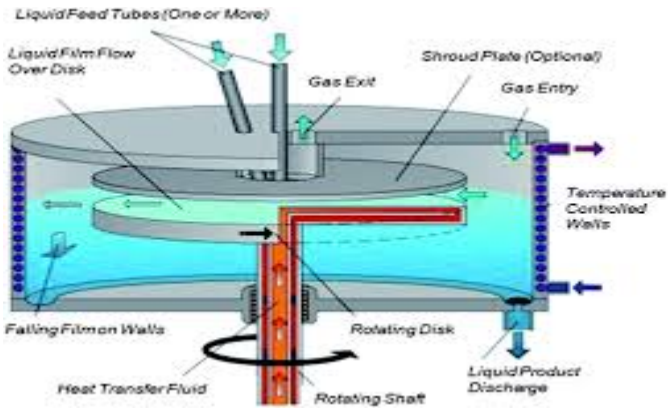

Figure 2. The spinning-disk reactor.

Hauptmann, Rae, and Guenkel, (1995) stayed that the former applies a supersonic shockwave to disperse gas into tiny bubbles in a supersonic in-line mixing device. They also added stator mixers, which are planned for processes requiring very fast mixing on a micro scale, contain a high-speed rotor spinning. Moreover, they underlined that in-line stator mixers similar to centrifugal pumps and the device may contribute to pumping the liquids.

Mebrane Reactors

The membrane can play many functions in the reactor systems. It can be used for selective separation of the reaction products providing a positive equilibrium shift (Tsotsis at all., 1992). They also expressed that it can be applied for a controlled distributed feed of some of the reacting species to increase product. In addition, the membrane can apply *in-situ* separation of catalyst particles from reaction products (Falconer at all., 1995). Moreover, the membrane can incorporate catalytic material, mean that the membrane itself becoming a highly selective reaction-separation system. Finally, we can say that the literature on catalytic membrane reactors is very rich and heat- and mass-integrated combination of hydrogenation and dehydrogenation works in a single membrane unit.

Multifunctional reactors combine reaction and phase transition. They also integrate reaction and heat transfer (Jansen, Klaassen, and Feron, 1995). According to the research team, reactive extrusion is a good example for such a combination. They explained the properties of this production;

- reactive extruders are being extensively used in the polymer industries,
- they enable reactive processing of highly viscous materials without requiring the large amounts of solvents,
- twin-screw extruders are effective mixing,
- the possibility of operation at high pressures and temperatures,
- plug-fl characteristics,
- capability of multistage,
- most of the reactions in extruders are single- or two-phase reactions,
- with catalyst, it immobilizes on the surface of the screws,
- allow carrying out three phase catalytic reactions.

Hybrid Separations

According to Poddar, Majumdar, and Sirkar, (1996). many of the developments in hybrid separation sector contain integration of membranes with another separation technique. In membrane absorption and stripping, it uses as a permeable barrier between the gas and liquid phases. The Poddar research group stayed that by using hollow-fibe membrane modules, large mass-transfer areas can be constructed in compact equipment. Moreover, absorption membranes make independent operation of gas- and liquid flow rates.

Foster, Burgoyne, and Vahdati, (1998) noted that membrane distillation mainly consists of bringing a volatile component of a liquid feed stream through a porous membrane. Also, temperature difference is the driving force of the process. They determined the advantages of membrane distillation;

- full rejection of ions, macro molecules, colloids and cells,
- the membrane than lower operating pressure across,
- less membrane fouling,
- potentially lower operating temperatures than in conventional evaporation.

Several other promising techniques do not include in the three categories we have analysed. Some are known and have been commercially used in other sectors.

Result

There are many research studies that conducted on the membrane reactors. However, no large-scale industrial applications have been noted practically up to now. According to Uhde, Sundmacher and Hoffmann (1996), the primary reason for this situation is the relatively much price of membrane units. They also stayed that other factors

that low permeability, mechanical and thermal fragileness are also play an efficient role. We hope that new developments in the sector of material engineering will change this negative situation.

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THE DESIGN PROCESS IN THE CONSTRUCTION INDUSTRY: CREATIVE PROCESS AND MANAGEMENT PROCESS*

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Abstract. The construction sector is of strategic importance to the European Union as it delivers the buildings needed by the rest of the economy and society. It represents more than about 12% of Europe Gross Domestic Products (GDP) and more than 52% of fixed capital formation. So, we can say that the construction sector is the largest economic activity and it is the biggest industrial employer in Europe. The building sector employs directly almost 22 million people.

In this paper, we present some results of a research project which contain managing the design process in house constructing. Its content has a general plan for developing design activities, including the content of the main activities, their special relationships and the responsibilities of persons.

Keywords: design process, process management, constructing design

Introduction

Construction is a basic factor for the implementation of the Single Market and for other construction relevant sectors as environment, energy and a little water. The performance of the design process in the constructing industry has a great effect on the success of the connected subprocesses in construction projects and on the level of the final product (Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). According to the many researchers, the management of the design process has little attention in spite of its big effect.

Fergunson (1989) stayed that poor design has a very strong effect on the level of efficiency during the production stage. According to Cornick (1991), a large percentage of defects in constructing arise through actions in design stages. Powell and Newland (1994) underlined that, the increasing complexity of modern constructing in a very competitive market-place has significantly increased the pressure for improving the performance of the design process in the sense of time and quality level in recent years. For this research determination, they give an example that there is a coincide with the design and the production stages to reduce project duration and increase the flexibility of product design.

The researches have been made on the management of the design process relatively little despite its importance in the sector in relation to the research time and effort addressed to production management (Kocaman and Abut, 2015; 2015; Kocaman, 2013; Koskela et al. 1997). According to Austin et al. (1994),

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only a small cost of the design process compared to the production costs because of its true importance for the performance of construction studies.

In this sector, it is a well-kwon realty that constructing design is a very difficult process to manage it during to process. Markus and Arch (1973) determined that constructing design contains thousands of decisions, usually a period of years, with numerous interdependencies, under a highly uncertain environment at the working conditions. Each category of professional personnel such as architects, project managers, structural engineers and service engineers has a distinct background, culture, education and learning style.

The lack of design process which needs to be planned and controlled more effectively to decrease the effects of complexity and uncertainty, results in insufficient information being available to complete design planes and inconsistencies within construction materials. We can give some examples for the main problems in design management such as poor communication, lack of adequate documentation, deficient or missing input information, unbalanced resource allocation, wrong decisions and lack of coordination between sub departments.

The Design Process

The constructing design process is a series of steps that builder follow to come up with a solution to a problem. Many times, the solution involves designing a product that meets certain criteria or accomplishes a certain task.

The constricting design process is different from the Steps of the Scientific Method. If a project involves making observations and doing experiments, so, it is needed to follow the Scientific Method. If the project involves designing, building, and testing something, it is needed to follow the Constructing Design Process. The steps of the engineering design process are an enlarged version of the steps of the constructing design process (EDP, www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-process-steps). The steps of the engineering design process are to:

- ✓ Define the Problem
- ✓ Do Background Research
- ✓ Specify Requirements
- ✓ Brainstorm Solutions
- ✓ Choose the Best Solution
- ✓ Do Development Work
- ✓ Build a Prototype
- ✓ Test and Redesign

The most descriptions of the design process are two patterns (Markus and Arch, 1973); one consists of an personal decision performed by a designer, concerned with the creation of alternative solutions. The second one is a management process, divided which develop from the general and abstract to the detailed and concrete. The design method requires the consideration of both patterns; Creative process and Management process.

Creative Process

Creativity has become a requisite skill for builders and a part of their basic training. However, there are many ways to implement builder's creativity and innovation process according to different epistemological approaches. Contrasting philosophies, positivist and constructivist worldviews, determine different design reasoning models and business strategies (Liem, 2014). According to Simson (1973), positivism means to a scientific and structured method focusing on identifying the causes influencing outcomes. It is an analytical, problem-centered approach that leads to a sequential process in which creativity takes center stage. His research contributed to shape this sequential engineering process based on three major steps:

- ✓ problem setting,
- ✓ problem solving (creativity),

- ✓ evaluation of solutions.

