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Editorial

Dear authors, reviewers, and readers

It has been a month since I was given the privilege to serve as the Chief Editor of the International Journal for Innovation Education and Research (IJIER). It is a great pleasure for me to shoulder this duty and to welcome you to ***THE VOL-5, ISSUE-6 of IJIER*** which is scheduled to be published on **30th June 2017.**

International Journal for Innovation Education and Research (IJIER) is an open access, peer-reviewed and refereed multidisciplinary journal which is published by the International Educative Research Foundation and Publisher (IERFP). IJIER aims to promote academic interchange and attempts to sustain a closer cooperation among academics, researchers, policy makers and practitioners from a wide range of disciplines, which contribute to state of the art in science, education, and humanities. It provides a forum for the exchange of information in the fields mentioned above by welcoming original research papers, survey papers, and work-in-progress reports on promising developments, case studies, and best practice papers. The journal will continue to publish high-quality papers and will also ensure that the published papers achieve broad international credibility.

The Chief Editor, appointed by the Associate Editors and the Editorial Board, is in charge for every task for publication and other editorial issues related to the Journal. All submitted manuscripts are first screensed by the editorial board. Those papers judged by the editors to be of insufficient general interest or otherwise inappropriate are rejected promptly without external review. Those papers that seem most likely to meet our editorial criteria are sent to experts for formal review, typically to one reviewer, but sometimes more if special advice is needed. The chief editor and the editors then make a decision based on the reviewers' advice.

We wish to encourage more contributions from the scientific community to ensure a continued success of the journal. We also welcome comments and suggestions that could improve the quality of the journal.

I would like to express my gratitude to all members of the editorial board for their courageous attempt, to authors and readers who have supported the journal and to those who are going to be with us on our journey to the journal to the higher level.

Thanks,

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Matlab Source Code for species transport Through Nafion Membranes in Direct Ethanol, Direct Methanol, and Direct Glucose Fuel Cells

John Summerfield

Abstract

A simple simulation of chemical species movement is presented. The species traverse a Nafion membrane in a fuel cell. Three cells are examined: direct methanol, direct ethanol, and direct glucose. The species are tracked using excess proton concentration, electric field strength, and voltage. The Matlab computer code is provided.

Keywords: Matlab, Simulation, Nafion Membrane, Fuel Cells

1. Introduction

An efficient fuel cell could replace combustion engines and advance the goal of being less oil dependent. For a fuel cell, an accurate mathematical model is an important tool for optimizing fuel cell efficiency, which makes fuel cell model a current research topic.[1,2] The novelty of this work is that three fuel cells are modelled apart from the typical hydrogen oxygen fuel cell. Furthermore, a Matlab computer program is presented so that others may investigate their own systems.

The systems studied in this work involve chemical species transport with an ion exchange polymer composite matrix supported on an electrode surface. The ion exchange polymer that is used to modify electrodes in this work is Nafion, the structure of which is shown in Figure 1.

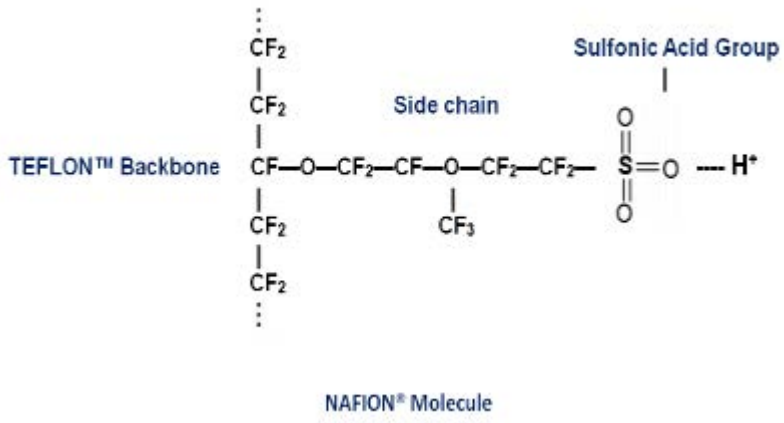

Figure 1: Molecular structure of Nafion.

Structurally Nafion is a Teflon-like, hydrophobic, fluorocarbon backbone with sidechains that terminate in a hydrophilic sulfonic acid. When Nafion is in contact with solution, the proton from the sulfonic acid can easily exchange with cationic species in solution. Nafion provides a cation selective matrix where cationic redox species are concentrated within the film. Because Nafion is a polymer, mass transport in

the system is slowed. In the acid form, Nafion provides ion conduction through the acidic proton about the sulfonic acid.

A fuel cell is similar to a battery in that it converts chemical energy into electrical energy and is better than a battery because it does not undergo charge/discharge cycles. A fuel cell provides power as long as it is provided fuel, similar to a combustion engine. A fuel cell is better than a combustion engine because it converts chemical energy directly into electrical energy without moving through a pressure-volume cycle and so is a more efficient process. The Carnot limitations restrict combustion engines to a theoretical maximum efficiency of 40%. Because a fuel cell converts chemical energy to electrical energy without mechanical cycles, there are no thermodynamic limitations and so the theoretical efficiency is 100%.

A fuel cell consists of two electrodes separated by an ion conducting membrane. As is typical, the membrane is Nafion and the electrodes are graphite. When catalyst coated electrodes are pressed against the membrane, interfacial zones are created. The electrochemical reactions occur only in these interfacial zones. A local difference in the concentration of anions and cations is produced because of these reactions. This separation of charge creates a potential difference across the cell. The slightly resistive nature of the electrodes and Nafion causes a potential loss in these regions. Table 1 shows the fuel cells investigated in this work.[3]

Table1: The fuel cell type, the anode reaction, the cathode reaction, and the cell voltages for this work.

Fuel Cell Type	**Anode**	**Cathode**	**Voltage (V)**
Methanol	$CH_3OH + 6OH^- \Rightarrow CO_2 + 5H_2O + 6e^-$	$3/2O_2 + 3H_2O + 6e^- \Rightarrow 6OH^-$	1.12
Ethanol	$CH_3CH_2OH + 2OH^- \Rightarrow CH_3COOH + 3H_2O + 4e^-$, $CH_3CH_2OH + 12OH^- \Rightarrow 2CO_2 + 9H_2O + 12e^-$	$3O_2 + 6H_2O + 12e^- \Rightarrow 12OH^-$	1.17
Glucose	$C_6H_{12}O_6 + H_2O \Rightarrow C_6H_{12}O_7 + 2H^+ + 2e^-$	$O_2 + 2H^+ + 2e^- \Rightarrow H_2O$	1.30

2. The Model

Consider a one dimensional model. Define $C_j(x, t)$ as the concentration in mol/cm^3, $J_j(x, t)$ as the flux (mol cm^{-2} s^{-1}) and $\varphi(x, t)$ as the potential (volts). The Nernst-Plank equation relates these quantities.

$$J_j(x,t) = -D_j \frac{\partial C_j(x,t)}{\partial x} - \frac{z_j F D_j}{RT} C_j(x,t) \frac{\partial \varphi(x,t)}{\partial x} \quad (1)$$

where D_j is the diffusion rate of species j (cm^2 s^{-1}), z_j is the charge on species j, F is Faraday's constant (C mol^{-1}), R is the gas law constant (J K^{-1} mol^{-1}), and T is temperature (K).

More specifically, $C_j(x, t)$ is the concentration of j needed to neutralize the sulfonates concentration. Let N be the concentration of sulfonates in the Nafion.

For simplification, the relation between flux and concentration is relied on,

$$\frac{\partial C_j(x,t)}{\partial t} = -\frac{\partial J_j(x,t)}{\partial x}$$.

(2)

Using Eq. (1), Eq. (2), and our newest definitions,

$$\frac{\partial C_j(x,t)}{\partial t} = D_j \frac{\partial^2 C_j(x,t)}{\partial x^2} + \frac{z_j F D_j}{RT}\left[\left(C_j(x,t)+N\right)\frac{\partial \varphi(x,t)}{\partial x}\right]_x$$

(3)

The total current, i, at steady state is set by the steady state flux, J_j,

$$i = \sum_j i_j = -\sum_j nFAJ_i$$

(4)

where n is the number of electrons involved in the redox reaction and A is the surface area of the electrode. This work considers each chemical species independently so Eq. (4) reduces to

$$i = -nFAJ_j$$.

(5)

Turning to the relation between concentration and electric potential energy, Poisson's equation is relied on

$$\frac{\partial^2 \varphi(x,t)}{\partial x^2} = -\frac{F}{\varepsilon}\sum_j z_j C_j(x,t)$$

(6)

where $\varepsilon = \varepsilon_0 \varepsilon_r$ and is the relative permittivity. ε_0 is the vacuum permittivity and ε_r is the dielectric constant. This is 20 for Nafion.[4] For the systems of interest, Eq.(6) becomes

$$\frac{\partial^2 \varphi(x,t)}{\partial x^2} = -\frac{F}{\varepsilon} C_j(x,t)$$.

(7)

Finally then, equations (3) and (7) are used to define the species movement over the Nafion membrane.[5]

Equation (3) provides the transport equation with a condition on $\varphi''\left(C(x)\right)$ as seen in Eq. (7). Instead of considering derivatives of the potential, it is replaced with a relation to the electric field, $E\left(C(x)\right)$,

$$E\left(C(x)\right) = -\frac{\partial \varphi\left(C(x)\right)}{\partial x}$$.

(8)

This transforms Eq.(1) to

$$J = -D_j \frac{\partial C(x)}{\partial x} + \frac{FD_j}{RT} C(x) E\left(C\left(x\right)\right)$$

(9)

where J is the time independent, steady state. Equation (7) can also be recast,

$$\frac{\partial E\left(C\left(x\right)\right)}{\partial x} = \frac{F}{\varepsilon}\left(C\left(x\right) - N\right) .$$

(10)

Equations (9) and (10) appear to have no simulation problems. After a bit of examination they reveal themselves to be stiff partial differential equations. Standard methods were used to regularize them[6] and a Runge-Kutta scheme was used for the simulation‘s calculations.[7]

Let $C\left(x\right) = N\left(1 + \tilde{C}\left(x\right)\right)$ then the above become

$$J = -D_j N \frac{\partial \tilde{C}(x)}{\partial x} + \frac{FD_j N}{RT}\left(\tilde{C}(x) + 1\right) E\left(\tilde{C}\left(x\right)\right)$$

(11)

and

$$\frac{\partial E\left(\tilde{C}\left(x\right)\right)}{\partial x} = \frac{FN}{\varepsilon}\tilde{C}\left(x\right) .$$

(12)

Let $x = l\tilde{x}$ where l is the Nafion film thickness in cm and the above can be rewritten as

$$J = -\frac{D_j N}{l} \frac{\partial \tilde{C}(x)}{\partial x} + \frac{FD_j N}{RT}\left(\tilde{C}(\tilde{x}) + 1\right) E\left(\tilde{C}\left(\tilde{x}\right)\right)$$

(13)

and

$$\frac{\partial E\left(\tilde{C}\left(\tilde{x}\right)\right)}{\partial \tilde{x}} = \frac{FNl}{\varepsilon}\tilde{C}\left(\tilde{x}\right) .$$

(14)

It was thought that the electric field values might be too large and create problems in the simulation so $E\left(\tilde{C}\left(\tilde{x}\right)\right)$ was scaled by 10^{-3}. That is $\tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right) = 10^{-3} E\left(\tilde{C}\left(\tilde{x}\right)\right)$. This scaling and rearrangement yields

$$10^{-3} \frac{\partial \tilde{C}(x)}{\partial x} = -10^{-3} \frac{lJ}{D_j N} + \frac{Fl}{RT}\left(\tilde{C}(\tilde{x}) + 1\right) \tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right)$$

(15)

and

$$\frac{\partial \tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right)}{\partial \tilde{x}} = 10^{-3}\,\frac{FNl}{\varepsilon}\,\tilde{C}\left(\tilde{x}\right) \quad .$$

(16)

Simplifications can now take place. Equations (15) and (16) now become

$$\delta \frac{\partial \tilde{C}(x)}{\partial x} = \alpha + \beta\left(\tilde{C}(\tilde{x})+1\right)\tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right)$$

(17)

and

$$\frac{\partial \tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right)}{\partial \tilde{x}} = \gamma \tilde{C}\left(\tilde{x}\right) \quad .$$

(18)

where $\alpha = -10^{-3}\, lJ/D_j N$, $\beta = Fl/RT$, $\gamma = 10^{-3}\, FNl/\varepsilon$, and $\delta = 10^{-3}$.

The simplifications continue. Let $\hat{E}\left(\tilde{C}\left(\tilde{x}\right)\right) = \tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right) - E_e$ where $E_e = \alpha/\beta$. Then

$$\begin{aligned}
\delta \frac{\partial \tilde{C}(x)}{\partial x} &= \alpha + \beta\left(\tilde{C}(\tilde{x})+1\right)\left(\hat{E}\left(\tilde{C}\left(\tilde{x}\right)\right)+E_e\right) \\
&= \alpha + \beta E_e + \beta E_e\,\tilde{C}\left(\tilde{x}\right) + \beta\left(\tilde{C}\left(\tilde{x}\right)+1\right)\tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right) \\
&= \alpha + \beta\left(-\frac{\alpha}{\beta}\right) + \beta\left(-\frac{\alpha}{\beta}\right)\tilde{C}\left(\tilde{x}\right) + \beta\left(\tilde{C}\left(\tilde{x}\right)+1\right)\tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right) \\
&= -\alpha\tilde{C}\left(\tilde{x}\right) + \beta\left(\tilde{C}\left(\tilde{x}\right)+1\right)\tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right)
\end{aligned}$$

(19)

and

$$\frac{\partial \hat{E}\left(\tilde{C}\left(\tilde{x}\right)\right)}{\partial \tilde{x}} = \gamma \tilde{C}\left(\tilde{x}\right) \quad .$$

$$\hat{E}\left(\tilde{C}\left(\tilde{x}\right)\right) = \tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right) - E_e$$

(20)

Finally let $a = \alpha/\delta$, $b = \beta/\delta$, and $c = \gamma$ along with writing each equation as a function of $\tilde{C}$ and $\hat{E}$.

$$\frac{\partial \tilde{C}\left(\tilde{x}\right)}{\partial \tilde{x}} = -a\tilde{C}\left(\tilde{x}\right) + b\hat{E}\left(\tilde{C}\left(\tilde{x}\right)\right) + b\tilde{C}\hat{E}\left(\tilde{C}\left(\tilde{x}\right)\right)$$

(21)

and

$$\frac{\partial \hat{E}\left(\tilde{C}\left(\tilde{x}\right)\right)}{\partial \tilde{x}} = c\tilde{C}\left(\tilde{x}\right) \quad .$$

$$\tilde{E}\left(\tilde{C}\left(\tilde{x}\right)\right) = \hat{E}\left(\tilde{C}\left(\tilde{x}\right)\right) - E_e$$

(22)

Equations (21) and (22) are the equations used in the Appendix 1 program. The diffusion coefficients shown in Table 2.

Table 2: Diffusion coefficients for the simulations. R is the ideal gas constant and T is temperature. The other parameters are found in the program.

Fuel Cell Type	**Diffusion Coefficient (cm^2/s^{-1})**	**Reference**
Methanol	$2.1x10^{-5}\exp\left\{-\frac{20,460}{R}\left(\frac{1}{T}-\frac{1}{313}\right)\right\}$	[8]
Ethanol	$1.83x10^{-5}$	[1]
Glucose	$6.5x10^{-6}$	[9]

To verify that the simulation results were accurate, an equation with a fixed point in the center of the interval over which the simulation was ran was needed. The equation used was

$$\bar{C}(x)=\bar{E}(x)+\bar{V}(x)=\left(x-\frac{l}{2}\right)^2+\frac{V_0}{l}x-\frac{V_0}{2}$$

(23)

where

$$\bar{E}(x)=\left(x-\frac{l}{2}\right)^2 \text{ and}$$

$$\bar{V}(x)=\frac{V_0}{l}x-\frac{V_0}{2}$$

(24)

The eigenvalue used in the simulation was the value that resulted from $\frac{d\bar{C}}{dx}$ evaluated at $x = l/2$. These equations were entered into the simulation in the form

$$dy_1 = y_2 + y_3$$

$$dy_2 = 2$$

$$dy_3 = 0$$

(25)

where $y_1=\bar{C}(x), y_2=\frac{d\bar{E}(x)}{dx}$ and $y_3=\frac{d\varphi(x)}{dx}$. The resulting curves were as expected, creating the correct parabola for y_1 and the correct lines for y_2 and y_3.

3. Results and Discussion

For a 52 micrometer Nafion membrane, the excess proton concentration at the membrane, the electric field strength at the membrane, and the voltage at the membrane are shown for all three fuel cells in Figures 2 through 10. The simulation currently does not allow a thickness of 51 micrometers or less. This is likely because of the fixed point assumption and for a membrane 51 micrometers or less, one cannot assume the excess proton concentration is zero in the middle of the film or the position of the zero concentration is too uncertain. It is interesting the simulation breaks down at around the same thickness used in a fuel cell. It is not clear if this is the result of the simulation method or a characteristic of the modeling equations or the constraints on the system. Without the fixed point assumption, there is no interval within the film where the concentration of protons and Nafion is neutral. This is why the simulation breaks down and could be why such thin films are not stable in fuel cells.

The shapes of the curves across the membrane are similar cell to cell. All are essentially invariant across the membrane. For the excess protons, the membranes show a neutral region across the membrane with steep gradients at boundaries that yield concentration polarizations. That is, protons build up at the anode edge and deplete at the cathode edge.

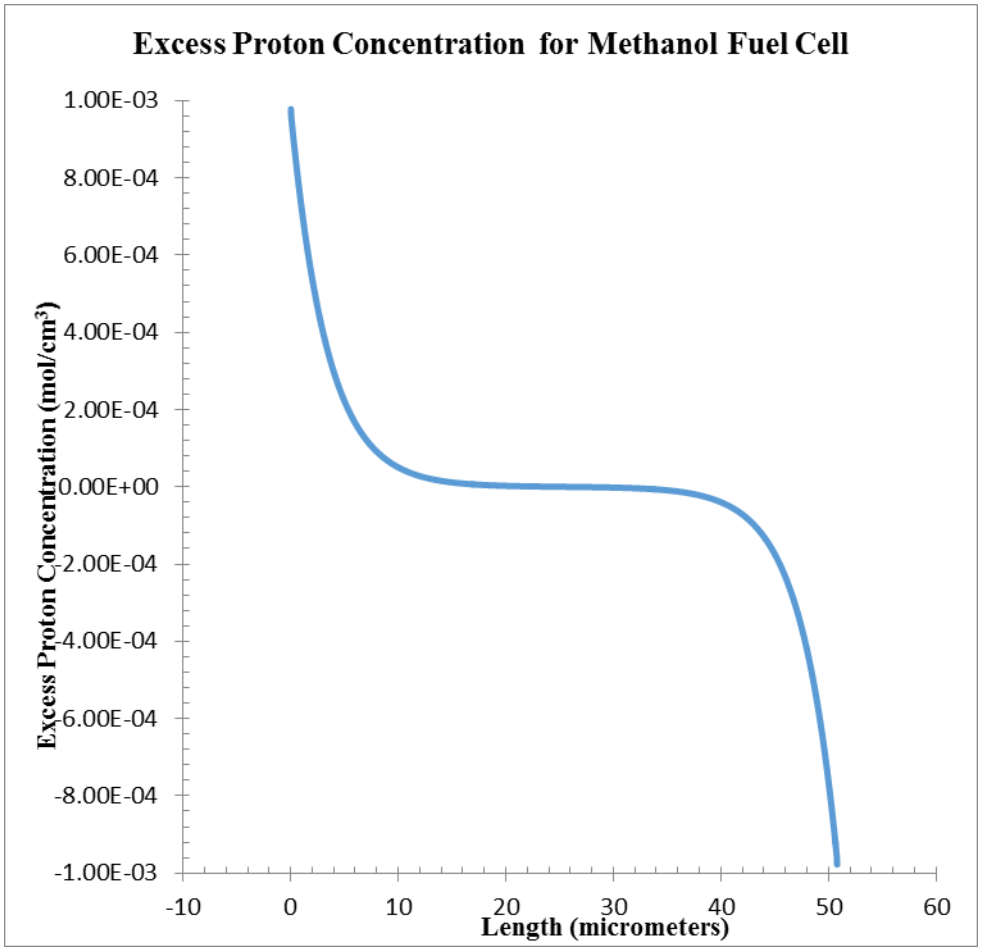

Figure 2: Excess proton concentration in a 52 micrometer Nafion membrane in a methanol fuel cell.

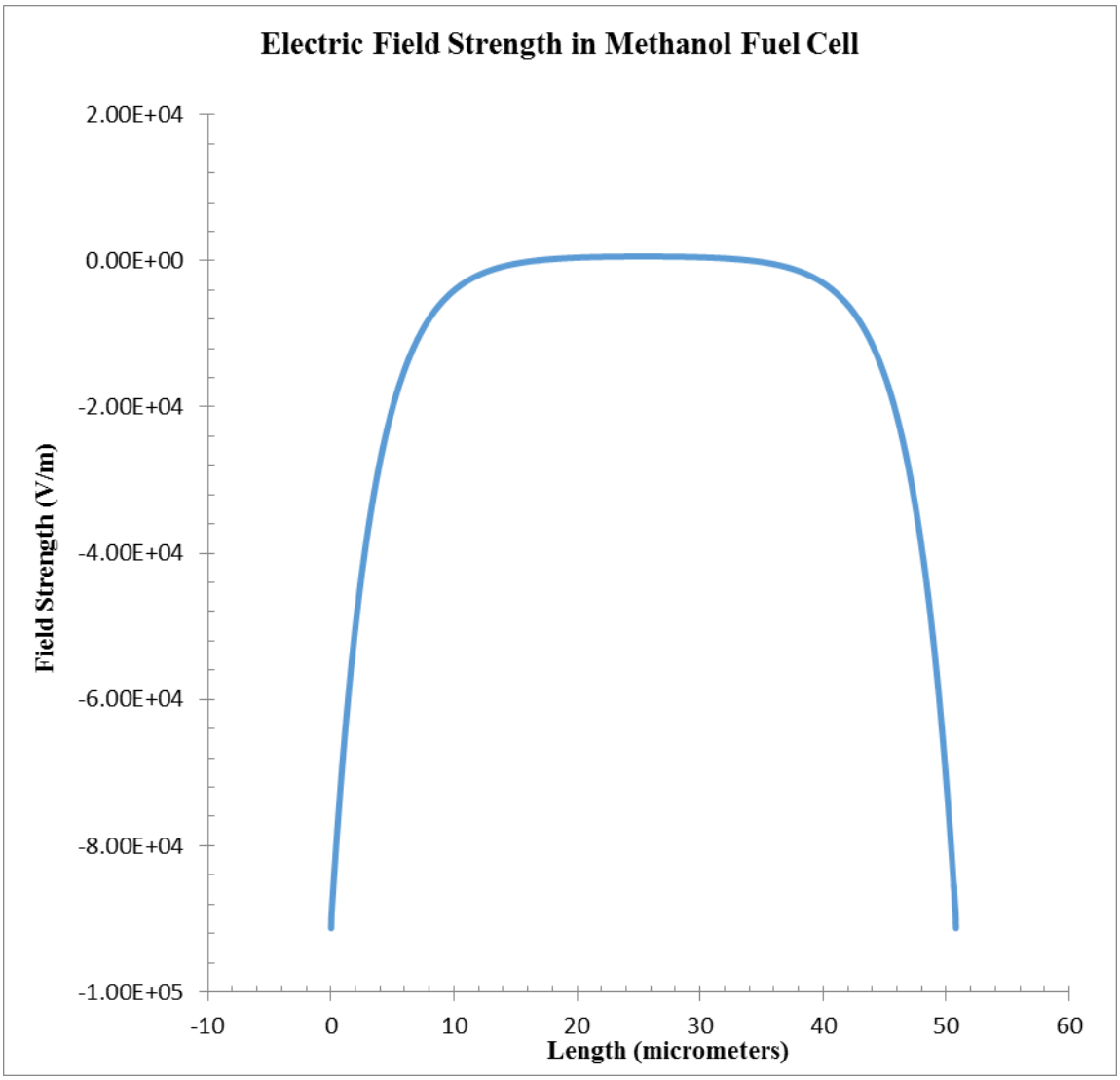

Figure 3: Electric field strength in a 52 micrometer Nafion membrane in a methanol fuel cell.

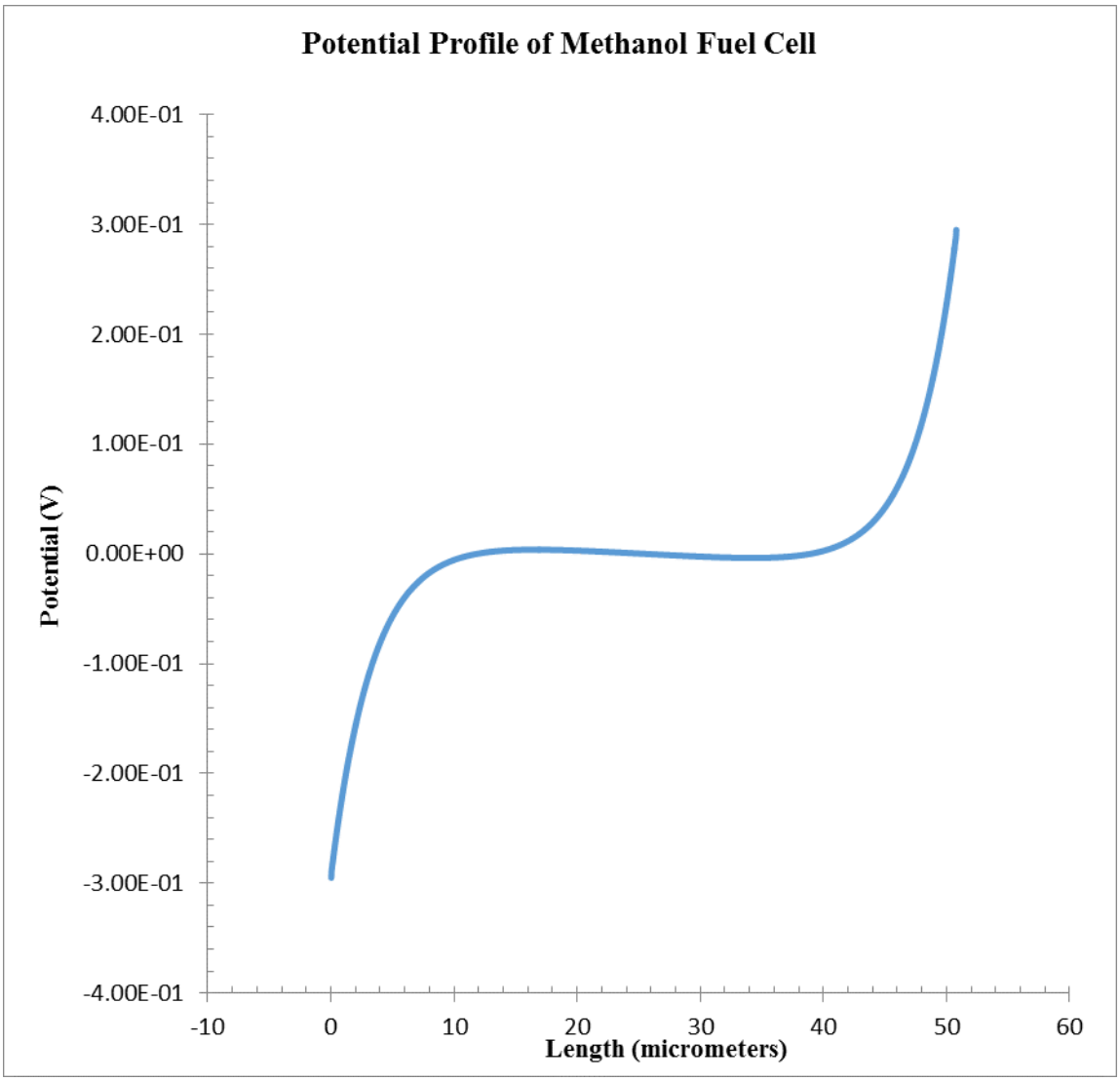

Figure 4: Voltage in a 52 micrometer Nafion membrane in a methanol fueul cell.