This approach gave rise to many sequential design practices, like the General Design Theory (Yoshikawa, 1985; Tomiyama et al., 2009 and Simon, 1973) and industrial engineering processes organized as a series of stages and gates (Aoussat et al., 2000 and Pahl et al., 2007).

Cross (1994) stayed that each designer deals with the design problem in a particular way. According to him, "one of the traditional ways used by designers for dealing with the problem is to develop quickly a potential solution or a group of potential solutions, which are used as a way to define and understand clearly the problem". One of the main contributions of creative models is the fact that they make comprehensible that individual design processes tend to be very unstructured. This should be taken into consideration when developing a model for managing the design process (Liem, 2014).

As a creative process, several models of design are presented in the literature. In Markus and Arch (1973)' model, there are four main activities in design: analysis, synthesis, evaluation and dissemination (figure 1).

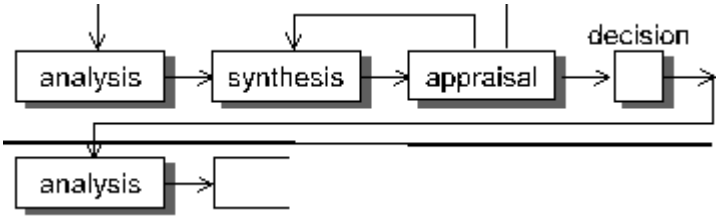

Figure 1: A creative process for construction design (Markus and Arch 1973)

Management Process

Design is traditionally regarded as a single stage in constructing projects. According to Cross (1994), the participation of the design team moves to start relatively late in the project and finish as soon as the production stage starts. We accept that design is regarded as a process which takes part of all stages of the constructing process. Also, we can say that design is one of the most important processes in constructing projects, since it has many interfaces with the other processes of the construction design. The design process is divided into stages varies considerably in different studies. In this study, we present Cross (1994)' design process which is divided into seven stages:

- ✓ Inception and Feasibility,
- ✓ Outline Design,
- ✓ Scheme Design,
- ✓ Design for Legal Requirements,
- ✓ Detail Design,
- ✓ Production Monitoring, and
- ✓ Feedback from Operation.

Also, Crosss stayed that each design stage can be further divided into sub-processes, which successively transform information from client requirements. Koskela (1992) pointed out

four kinds of activities involved:

- ✓ conversion,
- ✓ waiting,
- ✓ moving,
- ✓ inspection.

He stayed that only conversion activities are value adding; "waiting, moving and inspection activities are non-value adding and should be eliminated, rather than made more efficient. Part of the conversion activities are not value adding, since they cause rework, due to errors, omissions and uncertainty"

Several principles and methods determined for eliminating waste in the design process (Huovila et al. (1997):

I. Reduce uncertainty, which is one of the main causes of rework, especially in the early stages of design. This can be done by increasing the effort in terms of clearly defining the project restrictions and the requirements of internal and external clients,

II. Reduce waiting time by decomposing adequately the design tasks so that they can be properly planned, and allow the transfer of information to be made in smaller batches,

III. Reduce the effort needed for information transfer through team work, and by rearranging the design tasks.

Result

In this paper, we focused on the results of a research project which contain managing the design process in house constructing. Its content has a general plan for developing design activities, including the content of the main activities, their special relationships and the responsibilities of persons. The implementation phase of the research has started gradually, and the effectiveness of the model evaluated by using performance indicators, related both to the design process and the product. Based on our analysis, it is possible to develop a more detailed investigation on the actual content and impact of the activities in the constructing design to reach the modern designs of our modern world.

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THE EFFECT TO CHEMICAL SPECIES: FROM HISTORICAL STEPS TO TODAY'S APPROACH*

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Abstract. Every science department is working on certain objects or entities. Studying with about objects in a constant way requires a notion of identity which is special for the science area. Researchers usually use a certain notion without further reflection not to be contradiction in terms. chemists have many classificatory problems about the concepts and substances. To solve the problems, highly efforts are necessary to classify millions of substances today and most of them indistinguishable with the naked eyes.
The identity issue is also an ontological subject. But, this subject need be stay different position from the epistemological approach. This is necessary to achieve of the chemical identification problem. We clearly stay that chemical identification presume a concept of species identity for the real determination of substances. This presume is also necessary when a new species is found or produced to establish the identity of the species with its characteristic properties. The aim of this study is the impact of old-time instrumentation on chemical species identity. For this reason, we focused on how species identity was defined and determined in this period.
Key words: chemical species, a notion of identify, classification of substances

Introduction

From old to today, ontological issues emerge in the forefront of scientific research, such as the well-known ontological problems of quantum mechanics (Schummer, 2002). With the same perspective we can say that philosophers of science have much focused on the quantum issues, every classificatory science is more interested in ontological issues than pure physical subjects. Schummer stayed that a lot of critical episodes in the history of chemistry are direct connected with the identity issues of substances. His interesting example is the alchemical quest for making precious metals such as gold. According to this argument, artificial gold cannot be the same as natural gold for ontological reasons; the empirical properties are the same, but natural substances are strictly distinct (Kocaman, 2017; Kocaman at all, 2017; Kocaman, 2016). Ritter and Bergstrom (2001) gave a reference for a non-empirical concept of substance identity that they found support in the interpretation of Aristotales' distinction between natural things and artifacts (Koparan at all, 2018; Of at all, 2017; Tola at all, 2017).
Dobs and Siegfried (1968) stayed that the concept of species identity being prior to epistemological questions must not be fixed once forever. Because, the concept has renewed several times in the history of chemistry. Dobs and Siegfried stressed that it is not about ontology in the received perspective but about the ontological attitude of chemists. They also expressed that the ontological ideas of chemists must be came from their practice, since an explicit discourse is not about the concept of species identity in chemistry (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012). In this condition, chemists have created the identity of new species in synthetic chemistry.

Species identity in classical chemistry

Merton (1957) and Hooykaas (1958) first formulated and applied the classical approach to substance identity. He determined substance identity with composition related the experimental analysis and experimental synthesis. Merton didn't care about the philosophical elements for the purpose of substance identification. Composition had to be formulated in terms of simple substances with the starting point of experimental synthesis. Later, Merton approach was reformulated by Bergman. Then, the next chemists defined experimental standard procedures for elemental analysis of all kind of substances.
The number of chemical properties of substances is unlimited (Kucuk at all, 2005; Genel at all, 2012; Sener at all, 2010; Yesilyurt at all; 2005; Schummer, 1997). He stayed that if we extend the canonical set and consider all chemical properties as basic properties, there are infinitely many properties to be processed: "two samples belong

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to the same chemical substance, if all of their basic properties are the same. If there is only a single basic property in which they differ from each other they belong to different chemical species". This mean that nobody can reach the conclusion on a logically sound basis that two samples really belong to the same chemical substance, since it is practically impossible to define infinitely many properties (Alkan at all, 2009; Durak at all, 2015; Genel at all, 2016; Genel at all, 2013; Kocaman and Abut, 2015; 2015; Kocaman, 2013). Shummer concluded that "all identity claims in chemistry are necessarily only provisional".

If chemists say, "substance identity" in the metaphysical or in the chemical sense, they usually related this concept to 'pure substances' (Brock, 1992). Brock stayed that there is very little known about the history of the most fundamental chemical concept. And, he added that "we have good reasons to believe that the standard methods for purifying liquids and solids remained roughly the same at least since the 18th century. In this period, some chemists constantly used "solubility and crystal form" or "boiling point" as qualifying properties of the reagents (Ewing and Laitinen, 1997). They expressed that we may accept that our concept of purity was already well established in 18th century, since there was no way to define the concept of substance purity. Ewing and Laitinen underlined that this approach remained basically the same until the middle of 20th century, some chemists characterized, and fixed the identity of new chemical substances in the first half of 20th century.

The classical chemistry has the following categories (Schummer, 2002):

- description of preparation from starting materials including yield,
- results of elemental analysis including empirical formula,
- boiling point including pressure,
- visual characteristics,
- solubility in various solvents,
- exemplary chemical reactivities.

According to Schummer, all these properties doesn't satisfy to fix chemical species identity in a certain way.

The chemical structure theory is the central position of entering the microcosm of molecules and atomic structure (Schummer, 2002). He argued that the problem of chemical species identity in the realm of organic chemistry had caused serious problems. Schummer detailed this situation as that since there are many characteristic properties in which chemical substances can differ from each other, one must determine and compare many properties of two samples in order to prove their substance identity. The mean of above difficulty is all identity claims in chemistry based on a set of characteristic properties are not sustained.

The issue of substance identity has also an important social event that has been the power for solutions. The production of new substances is the main contribution to the progress of chemistry for a chemist, since he is also the producer of new kinds of material components (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018). Brock (1992) stayed that every researcher familiar with the history and sociology of priority in science knows how important rules and knowledge are necessary for the progress of science. He added that, priority claims to new substances also play a central role for patent systems, and thus need a power basis for legal issues. Also, it should be easy to check whether a certain species is a new one or not.

The Effect of Classification

Chemical structure theory was largely based on chemical properties and axioms. From a scientific view, chemical properties differ from physical properties in that they make relations between chemical substances, between reaction substances and reaction products connected by chemical transformations (Taylor, 1986).

According to Taylor, all chemical knowledge comes from a connected structure in which every substance is related to every other substance by direct or indirect connections. In such a connection, the identity of each substance pair with its connected location determined by its characteristic relations to other substances. Taylor also stayed that classical chemical structure theory reproduces that connection on a theoretical and sophisticated level, such that the relations between substances pair with relations between chemical structures. Another words, we can say that if the identities of chemical substances are determined by relations with each other, then chemical substances are relational parts of the system.

Laszlo (1998) suggested chemists and historians of twentieth century chemistry are strongly challenged by the enormous amount of scientific study realased in the past 100 years: "we have now a hundred times more chemists, chemical papers, chemical substances, etc. than at the beginning of the century". He also stayed that historians of science need to refer to primary sources that are expected to be in some sense representative of the subject under study: "Against the background of some 3 million chemists and more than 700,000 chemical publications a year today, every selection is running the risk of being arbitrary". Therefore, historians of this century's chemistry are forced to focus on particular events and narrow scientific topics, if they want to apply traditional methods in a different and original way.

The special methods provide physical properties, mainly electromagnetic properties, on various high levels (Bair, 1993). He underlined the point that unlike chemical properties, the physical properties do not determine relations between different chemical substances, but the response of a material sample to electromagnetic fields. It is

possible that the logical difference between chemical and physical properties may appear to researchers. According to Bair, the interesting relation of instrumentation in chemistry is also an interesting relation of physical properties which species identity was modified and adapted to physical properties.
The central question of the study is how the instrumental development has affected the concept of chemical species identity. We can say that the way chemists have implicitly dealt with the issue suggests usually three more or less important scientific ideas. Schummer (1997) argued that the first two are adaptive strategies and the third one, in some sense a consequence of the second one, gives to a fundamental ontological change.
The characterization of new compounds remained powerful and active until the end of 20th century (Baird, 1993). The data were used as extra characteristic features of new compounds. Also, spectrographic plots give rich knowledge to distinguish between a lot of pure substances. Baird stayed that more than any property of the characterization, including the refraction index that was constructed for that purpose, meets the requirement for defining substance identity. Baird also note that some chemists were finding mixed melting points with the samples and they were proving identity by comparing the spectra with the method that when enough number of spectra were registered, the next problem was how to match a new spectrum with a lot of spectra of the data bank. We note that a mechanical device was constructed for that purpose before the discovery of computers. But, the mechanical device never used as an efficient material at the chemical laboratories.
Chemists used spectroscopic data in constitution analysis is substantiation (Brock, 1992). Later, the substantiation is determined by means of traditional chemical methods. This substantiation method was the main part of chemists' research papers as 'experimental' part. According to Brock, the substantiation was achieved rather by a complete structural interpretation of the spectra. The kind of explicit argumentation changed in the late 1980s. He stayed that substantiation was still determined in the traditional way, mainly by following reaction steps on the substantiation level by a reaction mechanism. We see that there are still a few cases in natural products chemistry where researchers claim to have determined the substantiation by purely chemical means

Result

Chemical classification is much more complex and allows deriving more differentiated concepts than the classification made before. Also, the change turns out to be many new ontological and conceptual problems that most chemists are probably not aware of this generation. Additionality, there is a lack of well-defined identity criteria for the new quasi-molecular species due to the term 'molecular structure'. If there in not a selected criterion for species identity of the structures, chemical species classification would be failure. We know that spectroscopic instrumentation does not provide such criteria. So, it is a tool that is going to challenge chemists to move on their ontological approaches.
We observed that classical chemistry gave up metaphysical principles and applied experimental properties as basic for determining the identity of chemical substances. Because of that concept of species identity applied on an infinite set of basic properties, substance identification by comparing properties of samples was conditional.

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THE MEANING OF CHEMISTRY FOR TOMORROW I: TRUST, EDUCATION AND INNOVATION*

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Abstract. With global change creating serious challenges relating to energy sources as food and climate change, intervention is necessary and urgent. The Royal Society of Chemistry is committed to meeting these challenges head on and has identified where the chemical sciences can give quickly technological and sustainable solutions. This big organisation is in the efficient position to find solutions to the world's problems by working in partnership with countries, professional bodies, informal organisations, academics and industry sectors. Focusing global challenges means advancing fundamental scientific knowledge, supporting excellence in chemical science research. It needs an interdisciplinary approach and the Royal Society of Chemistry must build bridges between chemistry's sub-disciplines, and with other sciences and engineering. We believe that international active networks of this organization could be instrumental in implementing of the possible chemical solutions.

Keywords: chemistry, global world, ecological problem, energy sources

Introduction

The ecological problems caused by human activity such as climate change and food problems are some serious deterioration. It is estimated that more than one billion people now live in poverty without enough food, water or adequate sanitation and healthcare provision in many countries, especially in Africa (The world bank, 2008). We believe that mitigation of the challenges will rely on adopting sustainable development; the ability to meet the needs of the present without compromising the ability of future generations to meet their special needs (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012). This needs the eco-efficient processes and products that the chemical sciences can provide as a solution.

Global change is creating serious challenges for humanity from all over the world. By 2040 the world's population is expected to have increased by 1.9 billion to over eight billion, with most of those people living in cities (United Nations, 2014). According to this report, global energy requirements will continue to increase and will the pressure on the Earth's natural resources to provide this rapidly expanding population with enough food, water and shelter. It is noted in this report that the industrialized countries of Asia and Latin America are experiencing very rapid economic growth that is bringing modern society's environmental problems, including air and water pollution and waste problems, to wider areas of the globe. The ecological problems caused by human activity such as climate change are serious deterioration. Also, it is estimated that more than half billion people now live in poverty without enough food, water or adequate sanitation and healthcare provision in these parts of the world.

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The chemical sciences, according to our approach, can play a clear and an efficient role in pursuing sustainable development and in providing technological solutions to the challenges facing society today and in the future (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018). The technologies that the chemical sciences engender will improve the quality of daily life, underpin prosperity and will increase our readiness to face the challenges of the future for a livable environment or for a health world (RSC, 2009).

Creating a livable environment

Developments in the chemical sciences is required to provide the technological solutions needed by society and governments, to solve the global challenges in energy, food, health, water and sustainability in the totally of the world. Achieving this does not depend only on major research and technological advances in the areas discussed in this paper. It requires developing a supportive environment (European Communities, 2004).

The supportive environment needs the supply of an appropriately diverse scientific workforce, investing in research and regulatory framework that protects society. We believe that this also require engagement with key stakeholders, ranging from industrialists, academics and educationalists to governments, funding organisations and big informal corporation and organisations. There is also a need to invest in innovation. The translation of scientific findings into usable application and new developments will be a real and powerful solutions. Society and companies need to be clearly aware of these issues and, in seeking to achieve the target (International Energy Agency, 2006).