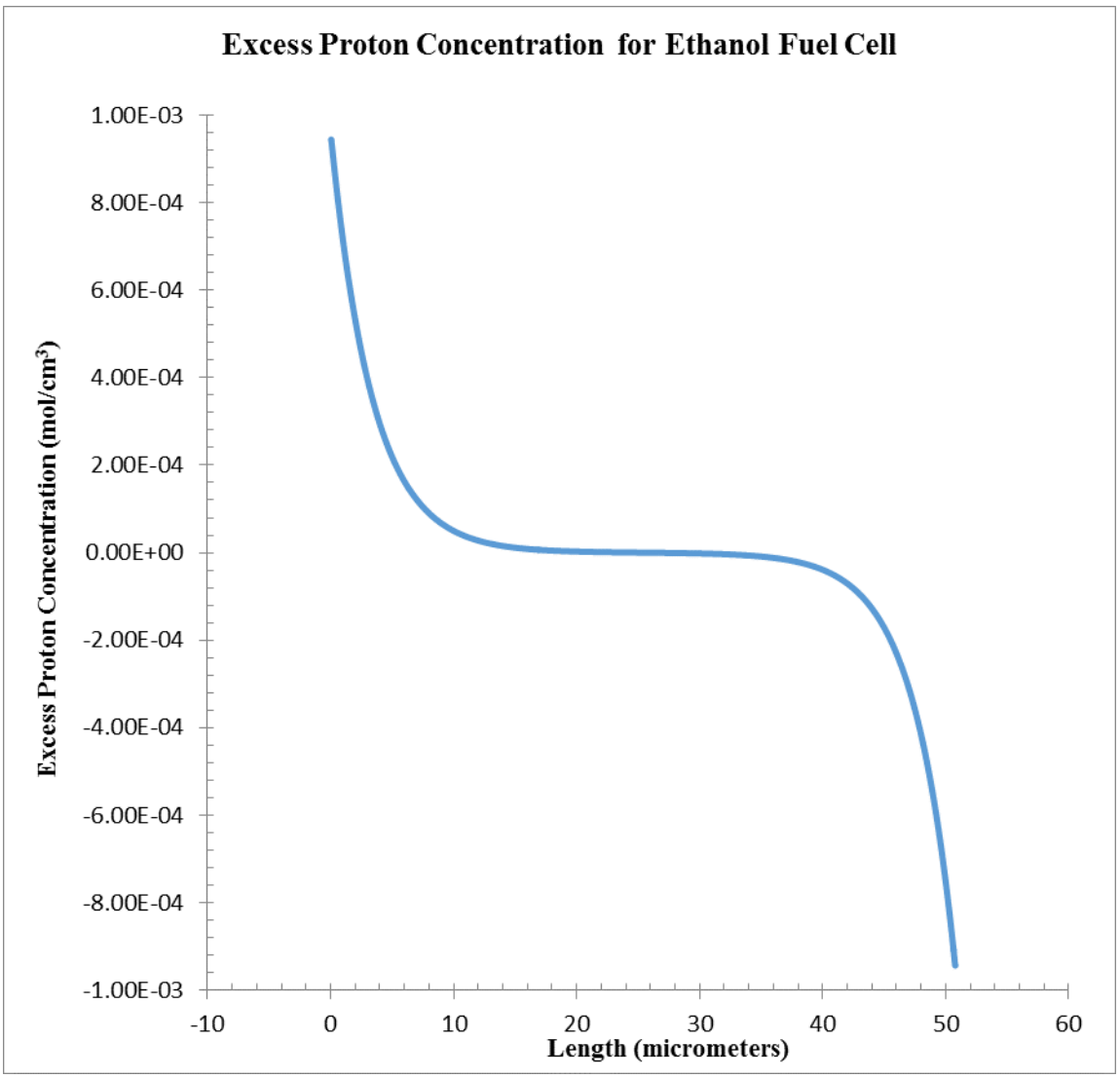

Figure 5: Excess proton concentration in a 52 micrometer Nafion membrane in an ethanol fuel cell.

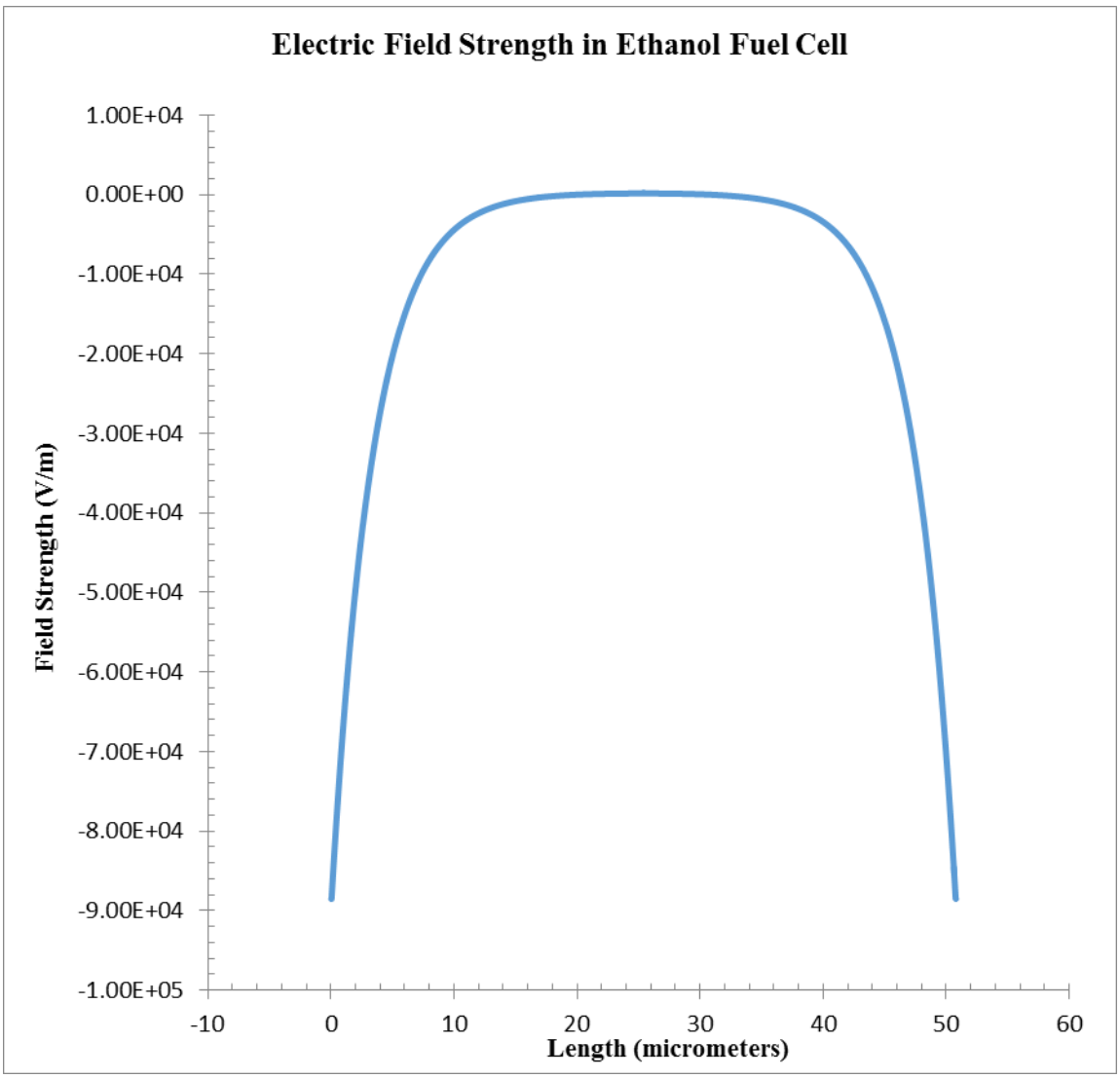

Figure 6: Electric field strength in a 52 micrometer Nafion membrane in an ethanol fuel cell.

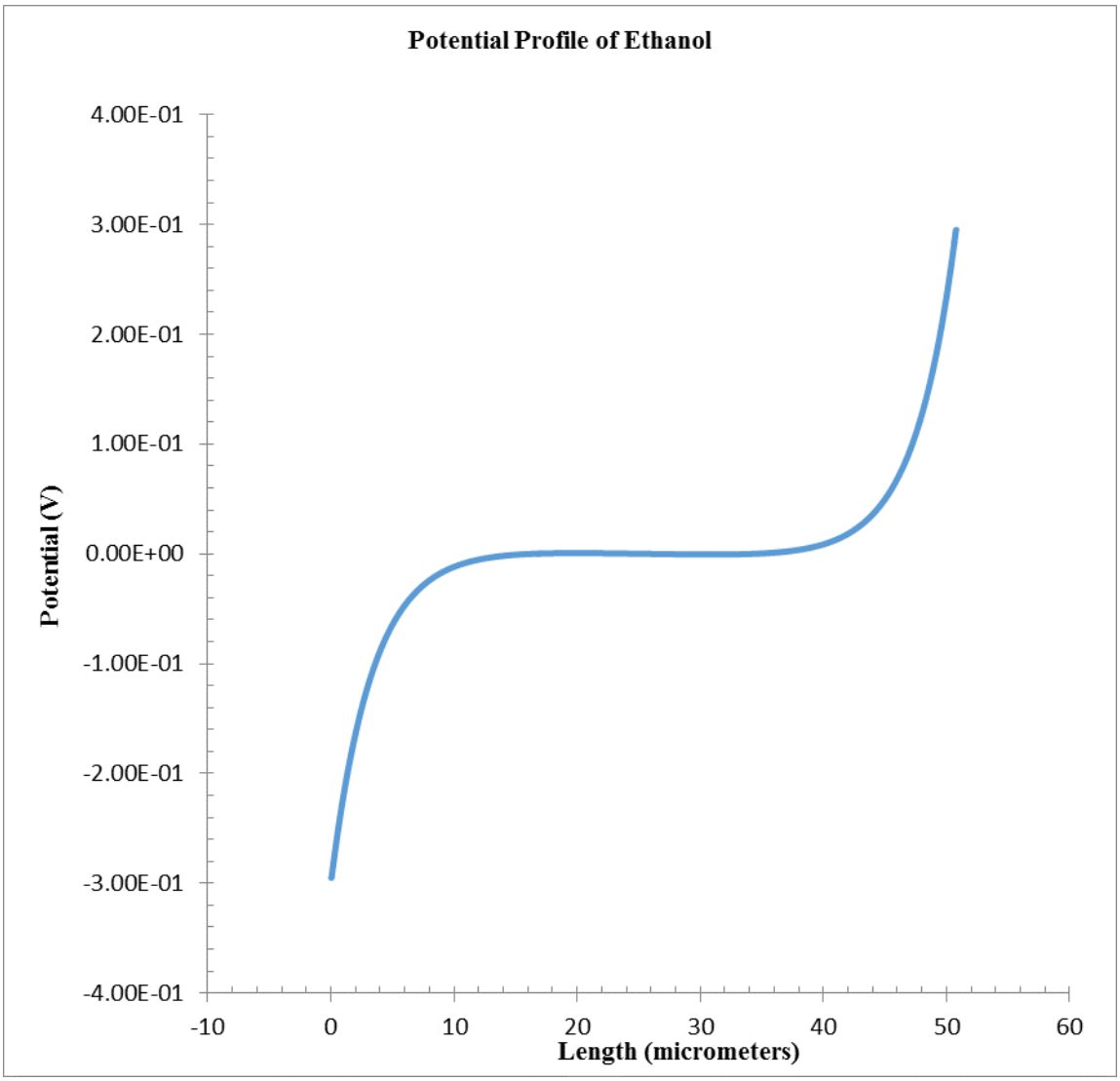

Figure 7: Voltage in a 52 micrometer Nafion membrane in an ethanol fuel cell.

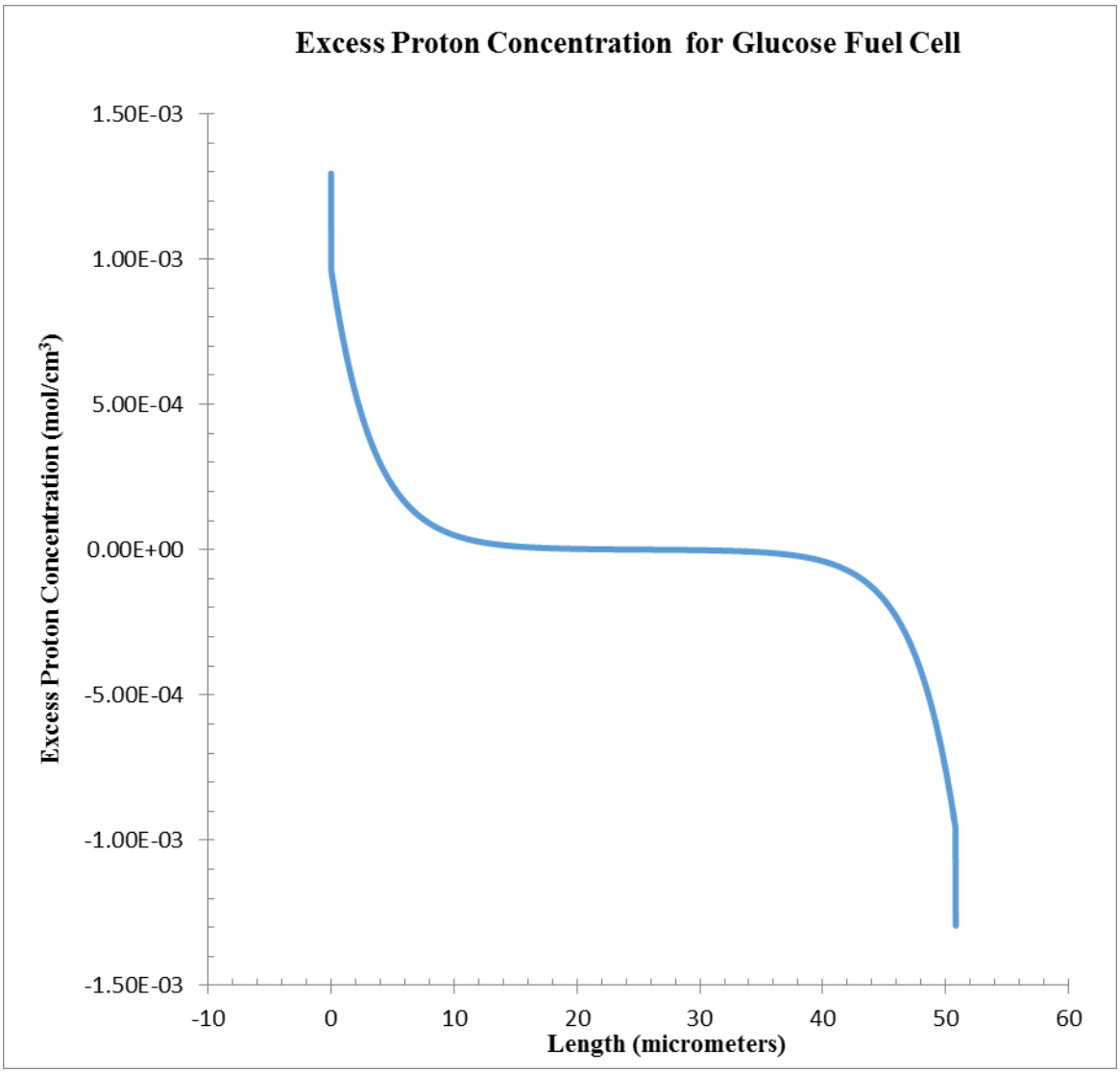

Figure 8: Excess proton concentration in a 52 micrometer Nafion membrane in a glucose fuel cell.