The issues in this paper are based on activities of some important society as the RSC aggregated from a global perspective. These subjects are as below;

- Trust
- Education
- Innovation

Trust

Developing a supportive environment will need engaging with key stakeholders and with the public to ensure the successful introduction of new and emerging technologies (Prest, 2009). According to Prest, this is a complex process that often requires a sustained study over a long period. Also, it often depends on effective stakeholder dialogue on the costs, benefits and risks to consumers and the environment of the technology concerned the subject. Moreover, he pointed out that perceptions of risk differ widely within society and with low public confidence in some parts of the chemicals sector. This mean that there is always a perception of high-risk and an excessive focus on the potential negative effects of new technologies.

According to us, the people is often unaware of the contribution the chemical sciences already make to today's society. The benefits of the chemical sciences to essential products and to environment are hidden and often inadequately communicated. There is a need to understand where the common ground is and how consensus can be developed between the related items. To progress science and technology and ultimately facilitate the uptake by society of new products and processes it is necessary to create an open dialogue between stakeholders. This should be based on necessary knowledge and a common understanding of the health, safety, environmental, social and ethical concerns. There must be a clear understanding of the benefits, burdens of new technologies to build trust amongst all stakeholders and the risks posed by failure to adopt new technologies (www.energysavingtrust.org.uk, last available at 21.06.2018).

Critical food hygiene and safety issues contain the subjects associated with microbiological contamination and the most common cause of health problems for consumers. This can be turned out by poor hygiene at any stage of the food chain. Also, this includes food spoilage caused by bacteria and fungi, which may secrete by-products that can be highly toxic, and via counterfeiting and adulteration, which can significantly undermine consumers' trust in the quality and safety of branded foods (British Wind Energy Association, 2008).

According to us, the trust is also working with schools in the three boroughs to give children or students the opportunity to play a part in improving their local green space for wildlife and to gain a better understanding of the biodiversity around them. By participating in such activities, it is also hoped that a culture of volunteering can be fostered among the young people of all over the world.

The NSW an environmental group is an independent statutory body established by the NSW government to fund a broad range of organisations to undertake projects that enhance the environment of Australia. The Trust is empowered under the Environmental Trust Act 1998, and its main responsibility is to make and supervise the expenditure of grants. The Trust is administered by the Office of Environment and Heritage (OEH), (www.environment.nsw.gov.au., last available at 20.06.2018). The objectives of this organization are decelerated as bellow:

- encourage and support restoration and rehabilitation projects in both the public and private sectors that will prevent or reduce pollution, the waste stream or environmental degradation,
- promote research in both the public and private sectors into environmental problems of any kind and, in particular, to encourage and support:
    - ✓ research into and development of local solutions to environmental problems
    - ✓ discovery of new methods of operation for NSW industries that are less harmful to the environment
    - ✓ research into general environmental problems
    - ✓ assessment of environmental degradation
- promote environmental education and, in particular, to encourage the development of educational programs in both the public and private sectors that will increase public awareness of environmental issues of any kind,
- fund the acquisition of land for national parks and other categories of dedicated and reserved land for the national park's estate,
- fund the declaration of areas for marine parks and related purposes,
- promote waste avoidance, resource recovery and waste management (including funding enforcement and regulation, and local government programs)
- fund environmental community groups
- fund the purchase of water entitlements for the purposes of increasing environmental flows for the state's rivers and restoring or rehabilitating major wetlands.

Education

An adequate supply of appropriately trained scientists and a broader technically-literate society with the relevant knowledge and skills will be required to ensure the long-term viability and innovative capacity of the chemicals and other chemistry-using industries (Prest, 2009).

Many countries in the world has adopted the vital importance of increasing the numbers of young people studying science, technology, engineering and mathematics (STEM) subjects and raising the level of STEM literacy among those entering adult life (Teitelbaum, 2007). According to Teitelbaum, the supply of STEM talent directly effects on all areas of research and development, innovation and hence the ability of the science and engineering-based industries to play their part in the economy. Despite the number of chemical science entrants to university courses showing significant signs of improvement.

We believe that long-term and long-lasting input necessary to be made in the areas of education, skills and capacity building to overcome the global challenges facing society. All levels of education have a vital role to play in creating a supportive environment and so, a livable world. Teitelbaum also noted that primary and secondary education's role is to build the base for scientific understanding and literacy, to raise young people's interest and curiosity in the sciences and to stimulate interest in the further study of the chemical sciences and careers resulting from science and technology. Move over, there is a need to identify and develop effective curriculum material to support teachers teaching. These teachers should be trained and qualified in their subject and must be supported in a school environment with modern facilities for inspirational practical learning with some special educational program. In addition, there must be enough provision of university places to educate the next generation of scientifically literate graduates and researchers for a wide range of careers and further fieldwork study.

According to Prest (2009), research in science education now offers clear guidelines about the kinds of curriculum structures and teaching and learning approaches that can match these goals. He noted that research has shown consistently that two of the key factors are the actual curriculum approach along with the quality and commitment of teachers. It is vital that new curricula are designed in line with the clear findings from research and that steps are taken to ensure the supply of adequate numbers of teachers fully qualified in chemistry. He pointed out that primary schools should focus on the tangible and descriptive aspects of the sciences. And, secondary schools should move away from this towards the goal of enabling students to begin to understand the world around them in terms of the insights and understandings that have been offered by chemistry.

With the introduction of new technologies, we believe that it will be of commercial interest for all sections of the work force to develop their skills and knowledge up to date and to ensure that new technologies are learned. This will become particularly important in the future with an ageing workforce. Moreover, education and training institutions have an important role in ensuring that there is a flow of people with the skills required by the technology-based industries of tomorrow, but industry is always in vital point to further developing these skills and competencies. We need to add that investment in in-service training and life-long learning is an absolute to develop skills at all levels to ensure the sector and individual companies remain competitive to this important subject.

Innovation

We believe that improving the trust of chemical and biotechnology industries will help towards the goal of achieving a better balance for risk-benefit sharing amongst stakeholders in the higher technology areas of innovation. Industry's commitment to increased transparency will also help in this process. However, this will need concrete, coherent and continued public support via related institutions, governmental projects and big companies' effort.

The pace of technological development required necessitates urgent investment in research and support for innovation. In general, European innovation performance has been weak compared to competing regions in the world (HM Treasury, 2004). Some countries in Europe have started to address this by establishing a business-led Technology Strategy Board in 2004 and subsequently by establishing the Knowledge Transfer Networks (KTNs). Chemistry Innovation KTN has provided a focus for improved innovation in businesses of the countries, increasing their ability to turn knowledge and expertise into new technologies and products.

There are always, extensive structural, social and political factors that significantly impact on the ability to innovate successfully in the world. More clearly, there is a need to ensure increased and long-term commitment to innovation by the leaders in related companies. These leaders are responsible for generating the motivation and employee behavior that cultivates an environment conducive to successful innovation. There are other well determined challenges such as ensuring people in addition to those working in R&D are actively involved in the complete innovation process and offering direct and visible support for different business models.

Finally, we point out that more effective interaction between companies and their supply chains will also be essential for improving innovation. Ultimately this will require using the existing national, local and regional initiatives more effectively as it is these that provide the most direct access to the SMEs and future some special customers. In general, better cooperation along the supply chain should lead to increasing the probability of successful innovation in this area.

Result

Addressing global challenges means advancing fundamental scientific knowledge, supporting excellence in chemical science research and maximising the number of future breakthroughs. It will require an interdisciplinary approach that will build bridges between chemistry's sub-disciplines, and with other sciences and engineering.

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THE MEANING OF CHEMISTRY FOR TOMORROW II: OPPORTUNITIES AND REGULATORS*

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Abstract. With global change creating serious challenges relating to energy sources as food and climate change, intervention is necessary and urgent. The Royal Society of Chemistry is committed to meeting these challenges head on and has identified where the chemical sciences can give quickly technological and sustainable solutions. This big organisation is in the efficient position to find solutions to the world's problems by working in partnership with countries, professional bodies, informal establishments, academics and industry sectors. Focusing global challenges means advancing fundamental scientific knowledge, supporting excellence in chemical science research. It needs an interdisciplinary approach and the Royal Society of Chemistry must build bridges between chemistry's sub-disciplines, and with other sciences and engineering. We believe that international active networks of this organization could be instrumental in implementing of the possible chemical solutions.

Keywords: chemistry, global world, ecological problem, energy sources, appreciation, regulatory

Introduction

The chemical sciences help to make our lives healthier, safer and easier to live. They provide us with food, potable water, clothing, shelter, energy, transport and communication and many more positive effects to our life, while at the same time helping us in conserving scarce resources and protecting the natural environment (Prest, 2009). The ecological problems caused by human activity such as climate change and food problems are some serious deterioration. It is estimated that more than one billion people now live in poverty without enough food, water or adequate sanitation and healthcare provision in many countries, especially in Africa (The world bank, 2008). We believe that mitigation of the challenges will rely on adopting sustainable development; the ability to meet the needs of the present without compromising the ability of future generations to meet their special needs. This needs the eco-efficient processes and products that the chemical sciences can provide as a solution.

Global change is creating serious challenges for humanity from all over the world. By 2040 the world's population is expected to have increased by 1.9 billion to over eight billion, with most of those people living in cities (United Nations, 2014). According to this report, global energy requirements will continue to increase and will the pressure on the Earth's natural resources to provide this rapidly expanding population with enough food, water and shelter. It is noted in this report that the industrialized countries of Asia and Latin America are experiencing very rapid economic growth that is bringing modern society's environmental problems, including air and water pollution and

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waste problems, to wider areas of the globe (Gungor at all, 2016; Gurol at all, 2008; Gungor at all, 2017; Gungor at all, 2018). The ecological problems caused by human activity such as climate change are serious deterioration. Also, it is estimated that more than half billion people now live in poverty without enough food, water or adequate sanitation and healthcare provision in these parts of the world.

The chemical sciences, according to our approach, can play a clear and an efficient role in pursuing sustainable development and in providing technological solutions to the challenges facing society today and, in the future, (Gubbuk at all, 2014; Gungor at all, 2008; Gungor at all, 2005; Gubbuk at all, 2012). The technologies that the chemical sciences engender will improve the quality of daily life, underpin prosperity and will increase our readiness to face the challenges of the future for a livable environment or for a health world (RSC, 2009).

Creating a livable environment

Developments in the chemical sciences is required to provide the technological solutions needed by society and governments, to solve the global challenges in energy, food, health, water and sustainability in the totally of the world. Achieving this does not depend only on major research and technological advances in the areas discussed in this paper. It requires developing a supportive environment (European Communities, 2004).

Progresses are turned out by the chemical sciences will clearly be important to future advances in environmentally benign and more sustainable energy production, storage and supply. The progress will be critical increased food production with less demand on arable land. These progresses will be effective advanced diagnostics and novel disease prevention therapies based on exploitation of the human genome. The development will have useful designing processes and products that preserve resources. Finally, the progress will be determinative the provision of clean accessible drinking water for all (Prest, 2009). Also, promotions in chemistry will be needed to develop functional materials to construct the buildings, to design lightweight vehicles and so, reduce greenhouse gas emissions for green world.

The supportive environment needs the supply of an appropriately diverse scientific workforce, investing in research and regulatory framework that protects society. We believe that this also require engagement with key stakeholders, ranging from industrialists, academics and educationalists to governments, funding organisations and big informal corporation and organisations. There is also a need to invest in innovation. The translation of scientific findings into usable application and new developments will be a real and powerful solutions. Society and companies need to be clearly aware of these issues and, in seeking to achieve the target (International Energy Agency, 2006).

The issues in this paper are based on activities of some important society as the RSC aggregated from a global perspective. These subjects are as below;

- Opportunities
- Appreciation of the chemical sciences
- Regulators

Opportunities

Teitelbaum pointed out that (2007) the attrition of women from chemistry is particularly bad in comparison to most other STEM subjects and it is therefore important to have an environment that supports the career aspirations of both men and women in academic world and in industry sector. Many businesses have already identified improving their workforce diversity as a way of accessing a special document archive. Especially, improving the culture to attract more women to make their long-term careers in research is important for the chemical sciences.

Most of the graduate population in most of Europe is now female. More women than men have graduated from higher education institutions for well over ten years. 61 percent of those who graduated in 2008 were female. In the UK, women are under-represented in most STEM subjects, the biological sciences being the exception (British Wind Energy Association, 2008). According to Teitelbaum, women are less likely than men to choose to read chemistry in the UK, where women make up around 49 per cent of those graduating at undergraduate level but 57 per cent of those graduating from all disciplines. He also noted that last increases in the overall number of chemistry graduates may also be counteracted by the relatively low retention rate of women in comparison to men.

Appreciation of the chemical sciences

This means that chemistry has a vital role in the school curriculum by providing future scientists and developing a future society where the place of chemistry is grasped in terms of its underpinning role in tackling main global challenges. The early years of secondary education are known to be critical and teaching must focus on what is accessible at these ages. Researchers has proved that this approach generates an increase in demand amongst young people to study chemistry. It also provides a powerful basis for enabling everybody to see the role of chemistry in the way it can contribute in taking society forward in addressing major challenges (Boole, 2008).

It is important for students that they are provided with information about careers, when students are approaching the point of making the subject choices that will determine what they can study at the next years of their life. In this step, they can follow by studying subjects like chemistry. According to Boole, the majority of those who study the chemical sciences at undergraduate or postgraduate level do so to pursue an interest in the subject. So, we need to add that it is important that children in primary and the early years of secondary schooling are given the opportunity to see the real excitement of chemistry either within their schools or home, and/or through other intervention programs, where they can access facilities that schools cannot provide such an opportunity. Boole also pointed out that the earlier these interventions take place the better. According to him, early impressions of science will stay with children longer. Moreover, it is equally important that those early messages are reinforced throughout young people's schooling with other intervention programs (HM Treasury, 2004).

We think that to create a supportive environment all over the world, it is important to take long-term action to foster an appreciation of the chemical sciences and stimulate an interest in studying chemistry and careers in science. Chemistry supports our understanding of all aspects of the world around and as a result the subject has an efficient role to play in everyone's general education background. All young people from all over the world are the future of society and the leaders of the governments. They need to be aware of that they will live in a world that is influenced strongly by the present contributions of research and development based on the chemical sciences.

Regulators

To create a supportive environment for innovation and to meet the challenges facing society it is necessary to monitor developments in EU Environment, Health and Safety (EH&S) policy and related regulations. A proactive approach needs to be taken in influencing and informing policy makers so that chemicals control regulation is scientifically sound, risk-based, proportionate, workable and sustainable.

While it is essential to protect health and the environment, it is always not possible to design-out all risks over the life cycle of chemical substances and products. We believe that regulations need to strike a balance between reducing risk as far as is possible and the benefits to society of chemicals. So, regulation based solely on a chemical's hazardous properties, and not on the actual risk it poses, can and has led to a reduction in chemical diversity, which in turn can impact negatively on innovation, for a chemical to cause harm requires exposure to its hazardous properties. While establishments such as the Royal Society of Chemistry support the search for safer alternatives it must be noted that chemical substances generally do not pose a single risk and in fact have a risk profile from some different special perspectives. Therefore, in the search for less harmful substitutes with equivalent functionality and utility, care must be taken to ensure that a reduction in one risk is not replaced by an increase in another. Furthermore, the search for safer solutions should be based on the principles of sustainability (The Royal Society of Chemistry, 2009).

Prest (2009) pointed out that it is also necessary to monitor international chemicals control policy to ensure that related European companies have a level playing field regarding EH&S regulation. While appropriate chemicals control policies do contribute to increased safety and sustainability, and can provide a source of competitive advantage, policies which are not based on scientific knowledge can bring additional costs for business that do not contribute to reducing negative approaches.

Finally, another very important area is green procurement, where related establishments consider external environmental concerns alongside the procurement criteria of price, type and quality. We agree with the idea that regulations requiring a proportion of public procurement to be green could turn out to be a massive demand for green, sustainable products and help foster innovation (European Communities, 2004). Shortly, Creating and

securing environmentally sustainable energy supplies, and improving efficiency of power generation, transmission and use are the basics of targeted points to tomorrow's life.