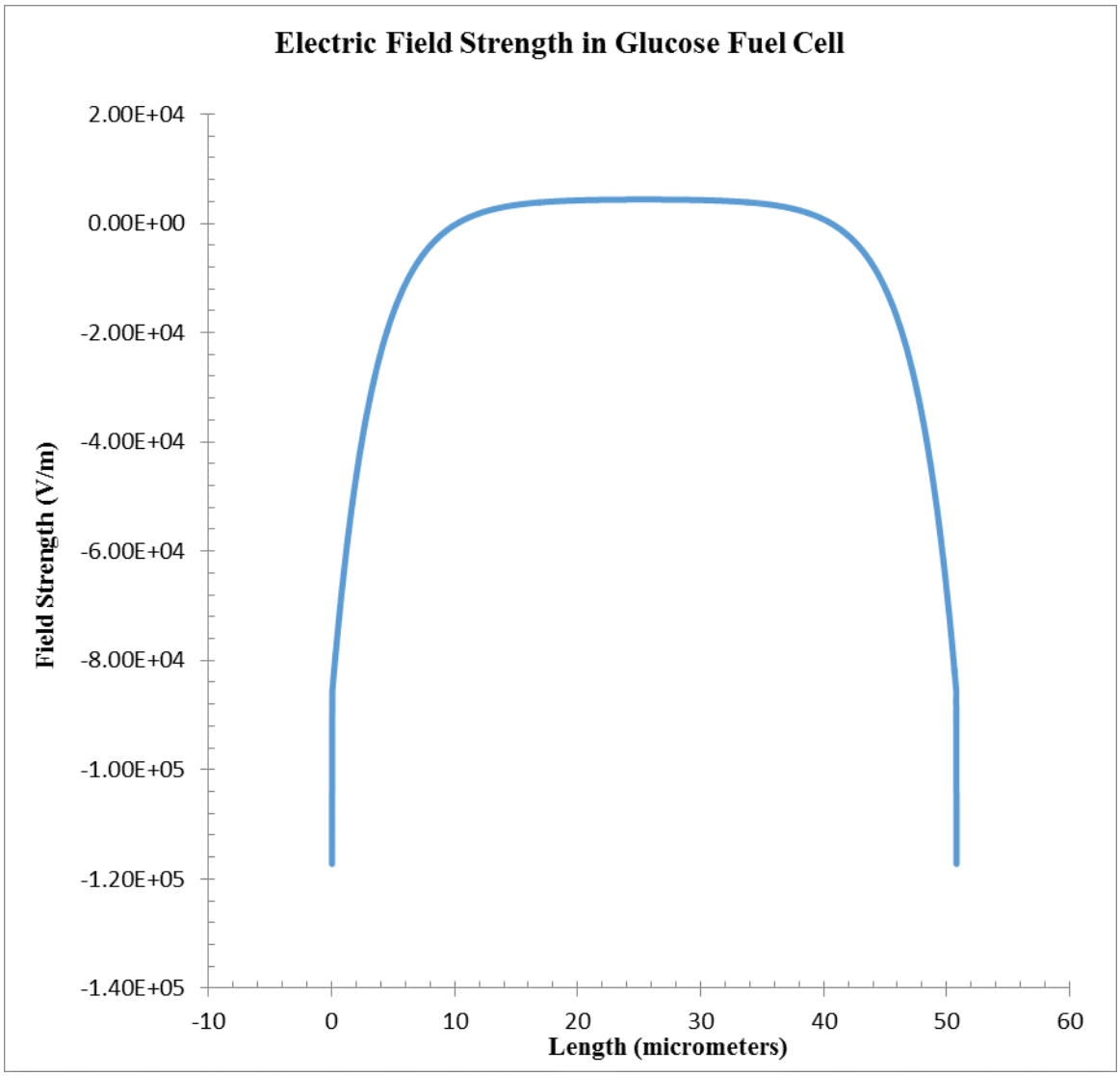

Figure 9: Electric field strength in a 52 micrometer Nafion membrane in a glucose fuel cell.

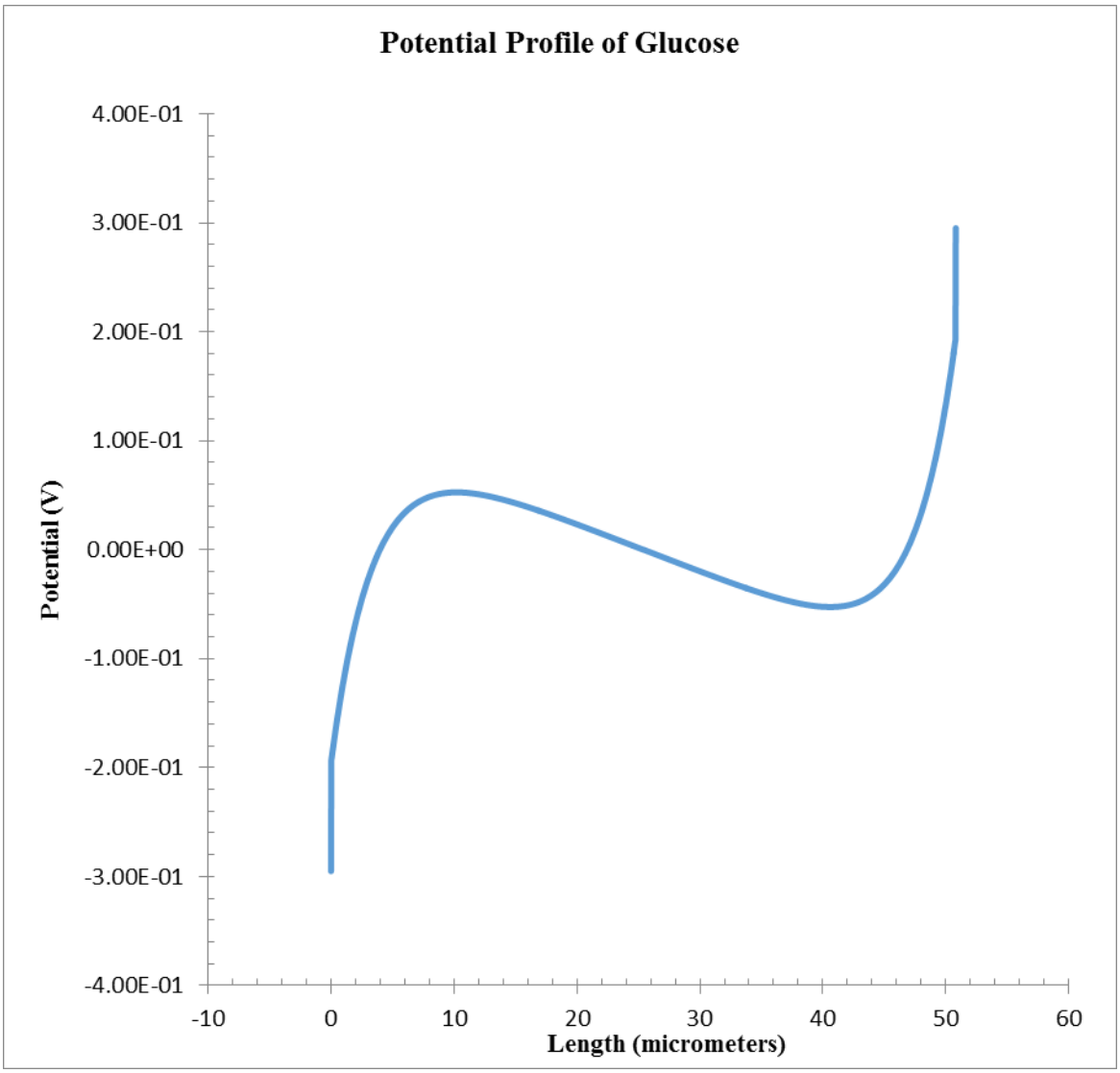

Figure 10: Voltage in a 52 micrometer Nafion membrane in a glucose fuel cell.

Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this paper.

Appendix 1: Matlab Code for Transport Through Nafion

```
function GeneralTest
clear all %#ok<CLALL>
global a
global b
global c
global E0
format long
length = 50.8; %number of microns interested in
i = 1*10^4; %Electric Density, A/m^2, (from 1 amp/cm^2)
Vo = 0.59; %V lost over membrane
```

```
lo = 175; %length in microns
Eo = 1.23;
area = 5*10^(-4); %m^2, 5 cm^2, from Wayneís thesis
ir = i*area; %A, current used for resistance
Vr = Eo-Vo; %V lost to resistance
Ro = Vr/ir; %resistance, Ohms
Res = Ro*length/lo;
I = Vr/Res; %A, adjusts current for the length of interest
ne = 6; %electrons in the reactions
F = 9.64853*10^7; %C/kmol
R = 8314.47; %J/K*kmol
l = lo*10^(-6)*length/lo; %m, data taken from 50 micron length
J = I/(area*ne*F); %kmol/m^2 s
D = 1.41*10^(-9); %m^2/sec – Change according to molecules Diffusion Coefficient
rho = 1.74*10^6; %g/m^3, 1.74 g/cm^3 average taken from Oberbroeckling/Leddy paper
MW = 1.100*10^6; %g/kmol, taken from 1100 g/mol
N = rho/MW; %kmol/m^3
T = 298; %K
er = 20;
eo = 8.85419*10^(-12); %C^2/(J m)
e = er*eo;
alpha = -10^(-3)*l*J/(D*N);
beta = F*l/(R*T);
gamma = 10^(-3)*F*N*l/e;
delta = 10^(-3);
a=alpha/delta;
b=beta/delta;
c=gamma;
lam1 = (-a+sqrt(a*a+4*b*c))/2;
lam2 = (-a-sqrt(a*a+4*b*c))/2;
M1 = [-a-lam1 b; c -lam1];
M1(2,2) = M1(1,2)*-M1(2,1)/M1(1,1) + M1(2,2);
M1(2,1) = 0; %changes to rref
ratio1 = abs(M1(1,2)/M1(2,2));
ratio2 = abs(M1(1,1)/M1(2,2));
%if M(2,2) is small enough, have one free variable to determine the eigenvectors
if ratio1 > 10^6
if ratio2 > 10^6
PosEigVec = [-b/(-a-lam1) 1]/10000;
```

```
end
end
M2 = [-a-lam2 b; c -lam2];
M2(2,2) = M2(1,2)*-M2(2,1)/M2(1,1) + M2(2,2);
M2(2,1) = 0; %changes matrix to rref
ratio1 = abs(M2(1,2)/M2(2,2));
ratio2 = abs(M2(1,1)/M2(2,2));
%if M(2,2) is small enough, have one free variable to determine the eigenvectors
if ratio1 > 10^6
if ratio2 > 10^6
NegEigVec = [-b/(-a-lam2) 1]/10000;
end
end
E0 = -alpha/beta;
n=1000;
Ee = -alpha/beta;
IC = Vo/(10^3*l);
del1= l/2;
del2= l/2;
X1=linspace(0,del1,n);
X2=linspace(0,del2,n);
try
XI1=[NegEigVec(1,1) -.1 0]';
[X1,Y]=ode15s(@F2,X1,XI1);
catch
del1=.999*del1;
X1=linspace(0,del1,n);
end
C1=Y*[1 0 0]';
E1=Y*[0 1 0]'+E0;
V1=-Y*[0 0 1]';
C1 = N*(1+C1);
E1 = 10^(3)*E1;
V1 = V1*10^(3);
C1min = min(C1);
C1max = max(C1);
E1min = min(E1);
E1max = max(E1);
deltax1 = del1/n;
```

```
try
XI2=[PosEigVec(1,1) -.1 0]';
[X2,Y]=ode15s(@F1,X2,XI2);
catch
del2=.999*del2;
X2=linspace(0,del2,n);
end
C2=Y*[1 0 0]';
E2=Y*[0 1 0]'+E0;
V2=-Y*[0 0 1]';
C2 = N*(1+C2);
E2 = 10^(3)*E2;
V2 = V2*10^(3);
C2min = min(C2);
C2max = max(C2);
E2min = min(E2);
E2max = max(E2);
deltax2 = del2/n;
A = [E1min, E2min];
Amin = max(A);
h1 = size(X1);
h2 = size(X2);
n1 = h1(1,1);
n2 = h2(1,1);
VaAll = V1(n1)-V2(n2);
x1 = 0;
while E1(n1-x1)<Amin
x1 = x1+1;
end
x2 = 0;
while E2(n2 - x2)<Amin
x2 = x2+1;
end
for x2 = 1:n2-1
x1 = 0;
Amin = E2(n2-x2);
while E1(n1-x1)<Amin
x1 = x1+1;
end
```

```
Va(n2-x2,1) = V1(n1-x1)-V2(n2-x2);
end
xv=1;
while Va(n2-xv,1)> Vo
xv = xv+1;
end
x1 = 0;
x2 = xv-1;
Amin = E2(n2-x2);
while E1(n1-x1)<Amin
x1 = x1+1;
end
Creal = zeros(2*n, 1);
Ereal = zeros(2*n, 1);
Vreal = zeros(2*n, 1);
xfinal = zeros(2*n, 1);
Cfinal = zeros(2*n, 1);
Efinal = zeros(2*n, 1);
Vfinal = zeros(2*n, 1);
xreal = zeros(2*n,1);
for xx = 1:n2-x2
xreal(xx) = deltax2*(xx-1);
Creal(xx) = C2(n2-x2-xx+1);
Ereal(xx) = E2(n2-x2-xx+1);
Vreal(xx) = V2(n2-x2-xx+1);
end
zro = 2*n-(n2-x2+n1-x1);
deltaxmid = (l-(n2-x2)*deltax2-(n1-x1)*deltax1)/zro;
for xx = 1:zro
xreal(n2-x2+xx) = xreal(n2-x2+xx-1)+deltaxmid;
Creal(n2-x2+xx) = N;
Ereal(n2-x2+xx) = Ee*10^3;
Vreal(n2-x2+xx) = 0;
end
for xx = 1:n1-x1
xreal(n2-x2+zro+xx) = l-deltax1*(n1-x1-xx);
Creal(n2-x2+zro+xx) = C1(xx);
Ereal(n2-x2+zro+xx) = E1(xx);
Vreal(n2-x2+zro+xx) = V1(xx);
```

```
end
line = 5; %number of points used to make the linearization
FE = zeros(2,line);
LE = zeros(2,line);
FV = zeros(2,line);
LV = zeros(2,line);
FC = zeros(2,line);
LC = zeros(2,line);
for xx = 1:line
FE(1,xx) = (xx-1)*deltax2;
FE(2,xx) = Ereal(xx);
LE(1,xx) = l-(line-xx)*deltax1;
LE(2,xx) = Ereal(2*n-line+xx);
FV(1,xx) = (xx-1)*deltax2;
FV(2,xx) = Vreal(xx);
LV(1,xx) = l-(line-xx)*deltax1;
LV(2,xx) = Vreal(2*n-line+xx);
FC(1,xx) = (xx-1)*deltax2;
FC(2,xx) = Creal(xx);
LC(1,xx) = l-(line-xx)*deltax1;
LC(2,xx) = Creal(2*n-line+xx);
end
RFE = corrcoef(FE'); %gives correlation coefficient for line
RLE = corrcoef(LE'); %made at the boundaries
RFV = corrcoef(FV');
RLV = corrcoef(LV');
RFC = corrcoef(FC');
RLC = corrcoef(LC');
pFE = polyfit(FE(1,:),FE(2,:),1);
pLE = polyfit(LE(1,:),LE(2,:),1);
pFV = polyfit(FV(1,:),FV(2,:),1);
pLV = polyfit(LV(1,:),LV(2,:),1);
pFC = polyfit(FC(1,:),FC(2,:),1);
pLC = polyfit(LC(1,:),LC(2,:),1);
clear M;
M(1,1) = pFE(1,1);
M(1,2) = -pLE(1,1);
M(1,3) = pLE(1,2) - pFE(1,2);
M(2,1) = -pFV(1,1);
```

```
M(2,2) = pLV(1,1);
M(2,3) = Vo - pLV(1,2) + pFV(1,2);
Xs = rref(M);
xi = Xs(1,3);
xf = Xs(2,3);
clear total
xfinal(1) = 0;
Cfinal(1) = pFC(1,1)*xi + pFC(1,2);
Efinal(1) = pFE(1,1)*xi + pFE(1,2);
Vfinal(1) = pFV(1,1)*xi + pFV(1,2);
xfinal(2) = deltax2 - xi;
Cfinal(2) = Creal(2);
Efinal(2) = Ereal(2);
Vfinal(2) = Vreal(2);
for x = 3:2*n-1
Cfinal(x) = Creal(x);
Efinal(x) = Ereal(x);
Vfinal(x) = Vreal(x);
end
for x = 3:n2-x2
xfinal(x) = xfinal(x-1) + deltax2;
end
deltaxmid = (l-(n2-x2)*deltax2-(n1-x1)*deltax1)/zro;
for xx = 1:zro
xfinal(n2-x2+xx) = xfinal(n2-x2+xx-1)+deltaxmid;
end
for xx = 1:n1-x1-2
xfinal(n2-x2+zro+xx) = l-deltax1*(n1-x1-xx);
end
xfinal(2*n-1) = 2*l-deltax1-xf;
Cfinal(2*n-1) = Creal(2*n-1);
Efinal(2*n-1) = Ereal(2*n-1);
Vfinal(2*n-1) = Vreal(2*n-1);
xfinal(2*n) = l;
Cfinal(2*n) = pLC(1,1)*xf + pLC(1,2);
Efinal(2*n) = pLE(1,1)*xf + pLE(1,2);
Vfinal(2*n) = pLV(1,1)*xf + pLV(1,2);
Vfinal(2*n)-Vfinal(1) %check potential drop
Efinal(2*n)-Efinal(1) %checks charge over membrane
```

```
sum1 = 0;
for x = 1:n2-x2
sum1 = sum1 + Cfinal(x);
end
sum1 = sum1*deltax2;
sum2 = 0;
for x = 1:n1-x1
sum2 = sum2 + Cfinal(2*n-x+1);
end
sum2 = sum2*deltax1;
sum3 = 0;
if n2-x2 < n
for x = n2-x2+1:2*n-n1+x1;
sum3 = sum3 + Cfinal(x);
end
sum3 = sum3*deltaxmid;
end
sum = sum1 + sum2 + sum3 - N*l; %gives excess protons, not good bc trap rule
%checks that ignoring b*Ctilde*Ehat is ok
Ctilde = Cfinal/N - 1;
Ehat = 10^(-3)*Efinal + alpha/beta;
for x = 1:2*n
Other(x,1) = Ctilde(x,1)*Ehat(x,1);
end
clear A
clear B
clear C
for x = 1:2*n
A(x,1) = abs(Ehat(x,1)/Other(x,1));
B(x,1) = abs(b*Ehat(x,1)/(-a*Ctilde(x,1)));
C(x,1) = abs(b*Other(x,1)/(-a*Ctilde(x,1)));
end
maxA = max(A);
minA = min(A);
maxB = max(B);
minB = min(B);
maxC = max(C);
minC = min(C);
for x = 1:2*n
```

```
All(x,1) = -a*Ctilde(x,1)+b*Ehat(x,1)*(1+Ctilde(x));
Assume(x,1) = -a*Ctilde(x,1)+b*Ehat(x,1);
Diff(x,1) = 100*(All(x,1)-Assume(x,1))/All(x,1);
end
maxDiff = max(Diff); %tells what % off
minDiff = min(Diff);
xfinal; %Output of these values are retrieved by removing the semicolon
Cfinal-N; %excess proton concentration
Vfinal; %potential
Efinal; %electric field
end
function F1=F1(T,Y)
global a
global b
global c
global E0
F1=-[-a*Y(1)+b*Y(2)*(1+Y(1));c*Y(1);Y(2)+E0];
end
function F2=F2(T,Y)
global a
global b
global c
global E0
F2=[-a*Y(1)+b*Y(2)*(1+Y(1));c*Y(1);Y(2)+E0];
end
```

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Innovating in the Educational Development of Collective and Individual Potential through Freinetian Thought Concepts in Digital Culture

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Abstract

Innovative methodologies are necessary in education in order to overcome learning difficulties. Some of these difficulties are caused through the disassociation between the educational methods of the current generation. In a society deeply immersed into the digital culture, it becomes necessary that the pedagogical methodologies are themselves associated with digital technologies to evoke the development of student potential. This study demonstrates that through Freinet pedagogy, which is based on a work pedagogy principal and a pedagogical use of technologies, one obtains important results for an innovative education.

Keywords: Digital culture; Freinet Pedagogy; Innovative Methodologies; Technology-based learning

1. Introduction

The development of human potential has always been of concern to educational processes. When considering this in terms of countries, this development is intimately linked to their capacity to generate income through innovative and entrepreneurial practices. When looking from the Brazilian perspective, the newspaper Correia (2016) provides some important data to the discussion: "Although there exists an expressive decline in the indicators associated with innovative practices, there does exist within the country a collective consciousness in the public as well as the private sector that the moment is one for uniting, in order to increase investments in research, development and innovation. (…) There is lack of initiatives that promote the integration of the different players (academic, public sector, private sector)".

When dealing with the question of academy, Morin (2003) describes that: "Our current university produces, throughout the world, an overly large proportion of specialists in pre-established subjects, therefore artificially delimited, while a large part of social activities, such as the principle of scientific development, demand capable individuals with a more ample angle of vision and at the same time approach the problem in an in-depth manner, adding new progress that goes beyond the historical boundaries of the subjects" (LICHNEROWICZ apud MORIN, 2003, p.13).

It is important to verify how these questions raised in the Correia (2016) are interwoven with the observation made by Morin (2003), and within this scenario, the existence of a direct relationship between innovations, as a vital necessity for the survival of businesses and education, is observed as a

founding process to the existence of innovation.

This relationship is pointed out in the words of Meira (2013): ―... every good business is a good school. To this, there are no exceptions. To the point where every collaborator of any type of business, should, at least once a week, make a conscious examination and ask themselves, what has been learnt over the last seven, fourteen, twenty-one days. If, time after time, the answer is very little or almost nothing, perhaps the time has come to look for a place where the future is being built. In almost every location where nothing is learnt, this is not because there are no problems, but because certain types of ruling cognitive blindness in the enterprise prevent you from asking yourself the questions that, when made, would create the learning opportunities for everyone. In those enterprises where nothing is ever learnt, at those times of greater scarcity of knowledge, these are on the route toward the corporate cemetery, where each gravestone has a Company Registration Number on it."

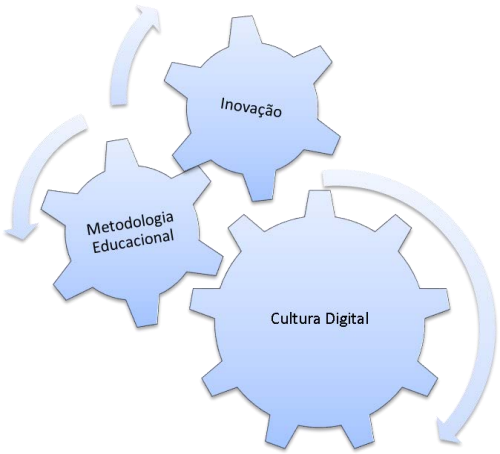

Figure 1 – Connections between the innovation players

In figure 1, one has the idea that the quantity of innovation a society needs is connected to a necessary educational methodology, arising from the digital culture. Therefore, in this work-study, the authors propose the application of the Freinet methodology with freeware digital tools as an innovative solution, which adheres to the desired educational objective, as well as producing students that make use of such tools. A combination of activities both collective and individual is explored for evoking educational potential from the students.

2. Digital Culture

Another issue that emerges, and fundamentally a part of the above discussion, is the immersion of the current society into the digital culture. For the very idea of digital culture, Buzato et al (2013) conceptualize this: ―As a set of processes and products of shared significance by people that not only use digital technologies from information and communication on a daily and integral manner, these are used to support and expand a particular mentality tied to post-industrial societies, which privilege collective participation and work distributed on the network in civic practices, in consumption, in leisure, in learning, in production and knowledge management, in identification and in subjective construction". As

also viewed in the conceptualization of Gil (2014): –Digital culture is a new concept. This arises from the idea that the revolution of digital technologies is, in its essence, cultural. What is being implied here is that the use of digital technology changes behaviour. The full wide ranging use of the internet and free software creates fantastic possibilities for democratizing access to information and knowledge, maximizes the potential for wealth and cultural services, amplifies those values that make up our common repertoire, and therefore, our culture and also empower cultural production, which thus creates new art forms".

Immersed in this culture, Almeida (1998) highlights that: –The problem is in how to stimulate youths to search out new ways to think, to search and select information, to construct their own way of working with knowledge and to reconstruct it continually, attributing to it new meanings, dictated through their interests and needs. How to awaken in themselves the pleasure and the abilities of writing, the curiosity to search for data, exchange information, encourage in them the desire to enrich their dialogue with knowledge from other cultures and people, to construct visual graphic art, to visit museums, to see the world beyond the walls of their school, or from only the neighbourhood or their country."

In its essence, little or no change will occur, if we do not face the use of Information and Communication Technologies (ICT´s) as an opportunity to construct education in a different manner. The use of technology in education can perform three functions: –a) to sustain (support) that which is already performed (conservative use); b) to supplement (enrich) that which is already undertaken (reforming use) and, c) to subvert what you do – and introduce a new form of producing things (transformation or if preferred revolutionary use)". In this manner, it falls upon pedagogy and not technology to be the revolutionary force behind the changes.

3. The WEB 2.0 and the Freinet Tools

The widespread use of digital technologies has brought about great changes in societies across the globe, and with them advancing globalization. The school, which before was an area not so affected by these changes, has started to feel the effects from these technologies in their pedagogical practises. According to Pretto (1996), there exist two possibilities for using technologies in education: instrumentally or as the foundation. If these are used as didactic resources to liven up the class, motivate the student or hold the student‘s attention, we are in these cases using these technologies instrumentally. However, in the second possibility these technologies are being used as elements that allow for a new way of being, thinking and acting. –School education will need to be given new conceptualization: it does not make sense anymore to imagine a teacher passing on to their students (liabilities) a large quantity of information (in general out of date), in which they do not have the minimum of interest. Today, information is searched for at the moment it is necessary (just in time), at the right dose (just enough), while we are actively doing those things that are necessary or of our interest (on the job, hands on). Instead of continually going over useless information, school education should aid us in developing the competencies and abilities necessary to live the life we choose for ourselves. Technology is a means, yes. However, this means frequently obliges us to review our goals and our methods" (CHAVES, 2005).

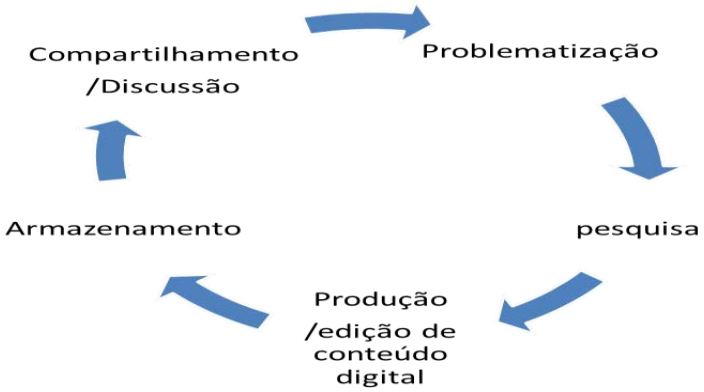

Figure 2. Work flow in digital production

Many a debate has occurred over the education crisis, but few remember that crises are the best opportunities for innovations. If the popular saying ―don‘t make changes to a winning team" has any credibility, the contrary should also hold sway ―make changes to a team that is losing". Experiences (Ferrari; Vasconcelos and Parreira Junior, 2008), (Ferrari, Lima, 2005) allow for the verification of rewarding results from the use of ICT‘s in education, which arise from carrying out projects or digital production projects (Figure 2).

These projects are formed as a means to resolve inquiries (problematization) personal and of student groups. The result is presented using dynamic forms (artistic expression, seminaries) in which we have the discussion concerning the generated content, opportunistically using new problematizations. Therefore, in summary, we have the following work production flow: problematizations →research →production/digital content editing →storage on sharing site (Web 2.0) →distribution to websites →presentation of work →collective discussions → new problematizations. It is understood here that the role of education is to help learners to search by themselves or in group for solutions to questions that affect them. Highlighted here also is that for the project to be successful, the guidance/mediation and the intervention through the teacher should be present.

The use of these digital media (images and sound) in the digital environment demanded a high level of expertise on the part of the user in the domain of the software necessary for production. For example, to create a site, the user had to have a notion of programming and skills in editing HTML pages. Another important factor was that the user took on only the passive role of assimilator of the information that came from cyberspace. The attitudes that marked the first generation of internet users became known as Web 1.0. ―Web 1.0 was extremely costly to its users; a majority of the services were paid and controlled through licencing, the systems were restricted to who had the means to pay for the transactions online and acquire software for the creation and maintenance of sites. Web 1.0 brought great advances in respect to access of information and to knowledge, however, the philosophy that was behind the World Wide Web concept was always for a space open to all, or be it, without an ―owner" or individual that controlled access or published content. (COUTINHO; BOTTENTUIT JUNIOR; 2007:199)"

However, the advance in technology has brought with it a change in scenario, according to the report that says, ―However, with the appearance of tools, technologies and systems that make new modalities of hypertextual production possible, such as blogs and Wikis systems, the structure of the Web have been

through a number of modifications. These modifications are concentrated on the need for openness, flexibility and ease of creation, editing and publication of pages inserting the netizens as Web constructors (MANTOVANI, 2006: 329)".