Result

Focusing global challenges means advancing fundamental scientific knowledge, supporting excellence in chemical science research. It needs an interdisciplinary approach must build bridges between chemistry's sub-disciplines, and with other sciences and engineering. Addressing global challenges means advancing fundamental scientific knowledge, supporting excellence in chemical science research and toping out the number of future breakthroughs. It will require an interdisciplinary approach that will build bridges between chemistry's sub-disciplines, and with other sciences and engineering.

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USING OF TECHNOLOGY FOR ELECTRIC POWER DISTRIBUTION SYSTEMS*

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Abstract. The Power Industry is the center point of a transformation process from being energy suppliers to becoming energy service companies. The Distribution utilities must provide productivity and reduce operating costs and maintenance costs whilst providing customers with a reliable power supply and services. The effective use of information technology is vital to achieve rapid success. Also, we can say that the power utilities are increasing efficiencies in distribution networks, which have among the highest transmission and distribution losses in the world. The construction of a new power distribution system has been modified to meet some basic requirements. It will adopt digital technology and "information technology-related technology, which has made rapid advances in recent years. This system aims at minimizing the total cost, not only reducing of the unit price but also the cost of installation, construction, operation, and maintenance. In this paper, we focus, as the new technologies, the construction of intelligent substations in the power distribution system, protection and control-unified equipment.

Keywords: power industry, electric distribution system, new technology

Introduction

With the advances in Information Technology, the modern world has jumped into a revolution in networking and communication technologies to provide automation as a solution to improve distribution efficiencies. Distribution Management System is a basic tool for enterprise-wide management of an electric utility system. The initiatives in distribution management contain complete distribution system automation and distribution management for electric utilities (Boyer, 1999). Existing distribution systems have certain inherent inefficiencies due to their legacy (Alsall, 2001). For one, most systems are monitored manually. Alsall stayed that the present system also does not guarantee reliable and complete power system and operate information that can facilitate trend forecasting or help the utility in better analysis and planning. According to him, new challenges are faced with the greater environmental concern and the proliferation of open information systems.

The new energy context requires renewed strategies to confirms one's position as a prime power utility. Controlling of energy losses with a vision to effective operations of billing and collection due to inefficient distribution network load forecasting and system planning. The power distribution company must be equipped with proper information technology, information system and database for collection, storage, manipulation, dissemination and online processing (Aydin at all, 2017; Hag and Ygge, 1995). Securing a reliable power supply has become an important

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social need worldwide. Detailed investigations and developments are in progress on power distribution systems and the monitoring of apparatus to ensure this need is fulfilled (Iwatani, 2001);

- digital technology based on the application of semiconductor high-speed elements,
- intelligent substations applying information technology,
- system configurations aimed at high-speed communication.

Iwantani also noted that incorporated in these arguments are demands for the future intelligent control of substations, protection and communication systems that have advantages in terms of high performance and functional distribution. Also, he claimed that, by applying these developments, the following savings for the whole system can be expected:

- reduced costs in remote surveillance in the field of apparatus monitoring and operation,
- reduced maintenance costs based on the integrated management of equipment,
- reduced costs due to space saving because of miniaturizing equipment

The power distribution system also requires reductions in initial investments, such as the unit price of apparatus and miniaturization, and reduced costs for the whole life cycle, including the operation and maintenance costs of the substation system.

Information technology for power distribution system

The meaning of information technology in this sector is a means of generating, processing, disseminating, storing and analyzing information (Hag and Yagge, 1995). In the power sector, it is expensive and requires total reengineering to control real time information for all consumers since the information required is at consumer level. The following information systems are suggested in the first phase for an efficient result (Chophade, 2005);

SCADA Systems: One major tool available for power utilities is the Supervisory Control and Data Acquisition (SCADA) system. According to Chophade, SCADA refers to a system that enables an electric utility to remotely monitor, coordinate, control and operate distribution components, equipment and devices in a real-time mode from remote locations with acquisition of data for analysis and planning from one central location.

Infrastructure creation, database generation and indexing of consumers by digital mapping: Chophade noted that first, complete networking covering interfaces with intranet and internet with firewall and other securities. Secondly, GIS based consumer indexing and data warehousing. Finally, GIS based material indexing (Figure 1).

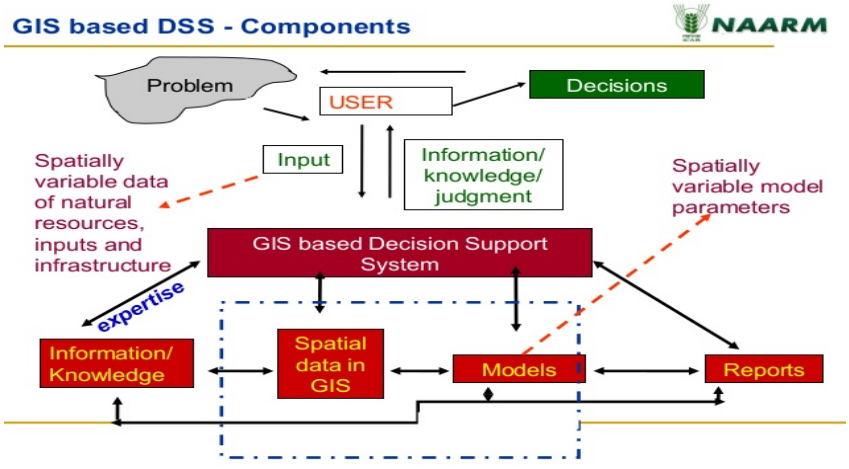

Figure 1: GIS based system.

(www.google.com.tr/search?q=GIS+based+system&rlz)

Information system for efficiency enhancement and cash flow improvement: Chophade classified the items of this title as that a. Consumer data management system. b. Spot billing at consumer premises by hand held computer. c. Anywhere collection. d. Integrated metering, billing and collection system. e. Energy audit and accounting. f. Network management system

Contributing devices to intelligent substation

The power distribution system and monitoring equipment are independent of every requires reductions in initial investments (Amin, 2001). Also, connection is based on the signal's unit price of apparatus and miniaturization and coming through the cable. Amin stayed that "an reduced costs for the whole life cycle, including the intelligent substation shares all information on operation/maintenance costs of the substation system. apparatus, control, protection, measurement". He pointed out that the construction of a new power distribution system apparatus monitoring equipment through one bus by has been modified to meet these requirements. High efficiency and technology made rapid advances in recent miniaturization can be accomplished (figure 2).

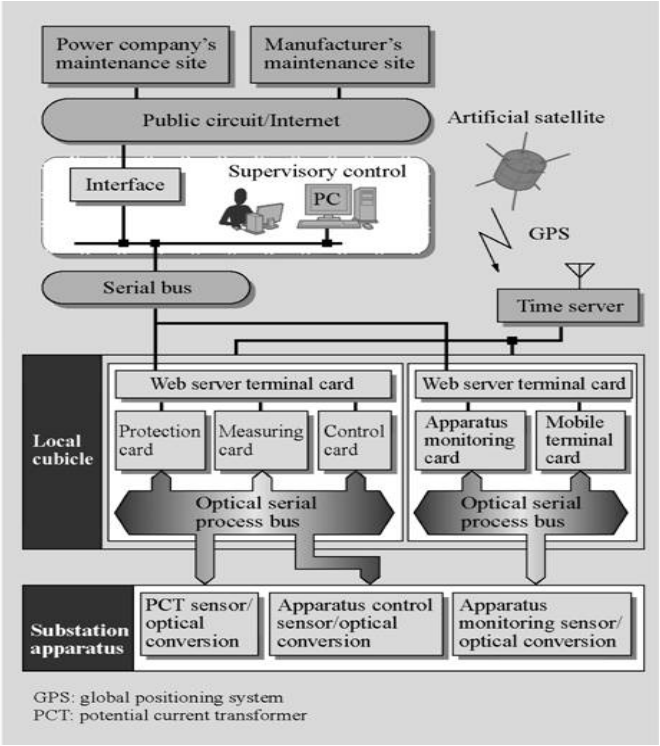

Figure 2. A system configuration for concept of intelligent substations.