This technological transition is similar to Freinet (2001), having lived at the historical moment of the rise of electricity, radio, newspapers, press, cinema and all other objects associated with technological development, managed to visualize the urgency of a reformulation of the conception surrounding the methods and the techniques used within the school. Then judge these as no longer compatible with the multitude of possibilities that the period of history in which he lived presented them. In this regard, he expands and proposes the innovation of techniques for the organization and operation of what he would consider to be the Modern School. In such, School Press, Free Text, Interschool Correspondence, the School Newspaper, the Mural Journal, Work Plans, the Book of Life, among other techniques, would make up the school context, allowing cooperation to become a means for the social construction of knowledge and communication, while disseminating the knowledge being studied (FREINET, 1996). As "The traditional models, focused upon the transmission of knowledge, were not moulded for the society formed on knowledge, but individual consumers of information with a low critical capacity and conscious participation in its workings. Worse still, it does not prepare the person, the citizen, with the capacity to learn how to learn, or relate to knowledge in an active and dynamic form (FREIRE; LIMA, 2007 p. 37-38)".

In opposition to an idealistic, reproductive proposal, and which undervalues life, Freinet searches, through his pedagogical techniques for the liberation of proletarian children: "We will look to teaching, not what is predicted by the bourgeoisie, included in the methods, contained in the manuals, but that which is the fruit of the desire of the children and can contribute to increasing the specific framework of their own class and own life" (FREINET, 1930, p.409-413).

In this sense, to rethink the school becomes vital. Sometimes the radical transformation is not possible; however, to rethink the academic space in the scope of curricular subjects is made feasible through the disposition of the educator. To adapt the academic space in a manner by which pedagogy is practiced through work requires an aligning between the pedagogical need of the curriculum, or that which the school wants to teach. Incorporating the vital energy of the practicing learners, which is to do, produce, construct, as Freitian thought makes it clear that what is natural for the child, is work.

4. Analysis

Innovation in education is possible from the recognition of the elements that compose the structure and within such, find the windows of opportunity that already exist. Freinet (2001) reformed the whole of his school in order to demonstrate his ideas and pedagogical practices. If it is not possible to act over the whole structure, effective actions can be taken on parts. Such actions can be found in a technical high school, in the training course for the Computer Technician in Maintenance and Computer Support Module, in a subject called "Software Operation Applications and Utilities – SOAU". This set out the following objectives, (a) Identify the types of software that are available for the large as well as small businesses, (b) Relate and describe software solutions for the office, and operate software utilities, (c)

Operate software applications, awakening to the use of informatics in society.

The execution of the objectives for this subject leads to the study of software for Text Editing, Spreadsheets, Databanks and Presentations. Thus, within this universe, the pedagogy of Freinet's work was put forward for the fulfilment of the objectives. By rethinking the content, one notes that in the Presentation Software content, there is an item dedicated to Figures and Animation. This item created the opportunity to bring to the subject digital tools such as digital cameras/camcorders, audio recorders or even smartphones that contemplate an enormous variety of medias through digital convergence.

4.1 Exploring collective potential

To explore the collective development of the students, a challenge was proposed based on producing a documentary, where the subject content was the very school itself. From among the group presentations, one in particular stood out (Figure 3), which established a script for debates. The script established by the group was based on a discussion of the influence of fashion among adolescents and the identification of ~~–a~~dolescent tribal groups" from there point of view. In addition, they gave a presentation of the physical space of the school, highlighting the positive and negative points of the structure, and even set up an interview with the schoolteachers

Figure 3. Vlog of the students – Source: archive of the author

In figure 4, it was put to the students that they produce a tutorial in video form concerning computer assembly. This was scripted and each part of the computer described concerning its function and position on the motherboard and the precautions needed during their assemblage.

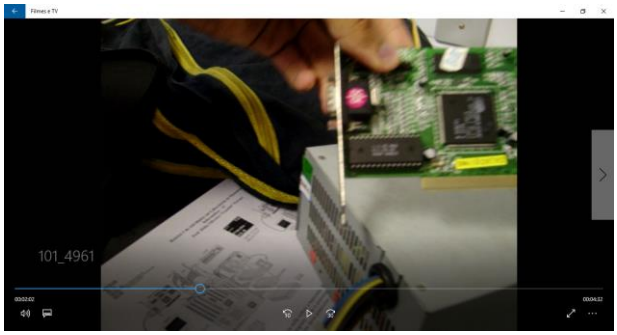

Figure 4. Video tutorial created by the students for assembling a computer – Source: archive of the author

By using the resource of digital cameras, for capturing images, the students also produced a tutorial on

paper. Figure 5 exemplifies this production.

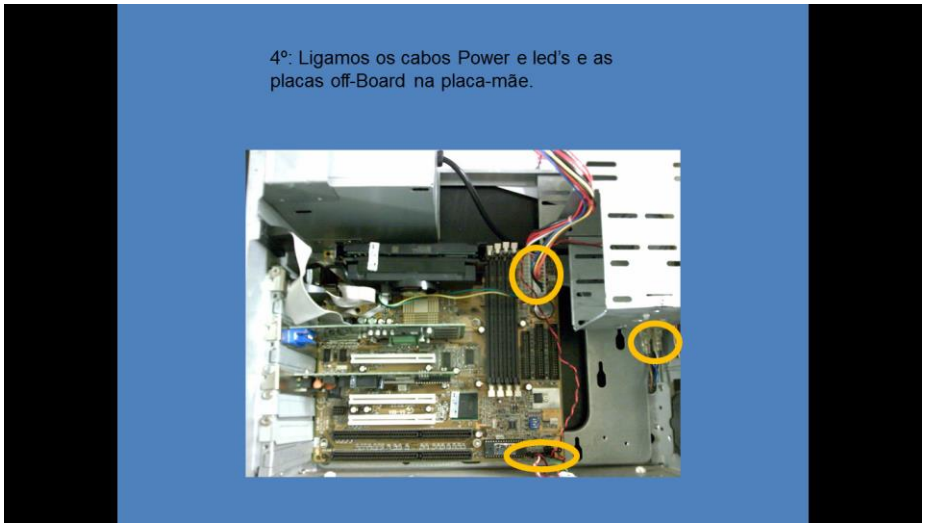

Figure 5. Tutorial concerning the maintenance of computers – Source: archive of the author

4.2 – Exploring individual potential

Another approach is the use of Podcasts. The podcast appeared in 2004 and can be created in tools from Web 2.0, or through sound editing software, such as Audacity.

The sound editor possesses very simple resources, such as Copy, Cut, Paste, Mix; add amplification effects, fade in and out, reverberation, echo, and provides sound management at the equalization level.

The pedagogical proposal was the production of a mix between voice and music. The narration should be created from the production of a free text, and recorded with background music, without going over 1 minute of final production. In figure 6, one notes the excerpts where the student inserts the sound (elevated frequency peaks) on the opening of the song Dream On, from Aerosmith.

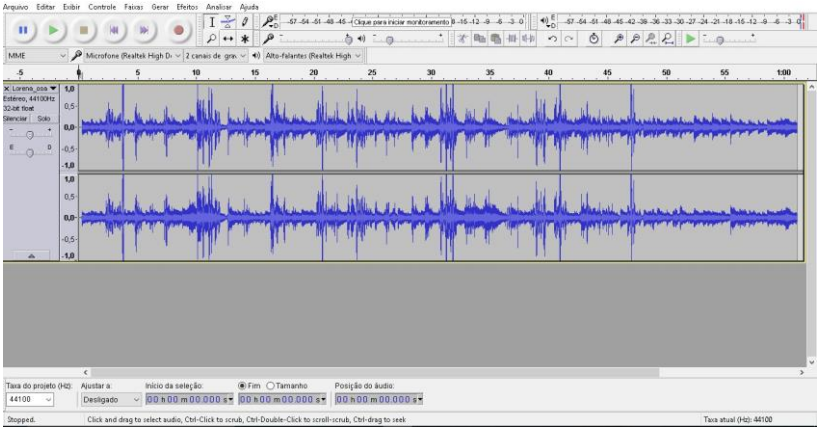

Figure 6. Sound from the work produced on the software Audacity.

Through use of these resources, it is possible to explore a multitude of pedagogical work production possibilities in both authorship and creation of students.

5. Conclusion

The discussion concerning academic knowledge and practice on a day-to-day basis is a long one and can be found in the literature. It is also known that this discussion influences the deficiency in the formation of the human potential of each country. Therefore, this study looks toward demonstrating that it is possible to produce an approximation between theory and practice from reality, innovation and methodology in the classroom.

In this manner, the construction of the link from the programmed content of the propaedeutic disciplines with the expectations and reality of the generation of students is a possibility that arises from the practice of using innovative methodologies, which make adequate use of digital technologies from information and communication.

Technology is an integral and fundamental part of the Freinet methodology. It thus become an innovative perspective in regards to this methodology, where it is continually updated from digital technologies present in this generation of students. These digital technologies are expanded upon by the digital convergence present in mobile devices or desktop type platforms.

The results from this methodology can be explained through the following evaluation: *—... it was the teacher, who asked me to do the best assignment ever, *_*, editing music is great. I learnt how to measure frequency \o/. I learnt how to use Movie Maker, also that excel brushes even your teeth if you want, you need only put in the right formula. (Student)".*

In Freinetian practice, the evaluation is performed by collectiveness as a contribution through suggestions for improving any work developed. In this work-study, the sharing of projects on the Web was not explored, where interactions can occur with other users, as this could lead to questions of authorship involving high school students.

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Devolution of Legislative Power to the Provincial Council of Sri Lanka

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Abstract

The objective of the study is to examine the states of legislative devolution in Sri Lanka under present constitution of 1978. The 'Indo-Lanka Accord' committed Sri Lanka to establish a system of devolution to Provincial Councils (PCs). Consequently with the aim of devolving power, the PCs were established in each of the nine Provinces of Sri Lanka under the Thirteenth Amendment to the Constitution. In a system where devolution of power exists, power is divided between the national and sub national level. In case of Sri Lanka such a division takes place between the central government which is the government at national level and the provincial council which is the government at sub national level. The legislation is the framework by which governments of whatever persuasion seek to achieve their purposes. Under a truly devolved system, the unit to which the power is devolved can exercise its autonomy in the implementation of the devolved functions. This autonomy should have been ensured, in the PC system as expected in the 1987 Indo-Lanka Agreement. It was found that the PCs are elected bodies which were given power to pass statutes applicable to their respective Provinces, with regards to certain specified matters. The legislative power of the PCs is not exclusive theirs. Issues related with legislative power also contributed to the weak capacity basis of the Provincial Council.

Key words: Provincial Council, Devolution, Legislative Powers, Thirteenth Amendment, Constitution

Introduction

In 1987 the Indo-Sri Lanka Accord generated the two Bills, via. the Bill titled the Thirteenth Amendment to the Constitution and the Provincial Councils Bills. The Thirteenth Amendment to the Constitution of 1978, enacted in 1987, sets out the framework for the devolution of political power through a system of Provincial Councils (PC) in Sri Lanka. Thus PCs were established under the Thirteenth Amendment to the Constitution, which came into effect on 14 November 1987 along with the Provincial Council Act No.42 of 1987 (Jayampathi 2010, p.1). The Thirteenth Amendment to the Constitution provides for: the establishment of Provincial Councils, the appointment and powers of the Governor of Provinces, membership and tenure of PCs, the appointment and powers of the Board of Ministers, the legislative powers of the PCs, alternative arrangements where there is a failure in the administrative machinery, the establishment of the High Court of the Province, and the establishment of the Finance Commission (www.priu.**gov**.lk/Prov**Councils**/Provicial**Councils**.html*)*.

Each PC consists of members elected by the voters of the Province, on the basis of the List System of Proportional Representation, the number of members for each PC being determined by its area and population (Leitan 2001, p.2). Meaning the system seeks to provide for a structure of devolved

power-sharing through the creation of popularly elected PCs, each lead by a Chief Minister (CM), who commands a majority in the PC. Each Provincial Council has a Chief Minister and Board of Ministers. There is also a Governor for each Province, who is appointed by the President. The Board of Ministers is to aid and advise the Governor in the exercise of his functions.

A Provincial Council, unless sooner dissolved, shall continue for a period of five years from the date appointed for its first meeting, with the expiration of the said period of five years by itself operating as dissolution of the Council (Hussain 2010, p.143). The dissolved PC gets constituted only upon the holding of an election under the Provincial Council Election Act No. 2 of 1988 where fresh slates of members are elected to constitute it.

Legislative Powers of the Provincial Council

The Law (Statute) making power of Provincial Councils, for what they make is law, although different from the law passed by Parliament. With the coming into effect of the thirteenth Amendment to the Constitution in 1987, a body other than Parliament was given legislative powers for the first time.

Provincial Councils are elected bodies which were given power to pass statutes applicable to their respective Provinces, with regards to certain specified matters. Indeed validity of a _statute' can always be canvassed in a court of law, even years after its passage. If it is ultra vires for a Provincial Council to enact such a statute, it is a nullity and is void ab initio (Uditha and Mahen 2009, p.32). The Statutes made by Provincial Councils have to be consistent with the other provisions of the Constitutions. They (statutes) will validity only within the territory over which the Council has Jurisdiction (Amarasinghe 2010, p.91).

The devolution of powers in respect of Provincial Council is specified under the 9th Schedule of the 13th Amendment to the Constitution, under 3 lists viz.

1. List I, the Provincial Councils List, which specifies the powers and functions under which provincial councils may pass statutes in relation to their respective provinces;
2. List II, the Reserved List which indicates the powers which belong exclusively to the central government;
3. List III, the Concurrent List, under which both the centre as well as the provinces are able to legislate (Leitan 2000, p.7).

Provincial Council List

Article 154G enables the Provincial Council to make Statutes. Hence Provincial Councils have statues making powers over the subjects named in List I of the Ninth Schedule to the Constitution (Provincial Council List). Article 154G(1) of the Constitution Reads: _every Provincial Council may, subject to the provisions of the Constitution, make statutes applicable to the Province for which it is established, with respect to any matter set out in List I of the Ninth Schedule' (1978 Constitution, Article 154G(1)). This power is subject to the provisions in the Constitution including Article 75 and Article 154(G)(10).

However, legislative power of the Provincial Council is not exclusive. Parliament may also legislate on matters in the Provincial Council List but under certain conditions (Jayampathi 2010, p.24).

The Provincial Council List mainly cover those areas of activity where decisions affect primarily persons living in the Province and are applicable to the Province only. (Uditha and Mahen 2009,p.39). Also the subjects allocated to the Provincial Councils cover a range of items which are of particular relevance to regional development and provincial governance (Amarasinghe 2010, p.92).