(www.seminarsonly.com/electronics/Artificial-Intelligence-In-Power-Station.php)

Apparatus monitoring system

According to Lee Smith (1996), all the data from each monitoring and measuring device is transmitted and used for a higher-level monitoring system via an optical bus. He also added tht the required data can be accessed through the intranet or the internet at the maintenance site of an electricity supply company or a manufacturer and the apparatus can be monitored from a remote location. So, the construction, analysis and diagnosis of the database including trend management and history management become arrangeable. Moreover, signs of abnormalities can be controlled well

in advance, and prompt action can be set in times of emergency. Finally, maintenance plans can be modified to ensure reliability efficient maintenance planning by inspecting revision description and parts management.

Switchgear

The sensor signal from the PCT is digitized at the sensor output edge and the load on the PCT only reaches that of an "analog-to-digital" converter. This mean that the burden can be drastically decreased because (McDonald and Saxton, 1997). They noted that Rogowski coils are used as the current sensors and capacitive potential dividers are used as the voltage sensors. These sensors drastically reduce the size of the switchgear. Some analyisng studies on miniaturizing conventional equipment have been focused at standardizing series. Finally, we note that advanced miniaturization will be applied by digitizing this system.

Protection and control systems

Applying digital technology and information technology function to the protection and control system are effective because of the rapid progress in today's information field. Digital technology has the advantages, namely minimizing maintenance and improving reliability (Antila, 2003). Also, it has accelerated the conversion from individual analog-type to digital-type relays. We have to add that digitization is not only needed for independent single-function equipment, but for the "systematic operation and employment" of the whole substation. These systems have improved efficiency in employment and maintenance using information technology. The key words are as follows: (Kashiwazaki at all., 2013);

- Slimming of total system as a protection control equipment → Unification of equipment
- High efficiency of employment and maintenance support using IT technology → Extended employment and maintenance by remote control
- System directly linked to the equipment for protection and control → Distributed installation near the apparatus

Result

In this study, we mentioned the emerging new technology in the electricity supply system. Technology research and development have been conducted based on the concept of an intelligent system on equipment and constitution of the system because of the progress in communication technology and expansion of information technology. We believe that it needs to be accelerated the development of products in accordance with the demands of costumers.

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ZERO DIVISORS ELEMENT OF A RING: LINEARLY ORDERED PRIMES*

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Abstract. In this paper, we focus zero-divisor graph for several classes of rings which generalize valuation domains to the context of rings with zero-divisors. The rings with nonzero zero-divisors that satisfy certain divisibility conditions between elements or comparability conditions between ideals or prime ideals are be detailed by some theorems, lemmas and examples. We refer rings R such that the prime ideals of R contained in Z(R) are linearly ordered. In particular, we determine the diameter and girth for Γ(R) and Γ(R[X]). We use the technique of idealization of a module to construct examples for this study.
Keywords: *rings, zero-divisor graph, prime ideals, ideal of a ring*

Introduction

We firs give some basic definitions which are used in the examination of the concepts. Let R be a commutative ring with 1_R, and let Z(R) be its set of zero-divisors. The zero-divisor graph of R, denoted by Γ(R), is the graph with vertices $Z(R)^* = Z(R) \setminus \{0\}$, the set of nonzero zero-divisors of R, and for distinct $x, y \in Z(R)^*$,

The vertices x and y are adjacent if and only if xy = 0

(Anderson and Badavi, 2008). Moreover,

R is an integral domain if and only if Γ(R) is the empty graph

and,

A nonempty Γ(R) is finite if and only if R is finite and not a field

(Anderson and Livingston, 1999).

Let G be a graph. We say that G is connected if there is path between any two distinct vertices of G. At the other extreme, we say that G is totally disconnected if no two vertices of G are adjacent. For vertices x and y of G, we define dxy to be the length of a shortest path from x to y in G (dxx = 0 and dxy = ∞).

The diameter of G is diam(G) = sup{dxy | x and y are vertices of G}.

The girth of G, denoted by gr(G), is the length of a shortest cycle in G (gr(G) = ∞ if G contains no cycles). Then Γ(R) relates to diam (Γ(R)) ≤ 3 and gr(R) ≤ 4 if R contains a cycle. Thus diam(Γ(R)) = 0,1,2 or 3, and gr(Γ(R)) = 3,4, or ∞ (Huckaba, 1988; Axtel and Sticles, 2006; Anderson et al., 2003; Axtel et al., 2005; De Meyer and Schneider, 2002, Lucas, 2006 and Redmond, 2007).

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An integral domain R with quotient field K is called a pseudo-valuation domain (PVD) if every prime ideal P of R is strongly prime, in the sense that whenever xy ∈ K and xy ∈ P, then x ∈ P or y ∈ P (Hedstrom and Houston,1978). Later Badawi et all. (1995) extended this concept to rings with zero-divisors where R is called a pseudo-valuation ring (PVR) if every prime ideal P of R is strongly prime, in the sense that xP and yR are comparable for all xy ∈ R. The research team proof that any valuation domain is a PVD, and

An integral domain is a PVD if and only if it is a PVR.

We remember that that a ring R is a PVR if and only if for all x, y ∈ R, we have either x | y or y | xz for every non-unit z ∈ R (Badawi et al., 1995, Theorem 5). We say that a ring R is a chained ring if the (principal) ideals of R are linearly ordered (by inclusion), equivalently, if either x | y or y | x for all xy ∈ R. By our earlier comments, a chained ring is a PVR.

Remember (Beck, 1988) that for an R-module M, the idealization of M over R is the ring formed from R × M by defining addition and multiplication as

$$(r, a) + (s, b) = (r + s, a + b)$$
$$(r, a) . (s, b) = (rs, rb + sa).$$

A standard notation for this "idealized ring" is R(+)M (Huckaba, 1988). Note that

the ideal $I = \{0\}(+) M$ of $T = R(+)M$ satisfies $I^2 = 0$;

so $I \subseteq Nil(T)$.

Linearly Ordered Primes of a Ring

The main research point of this study is to anlayse the zero-divisor graph of a ring R such that the prime ideals of R contained in Z(R) are linearly ordered. These are precisely the rings R such that the prime ideals of T(R) are linearly ordered, and include chained rings, divided rings, PVRs, Ø-PVRs, rings with Z(R) = Nil(R), and zero-dimensional quasilocal rings. We investigate that $diam(\Gamma(R)) \leq 2$ and $gr(\Gamma(R)) = 3$ or ∞.

Theorem 1. Let R be a ring and let x, y ∈ $Nil(R)^*$ be distinct with $xy \neq 0$. Then $(0: (x, y)) \neq \{0\}$, and moreover, there is a path of length 2 from x to y in $Nil(R)^* \subseteq \Gamma(R)$. In particular, if Z(R) = Nil(R), then $diam(\Gamma(R)) \leq 2$ (Anderson, 2008).

Proof. Since $xy \neq 0$ and x ∈ $Nil(R)^*$, let n (≥2) be the least positive integer such that $x^n y = 0$. Also, since $x^{n-1} y \neq 0$ and y ∈ $Nil(R)^*$, let m (≥2) be the least positive integer such that $x^{n-1} y^m = 0$. Then $0 \neq x^{n-1} y^{m-1} \in Nil(R)$ and $x^{n-1} y^{m-1} \in (0 : (x, y))$. Thus $x - x^{n-1} y^{m-1}$-y is a path of length 2 from x to y in $Nil(R)^*$ (Anderson, 2008).

We know that if Z(R) = Nil(R), it is not difficult to describe the diameter of Γ(R); and moreover, $diam(\Gamma(R)) \neq 3$ in this case. Also, in this case, Nil(R) is the unique minimal prime ideal of R and is the only prime ideal of R contained in Z(R); so this is the simplest case where the prime ideals of R contained in Z(R) are linearly ordered.

Lemma 2. Let R be a ring with x ∈ $Nil(R)^*$ and y ∈ $Z(R)^*$. Then $dxy \leq 2$ in Γ(R) (Anderson and Badawi, 2008).