The Constitution has provided for the Provincial Council to pass statutes on all subjects in List I irrespective of whether laws already passed by Parliament are in existence. A provincial Council may by a resolution decide not to exercise its statute-making powers. Upon the acceptance of this resolution, the Parliament is thereafter empowered to make laws applicable to that Province. Article 154G(3) provides that Parliament could by a majority legislate in respect of the matters specified in Provincial Council List I with the consent of some of the Provincial Councils in which event the Bill shall become Law applicable only to those provinces. But if Parliament passes by a two-third majority, such Law would become applicable to all Provincial Councils whether they agreed to such Law or not.

The Provincial Council List (List I) enumerates 37 subjects or ‗items' (many of which contain ‗sub-items' further specifying the scope and limits of the itemized subjects) over which legislative and executive powers are devolved on Provincial Councils. Three of the most important subjects are further elaborated in three appendices that form part of the Provincial Council List. These are Law and Order (Appendix I), Land and Land Settlement (Appendix II) and Education (Appendix III) (CPA 2010, p.36).

Some of the subjects listed in the Provincial Council list (List) are following: Police and Public order, Planning, Education and Educational services, Local government, Provincial housing and construction, Roads and bridges and ferries thereon within the province, Social services and Rehabilitation, Regulation of road passenger carriage services and the carriage of goods by motor vehicles within the Province and the provinces of inter-provincial road transport services, Agriculture and Agrarian Services, Rural Development, Health, Food supply and distribution within the Province, Co-operative, Land, Irrigation, Animal husbandry and transport (Ninth Schedule of the 1978 Constitution).

So, it is plain and simple that the Parliament is not precluded from making laws in respect of a subject in the Provincial Council List, but it has to follow a special procedure prescribed by Article 154G. The Provincial Council is a however subordinate law-making bodies. Parliament remains supreme and can be exercise of its legislative powers determine the scope of the powers of the Councils. Also the statute of a Provincial Council applies only within the Province. Therefore the sphere of jurisdiction of the Provincial Council though significant it is by no means an exclusive one.

The Reserved List

There is no ambiguity with the Reserved List. Those subjects and functions are exclusively reserved for the Central Government only. Means the Reserved List contains the matters in respect of which the Parliament is empowered to make laws. These cover areas of national importance. The provincial Council shall have no power to make statutes on any matter set out in the Reserved List II of the Ninth Schedule.

The Matters set out in the Reserved List II are: National Policy on all subjects and functions relating to: Defense and Security with Internal security, law and Orders and prevention and detection of crimes. Foreign Affairs, Post and Telecommunication, Justice placed in relation to the Judiciary and Courts Structure, Finance in relation to National Revenue, Monetary policy, external resources and customs, Foreign trade, Inter Provincial Trade and commerce, Ports and Harbors, Aviation and Airports, National Transport, Rivers and waterways, Shipping and Navigation, Maritime Zones including historic waters, territorial waters, Exclusive economic zone, State land a foreshore, Mines mineral, Immigration and Emigration and Citizenship, Election including Presidential, Parliament, Provincial Council and Local Authorities, Census and Statistics etc (Ninth Schedule of the 1978 Constitution).

The first item in the Reserved List is the ‗National policy on all subjects and functions. Notably the Provincial Councils have no powers in respect of National Policy, even on subjects and functions included in the Provincial Council List. It is for the Parliament to lay down National policy. The statute of a Provincial Council is subject to such policy. It is therefore clear that Parliament retains its control on all matters and where appropriate may dictate to the Provincial Councils. For instance; The National Transport Commission Act No.37 of 1991. Some of the provisions of this Act are in conflict with items 8 of the Provincial Council List. However, since it relates to National policy, its constitutional validity was upheld by the Supreme Court and it was passed by a simple majority (Uditha and Mahen 2009, p.40).

Concurrent List

The Concurrent List contains the matters in respect of which both the Parliament and the Provincial Council may make laws and statutes respectively. The Concurrent List (List III) enumerates 36 subjects, once again with some items further elaborated in sub-items. The following are some of the subject listed in Concurrent List. Namely; Higher Education, national Housing and Construction, Social services and rehabilitation, Agricultural and Agrarian Services, Health, Registration of births, marriages and deaths, Renaming of Town and villages, co-operative, co-operative Banks, Irrigation, Social forestry and protection of wild animals and birds, fisheries, Animal Husbandry, Employment, Tourism, Drugs and Poisons etc (Concurrent List, 13th Amendment to the 1978th Constitution).

Every Provincial Council may subject to the provisions of the Constitution, make Statutes applicable to the respective Province, with respect to any matter on the concurrent List III of the Ninth Schedule after such consultation with Parliament as it may consider appropriate in the circumstances of each case (Article 154G (5) (a)). Also any matter on the Concurrent List the Central Government can legislate after consultation with the Provincial Council. If any provision of any statute made by a Provincial Council is inconsistent with the provisions of any such law made by Parliament, such law shall prevail and the provisions of the statute shall, to the extent of such inconsistency be void (Article 154G(5).

Assessing the Legislative Power of Provincial Council

According to the majority determination in the Thirteenth Amendment case is that the Provincial Councils do not exercise sovereign legislative power and are subsidiary bodies exercising limited

legislative powers (Uditha and Mahen 2009, p.38). The power given to the Provincial Council to make statutes in respect of the matters set out in the Concurrent List is restricted (Selvakumaran 2010, p.74-75). Here, the devolution clearly flows from Parliament. A Provincial Council ought not to take upon itself responsibilities that it cannot handle. On the other hand, if it has the capacity to discharge its responsibilities in respect of the matters in the Concurrent List, provisions is made for the Council to do so, provided that, where there exists a conflict between the National Government and the Provincial Council, the Parliament could effectively obstruct the Council by firstly objecting to the making of any statutes in respect of the said matters and thereafter by enacting legislation based on National Policy (Uditha and Mahen 2009, p.44).

As said earlier a Provincial Council can make a statute which will apply only within its provincial limits. No Provincial Council can claim to have authority to make statutes having application extra provincially or territorially. The exercise of power to make statutes is subject to other provision of the Constitutions. This, of course, would have been an inherent limitation of any authority or body which is a creature of a constitutional or legislative document, even if it has not been stated expressly. Further there is a procedural prescription which a provincial Council is expected to follow if it were interested in making a statute on a matter on the Concurrent List. The Provincial Council is expected to carry out such consultation with Parliament as it may consider appropriate in the circumstances of each case (Ibid 2010, p.74-75).

However, a statute made by a Provincial Council may be void if the statute is inconsistent with a law passed by Parliament which was enacted following the provisions of paragraphs (2), (3), (4) and (5) of Article 154G of the Constitution. This is due to paragraph (6) of Articles 154G, which reads as follows:

> ~~–~~if any provision of any statute made by a Provincial Council in inconsistent with the provisions of any law made in accordance with the preceding provisions of this Articles, the provisions of such law shall prevail and the provisions of such statute shall, to the extent of such inconsistency, be void."

Therefore any statute made by a Provincial Council, the provisions of which are inconsistent with any law passed by Parliament in terms of paragraphs (2),(3),(4) or (5)(a) of Article 154G will be void to the extent of their inconsistency (Selvakumaran 2010, p.75-76).

The subjects and functions allocated in the Provincial Council List are not exclusively theirs. In terms of Article 154H a Statute enacted by a Provincial Council (as opposed to Law enacted by Parliament) comes into force only upon receiving the assent of the Governor. A Governor could assent or return same to the Provincial Council together with a message requesting the Council to reconsider it or consider the desirability of introducing amendment as may recommended in the message.

Thereafter the Governor may assent to the Statute or reserve it for reference by the President to the Supreme Court within one month of the passing of the statute for the second time, for a determination that it is not inconsistent with the provisions of the Constitution. Depending on the determination of the Supreme Court the Governor shall either assent or withhold his/her assent (Article H (4)). The above provisions place several effective obstacles in the passage of a statute before it comes into force. It is

open to a Governor temporarily obstruct a statute for various reasons, yet a permanent obstacle may be placed, only if the statute is inconsistent with the Constitution (Uditha and Mahen 2009, p.33-34).

The Thirteenth Amendment also provides for the procedure for the amendment or repeal of Chapter XVIIA of the Constitution or the Ninth Schedule. If all the Provincial Council agrees to the amendment or repeal, such a Bill in Parliament could then be passed with a simple majority. If one or more Councils do not agree then it requires a two thirds majority to be passed.

In 1988, when the Provincial Council system started functioning, it was found that there were about 300 laws in force pertaining to subjects in the Provincial and Concurrent list (Wicramaratna 2010). All these referred to the functions and powers of Ministers in the Central Government. Therefore, the PCs should make the necessary statues to transfer such powers and functions to the provincial ministers and officials. For this purpose _Statute Drafting Unit' with the necessary human and material resources is pre-required. But, the biggest challenge is unavailable of qualified personnel (legal draftsman) in some of the provincial councils. For instance the Eastern Provincial Council is not properly equipped to the specialized task of making statutes.

It was noted that the Provincial Council (Consequential Provisions) Act, No.12 of 1989 was passed by the Parliament. The Act was passed in order that even in the absence of statutes, provincial authorities may exercise powers using pre-1987 laws a legal basis. A pre-1987 parliamentary law on a matter in the Provincial Council List will be inoperative in a Province only if a statute is made. The Provincial Council (Consequential Provisions) Act enables the provincial councils' authorities to exercise powers in respect of matter set out in the Provincial List. The proposal of the Provincial Council (Consequential Provisions) Act was brought by Mr. Bernard Soysa. He was a member of the Western Provincial Council, and was the prime mover of this proposal (Wickramaratne 2010, p.65). So, the initiative was taken by a member of the sub-national government. Despite the fact the central government showcased its unwillingness. However, the government reluctantly agreed to make such a provision (Ibid).

Conclusion

With the aim of devolving power, the Provincial Councils were established in each of the nine Provinces of Sri Lanka under the Thirteenth Amendment to the Constitution. Despite the PC System of Sri Lanka is an example of devolution, which has been formulated strictly following the power arrangement within a unitary system of government. Despite the Amendment the Central Government would continue to hold supreme power. The Parliament retains a variety of ways in which it can also pass laws on the subjects assigned to the Provincial Council (Amarasinghe 2010, p.91). Also the President remained supreme in the Executive field; the Governor is a figurehead who is subject to the control and directions of the Executive President and the Provincial Council in terms of the Thirteenth Amendment would only be a body subordinate. If the President gives directions to any Provincial Council they have to be complied with. Failure can entail Parliament declaring the taking over of the functions of the Council and the President thereafter would take over functions by issuing a Proclamation.

The Ninth Schedule to the Thirteenth Amendment contains three Lists. These Lists set out the subjects and the legislative functions allotted to the centre and the periphery (Provincial Council). List I

enumerated the Provincial Council List, List II the Reserved List or subjects allocated clearly to the Central Government and List III the Concurrent List. There is no ambiguity with the Reserved List. Those subjects and functions are exclusively reserved for the Central Government. But the subjects and functions allocated in the Provincial Council List are not exclusively theirs. It was found that the Provincial Council has no power in respect of National Policy, even on subjects and functions listed in the Provincial Council List. The legal framework which deals with Provincial Council system allows the central government to intervene day to day affairs of the Councils. The weakness of the concurrent jurisdiction, the Reserved List –national policy" power, the Governor's involvement in the statute-making process generally through the requirement of assent and specifically in relation to financial statutes, the lack of precision and clarity in the textual formulations of the three lists all contribute to a vulnerable system of legislative devolution. So it is clear that the devolution of legislative power attempted by the 13th Amendment was done within the constraints of a _Unitary State" and a –Centralized Executive Presidency". The scenario is inappropriate for meaningful devolution and practicing principles of subsidiarity as well as.

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The Prime Numbers

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Introduction:

A prime number is a natural number that has Just two divisors: one and itself. From antiquity until our time, scientists are researching mathematical reasoning to understand the prime numbers; eminent scholars had worked on this field before it is abandoned. Mathematicians considered the prime numbers like « building blocs in building natural numbers » and the field of mathematics the most difficult.
Everything is about numbers, everything is about measure, The understanding of the natural numbers and more general the understanding of the numbers depend on the understanding of the prime numbers. This understanding of the prime will gives us greater ease to understand the other sciences. The prime numbers play a very important role for securing information technology hence promotion of the NTIC, Every year, there is a price for persons who will discover the biggest prime ~~it~~'s the hunt for the big prime"
This first part of this article about the prime numbers has taken a weight off the scientists _s shoulders by highlighting the universe of the prime numbers and has bring the problem of the prime numbers to an end. The mathematical formulas set out in this article allow us to determine all the biggest prime numbers compared to the capacity of our machines.

Summary:
By a little thinking whose origins are first physics before getting to the mathematics, we have written an article about the prime numbers.

In This article:
1). We have established a diagram called **genesis of the "supposed" prime numbers diagram** (this diagram gives us all the natural numbers except the even numbers and integers divisible by three different of two and three).
2) We have represented the chain of the prime numbers (the chain of the prime numbers is **a broken line exhibiting discontinuities**).
3) We have explained **the origin of the twin prime**.
4) We have explained **the difference between a prime number and a "non" prime number** (Note: a ~~n~~on" prime number is a number which is not prime).
5) We have determined in the order: the set of the ~~s~~upposed" prime numbers, the set of the ~~n~~on" prime numbers, the set of the prime numbers and the subset of the prime numbers (**prime numbers small than a given integer, prime numbers between two whole numbers**).
6) We have done an application of the results.

PLAN:

This article comprises six chapters:

Chapter I: Genesis of the "supposed" prime numbers diagram.

Chapter II: The set of the "supposed" prime numbers.

Chapter III: The "non" prime numbers.

Chapter IV: Infinite and ordered set of the prime numbers.

Chapter V: Subset of infinite and ordered set of the prime numbers.

Chapter VI: Applications

Chapter: Genesis of the "supposed" prime numbers diagram.

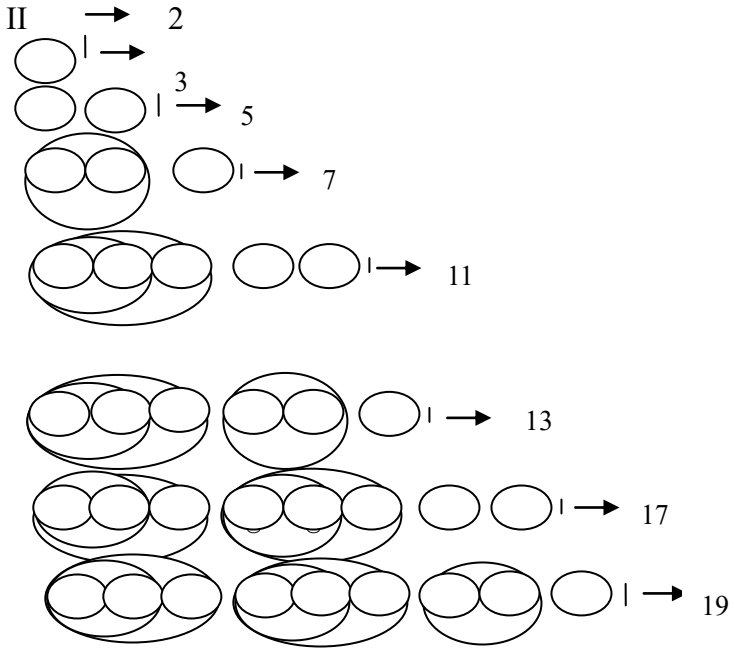
I. Genesis of the "supposed" prime numbers diagram.