Proof. We assume that $x \neq y$ and $xy \neq 0$. Since y ∈ $Z(R)^*$ and $xy \neq 0$, there is a z ∈ $Z(R)^* \setminus \{x\}$ such that yz = 0. Let n be the least positive integer such that $x^n z = 0$. Then $x – x^{n-1} z – y$ is a path of length 2 from x to y (if n = 1, then $x^{n-1} - z = z$). Thus $dxy \leq 2$ in Γ(R) (Anderson and Badawi, 2008).

Theorem 3. Let R be a ring.

(1) The prime ideals of R contained in Z(R) are linearly ordered if and only if for all x, y ∈ Z(R), there is an integer $n = n(x, y) \geq 1$ and an element z ∈ R\Z(R) such that either $x \mid zy^n$ or $y \mid zx^n$.

(2) The radical ideals of R contained in Z(R) are linearly ordered if and only if for all xy ∈ Z(R), there is an integer $n = n(x, y) \geq 1$ such that either $x \mid y^n$ or $y \mid x^n$.

(3) If the prime ideals of R contained in Z(R) are linearly ordered, then Nil(R) and Z(R) are prime ideals of R (Badawi, 1995).

Proof. (1) Note that the prime ideals of R contained in Z(R) are linearly ordered if and only if the prime ideals of T(R) are linearly ordered, if and only if for all x, y ∈ T(R), there is an integer n = n(x, y)≥ 1 such that either x | y^n or y | x^n in T(R) (Badawi, 1995).

(2) Suppose that the radical ideals of R contained in Z(R) are linearly ordered. Let x, y ∈ Z(R). Then Rad(xR), Rad(yR) ⊆ Z(R); so we may assume that Rad(xR) ⊆ Rad(yR). Thus x ∈ Rad(yR); so y|x^n for some integer n ≥ 1. Conversely, let I, J ⊆ Z(R) be radical ideals of R. If I and J are not comparable, pick x ∈ I\J and y ∈ J\I. If x|y^n , then y^n ∈ xR ⊆ I, and hence y ∈ I, a contradiction (Badawi, 1995).

(3) Suppose that the prime ideals of R contained in Z(R) are linearly ordered. Then Nil(R) is an intersection of linearly ordered prime ideals of R since each minimal prime ideal of R is contained in Z(R), and thus Nil(R) is prime. Also, Z(R) is the union of linearly ordered prime ideals of R, and hence Z(R) is prime (Badawi, 1995).

Dobs (1976) showed that Z(R) is a union of prime ideals of R and

Z(R) is a prime ideal of R if and only if it is an ideal of R.

If dim(R) = 0 and the prime ideals of R contained in Z(R) are linearly ordered, then R is quasilocal with Z(R) = Nil(R) its unique prime ideal. If Nil(R) □ Z(R) and Nil(R) is a prime ideal of R, then dim(R) ≥ 1 and Γ(R) must be infinite. For in this case, R is not an integral domain, and thus if Γ(R) is finite, then R must also be finite contradicting dim(R) ≥ 1. In particular, if the prime ideals of R contained in Z(R) are linearly ordered and Nil(R) □ Z(R), then R is infinite (Anderson and Livingston, 1999).

If the radical ideals of R contained in Z(R) are linearly ordered, then the prime ideals of R contained in Z(R) are also linearly ordered. In the following example where the prime ideals of R contained in Z(R) are linearly ordered, but the radical ideals of R contained in Z(R) are not linearly ordered.

Example. Let H = ℤ+ XQ[[X]], and let I = $\mathbb{Z}_2$X + X^2 XQ[[X]], be an ideal of H. Set R = H /I. Then Z(R) = (2ℤ + XQ[[X]] / I = 2R = Ann_R(1/2X + I), N(R) = Nil(R) = XQ[[X]] / I, and $Nil(R)^2$ = {0}. The prime ideals of R contained in Z(R), namely, Z(R) and Nil(R), are linearly ordered. But the radical ideals of R contained in Z(R) are not linearly ordered since the two radical ideals (6 ℤ+ XQ[[X]]) / I and (10ℤ + XQ[[X]]) / I are not comparable. Thus, the prime ideals of R are also not linearly ordered; for example, (2ℤ + XQ[[X]]) / I and (3ℤ + XQ[[X]]) / I are not comparable. We conclude that diam(Γ(R)) = 2 and gr(Γ(R)) = 3 by Lemma 2.

We note that

the prime ideals of R contained in Z(R) are linearly ordered if and only if the prime ideals of T(R) are linearly ordered (Dobs, 1976).

Also, Anderson and Livingston (1999) show that

a nonreduced ring R has Γ(R) complete if and only if $Z(R)^2$ {0};

If xy = 0 for all x, y ∈ Z(R) with x ≠ y, then x^2 = 0 for all x ∈ Z(R). So if R is a nonreduced ring with $Z(R)^2$ ≠ {0}, then {0}≠ N(R) = Nil(R) = Z(R) and diam(Γ(R)) ≤ 1, with equality when $|Z(R)^*| \geq 2$.

Theorem 4. Let R be a ring with $Z(R)^2 \neq 0$ such that the prime ideals of R contained in Z(R) are linearly ordered. Then diam(Γ(R)) = 2 (Anderson and Badawi, 2008).

Proof. By the above comments, R is not reduced. So Γ(R) is not a complete graph and diam(Γ(R)) ≥ 2. Let x, y ∈ $Z(R)^*$be distinct with xy ≠ 0. If xy ∈ Nil(R), then dxy = 2 by Theorem 1. If x ∈ Nil(R) and y ∈ Z(R)\Nil(R), then dxy = 2 by Lemma 2. Finally, suppose that x, y ∈ Z(R)\Nil(R). Since the prime ideals of R contained in Z(R) are linearly ordered, there is an integer n ≥ 1 and an element z ∈ R\Z(R) such that either x | zy^n or y | zx^n by

Theorem 3(1). We may assume that $x \mid zy^n$ for some integer $n \geq 1$ and $z \in R\backslash Z(R)$. Thus $dxy = 2$. Hence $\text{diam}(\Gamma(R)) \leq 2$, and thus $\text{diam}(\Gamma(R)) = 2$ since $\text{diam}(\Gamma(R)) \geq 2$ (Anderson and Badawi, 2008).

Example. This example illustrates what can happen when the prime ideals of R contained in Z(R) are not linearly ordered;

i. Let $H = \mathbb{R}[[X, Y]] + ZF[[Z]]$, where F is the quotient field of $\mathbb{R}[[X, Y]]$, and let $I = ZH$. Set $R = D/I$. Then R is quasilocal with maximal ideal $Z(R)((X, Y) + ZF[[Z]])/I$, $NR = \text{Nil}(R) = ZF[[Z]]/I$, $\text{Nil}(R)^2 = 0$, and $((X) + ZF[[Z]])/I$ and $((Y) + ZF[[Z]])/I$ are incomparable prime ideals of R contained in Z(R). One can easily show that $\text{diam}(\Gamma(R)) = 3$ and $\text{gr}(\Gamma(R)) = 3$.

ii. Let $R = \mathbb{Z}_2 \times \mathbb{Z}_4$. Then $N(R) = \text{Nil}(R) = \{0\} \times \{0, 2\} \subset Z(R) = U \cup V$, where $U = \mathbb{Z}_2 \times \{0,2\}$ and $V = \{0\} \times \mathbb{Z}_4$ are incomparable primes ideals of R contained in Z(R). One can easily show that $\text{diam}(\Gamma(R)) = 3$ and $\text{gr}(\Gamma(R)) = \infty$.

We conclude this study with a discussion of the girth of $\Gamma(R)$ when the prime ideals of R contained in Z(R) are linearly ordered. We noted the case where $Z(R) = \text{Nil}(R)$. In this case, $\text{gr}(\Gamma(R)) \neq 4$, and, the girth is either 3 or ∞. Finally, $\text{gr}(\Gamma(R)) = \infty$ if and only if $\Gamma(R)$ is a finite star graph.

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