1) The diagram

Note:

Each line corresponds to a succession of circles which ends with a bar.

The total number of bars for each line corresponds to a « supposed » prime number.



Note1: The data from the Diagram

1) We could continue to build the diagram until the « supposed » prime number of our choice.
2) Each circle contains at maximum six bars and at minimum two bars.
3) We found that the data from the diagram is all the natural numbers except the even numbers and natural numbers divisible by three.

Note3: The method

1) One will seek to translate the data from the diagram into mathematical formulas; the obtained formulas form the set of the ―supposed" prime numbers.
2) The set of the ―supposed" prime numbers includes the set of the prime numbers and the set of ―non" prime numbers (a ―non" prime number is a ―supposed" prime which is not prime).
3) In the following time, we will seek to isolate in this previous set the ―non ―prime numbers, the remaining numbers form the set of the prime numbers.

Note4: the comprehension of the Diagram

1) The logic used to build the diagram is far from the logic used by the mathematicians (One must think like a physician to build the diagram).
2) The hardest to understand in this article is the logic used to build the diagram named ―to understand the diagram".
3) **The part named "to understand the diagram" is reserved for the whole book because they are too many theories**.

The whole book is entitled the naturals numbers.

4) Without understanding the logic used to build the diagram you can understand the essence of this article, you only have to read and understand the following pages.

Note5: **Humanity hasn't understand the natural numbers until this moment (naturally, before the onset of this article).**

II. Exploitation of the data from the diagram :

1) Difference between two successive « supposed » prime numbers :

The illustration of these differences amounts to arrange the obtained numbers in increasing order, showing the added value to each number to get the following number.

2 ⟶ +1
3 ⟶ +2
5 ⟶ +2
7 ⟶ +4
11 ⟶ +2
13 ⟶ +4
17 ⟶ +2
19 ⟶ +4
23 ⟶ +2
25 ⟶ +4
29 ⟶ +2
31 ⟶ +4
35 ⟶ +2
37 ⟶ +4

41 ⟶ +2
43 ⟶ +4
47 ⟶ +2
49 ⟶ +4
53 ⟶ +2
55 ⟶ +4
59 ⟶ +2
61 ⟶ +4

2) Interpretation:

The arrangement of the « supposed » prime, in increasing order makes the diagram ridiculous because you only need, from 5, to add alternatively 2 (to get the following number) and then 4 (to get the number that follow this previous following number) and so on.

Note: The first nine "supposed" prime numbers are all prime numbers,

After 23, we have a mixture of prime numbers and "non" prime numbers based on a logic we don't know yet.

That inspires us mathematical formulas that condition the "supposed" prime numbers,

Hence the need to translate these obtained data into mathematical formulas.

III. Formulas for the numbers from the diagram:

a) The « supposed » prime numbers :

The obtained numbers from the diagram are a mixture of prime numbers and ―non" prime numbers, that's why we call them ―supposed" prime numbers.

b) Demonstration :

5 ⟶ 5
5+2 ⟶ 7
5+2+4 ⟶ 11
5+2+4+2 ⟶ 13
5+2+4+2+4 ⟶ 17
5+2+4+2+ 4+2 ⟶ 19
- - - - - -

Let n_1 and n_2 be two parameters such as $n_1; n_2 \in N$

n_1: the number of two added to 5 to get a new number.

n_2: the number of four added to 5 to get the same previous new number.

We also see that an obtained number from the diagram is obtained by this following formula:

$5 + 2n_1 + 4n_2$

*Relation between n_1 and n_2:

There are two possibilities:

$n_1 = n_2$ or $n_1 = n_2+1$ (that means $n_2 = n_1-1$)

For $n_1 = n_2$:

$5 + 2n_1 + 4n_2 = 5 + 2n_1 + 4n_1 = 5 + 6\,n_1$ avec $n_1 \geq 0$

For $n_1 = n_2 + 1$ or $n_2 = n_1-1$

$5 + 2n_1 + 4n_2 = 5 + 2n_1 + 4\,(n_1 - 1) = 5 - 4 + 6n_1 = 6n_1 + 1$, $n_1 \geq 1$

$5 + 2n_1 + 4n_2 = 5 + 2(n_2 + 1) + 4n_2 = 7 + 6n_2$; $n2 \geq 0$.

Three mathematical formulas have been obtained:

$6n_1+5$ avec $n_1 \geq 0$; $6n_1+1$ avec $n_1 \geq 1$ ou $6n_2+7$avec $n_2 \geq 0$

Two of these previous three formulas are equivalent, it_s:

$6n_1+1$ avec $n_1 \geq 1$ ou $6n_2 + 7$avec $n_2 \geq 0$

When we reduce $n \geq 0$ to $n \geq 1$, we obtain the following two formulas:

$U_n = 6n+5$ and $V_n = 6n+7$, $n \in N$

When we reduce $n \geq 1$ to $n \geq 0$, we obtain the following two formulas:

$U_n = 6n - 1$ et $V_n = 6n+ 1$, $n \in N^*$ Soit $6n \pm 1$, $n \in N$:

For $n_1 = n$; $n_2 = n - 1$

$6n_2 + 5 = 6(n - 1) + 5 = 6n - 1$

In the following pages we will focus on better illustrate the chain of the prime numbers:

$U_n = 6n+5$ et $V_n = 6n+7$, $n \in N$

Chapter I: The set of the « supposed » prime numbers.

I. The set of the « supposed » prime numbers:

1. Definition

The « supposed » prime numbers are 2; 3 and numbers which come from the two following formulas:

$U_n = 6n + 5$; $V_n = 6n + 7$, $n \in N$

1. To identify the « supposed » prime numbers except 2 and 3:

a. Parameters of a « supposed » prime number:

$U_n = 6n + 5$; $V_n = 6n + 7$ and $n \in N$

$\frac{U_n - 5}{6} = n$; $\frac{V_n - 7}{6} = n$ and $n \in N$

Consequence:

Let N be a natural number, different of 2 and 3:

If $\frac{N-5}{6} \in N$ or $\frac{N-7}{6} \in N \Rightarrow$ N is a –supposed" prime number.

3. The set of the « supposed » prime numbers:

This set is formed by $6n + 5$ and $6n + 7$, $n \varepsilon N$ taking into account 2 and 3.

Let Esp be the **set of the « supposed » prime numbers**

$$Es_p = \{2 ; 3 ; 6n + 5 ; 6n + 7, n \varepsilon N\} \text{ or } Es_p = \{2 ; 3 ; 6n - 1 ; 6n + 1, n \varepsilon N^*\}$$

Note:

This set contains all the prime numbers and the « non » prime numbers.

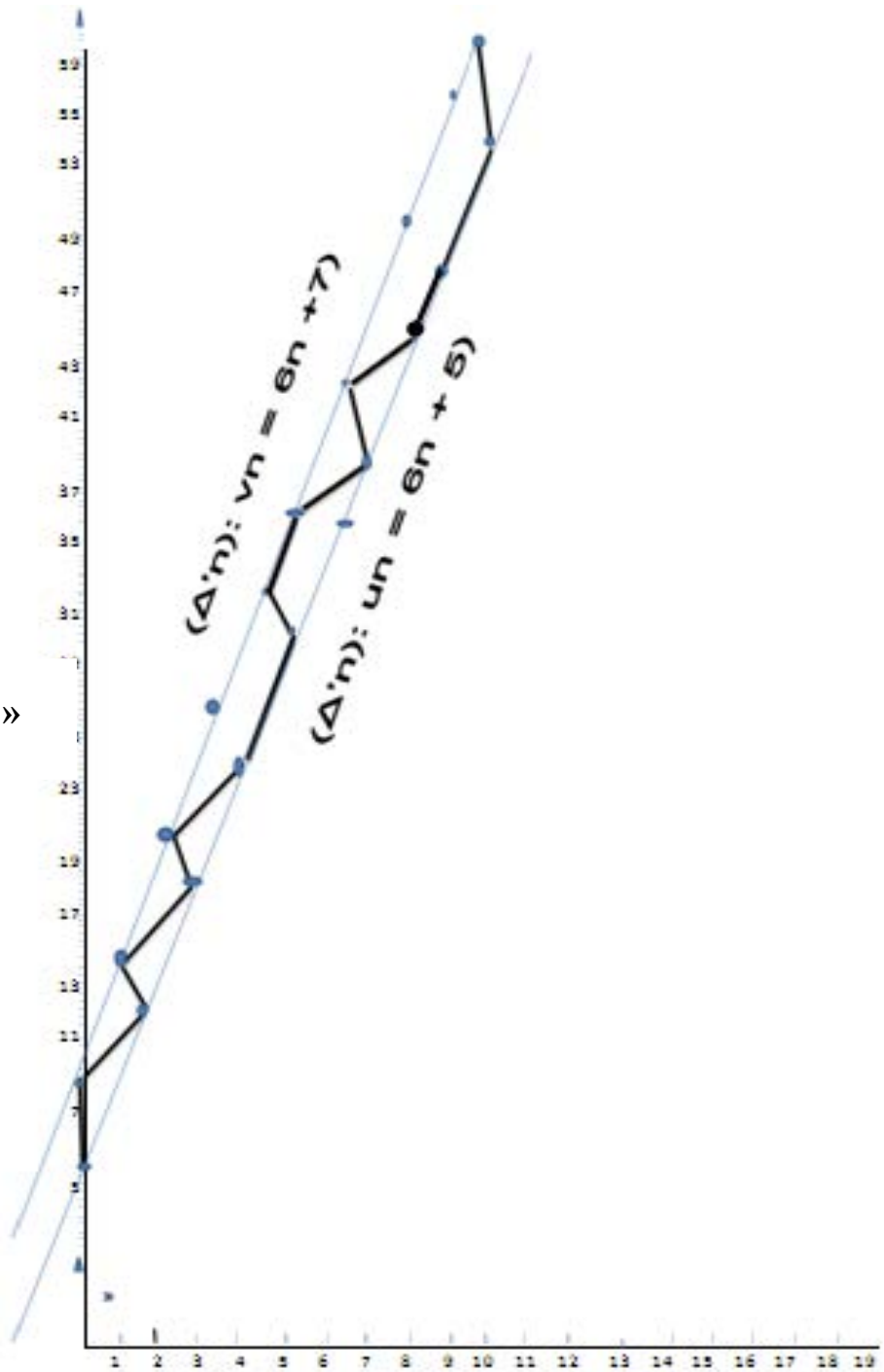
Let Ep be the set of the prime numbers and Enp be the set of the ~~"n~~on" prime numbers.

Esp = EpUEnp

I. The chain of the prime numbers:

1. Graphical Representation in an orthonormal coordinate system of the "supposed" prime numbers:

« Supposed »



n∈ N

2)Analysis:

*$U_n < V_n \ \forall\ n \in N$

*The couples (U_n ;Vn) are ordered.

*If two « non » prime numbers are obtained by the couple for n defined, we obtain a discontinuity on the chain.

*The first discontinuity is obtained for n = 35

6 x 35 + 5 = 215 divisible by 5

6 x 35 + 7 = 217 divisible by 7

*We deduct that the chain of the prime numbers is **a broken line exhibiting discontinuities.**

Note: The twin prime are two prime numbers which come from the couples ($U_n = 6n + 5$,$V_n = 6n + 7$; $n \in N$ and n defined).

Twin prime are the same number of Keurs noted k such as $k = n + 2, n \in N$.

2) Generality:

If ($Un = 6n + 5$,$Vn = 6n + 5$ $n \in N$) are prime, the couple has said twin prime.

If ($Un = 6n + 5$, $Vn = 6n + 5$ $n \in N$) are « non » prime, the couple has said twin « non » prime.

If one of ($Un = 6n + 5$,$Vn = 6n + 5$ $n \in N$) is a prime number and the other a ~~"n~~on" prime number, the couple has said twin mixed.

III. Relations

1. Relation between U_n and $U_n + 1$

$U_n = 6n + 5$; $U_{n+1} = 6(n + 1) + 5 = 6n + 6 + 5 = 6n + 11$

$\Delta Un = U_{n+1} - U_n = 6n + 11 - 6n - 5 = 11 - 5 = 4$

$U_{n+1} = U_n + \Delta Un \quad \Rightarrow \quad \mathbf{U_{n+1} = U_n + 6}$

2. Relation between V_n and V_{n+1} :

$Vn = 6n + 7$;$\mathbf{V_{n+1}} = 6\ (n +1) + 7 = 6n +6 + 7 = 6n + 13$

$\Delta V_n = \mathbf{V_{n+1}} - V_n = 6n + 13 - 6n - 7 = 6 \quad \Rightarrow \Delta V_n = 6$

$\mathbf{V_{n+1} = V_n + 6}$

3. Relation between U_n and Vn

$V_n - U_n = 6n + 7 - 6n - 5 = 7 - 5 = 2$

$\mathbf{V_n = U_n + 2}$ And $\mathbf{U_n = V_n - 2}$

4. Sums of the (n + 1) first terms of Un and Vn

$S_{Un} = U_0 + U_1 + . - + U_{n-1} + U_n = 6 \times 0 + 5 + 6 \times 1 + 5 + -- + 6 \times (n - 1) + 5 + 6 \times n + 5$
$= 6 (0 + 1 + 2 + . - - + n) + 5(n + 1)$

$= 6 (1 + 2 + - \quad + n) + 5(n + 1)$ or $1 + 2 + . + n = \frac{n(n+1)}{2}$

$= 6 \times \frac{n(n+1)}{2} + 5(n + 1) = 3n (n + 1) + 5((n + 1) = (n +1) (3n + 5)$

$S_{un} = (n + 1) (3n + 5)$

$S_{vn} = V0 + V1 + . - + V_{n-1} + V_n = 6 \times 0 + 7 + 6 \times 1 + 7 + . - + 6 \times (n - 1) + 7 + 6n + 7$
$= 6 (0 + 1 + 2 + - + n) + 7(n+1)$

$= 6 (1 + 2 + - + n) + 7(n+1) = 6 \times \frac{n(n+1)}{2} + 7 (n + 1)$

$= 3n (n + 1) + 7 (n + 1) = (n + 1) (3n + 7)$

$S_{vn} = (n + 1) (3n + 7)$

5. Sum of sums of the (n+1) first terms of Un andVn

$S_{Un} + S_{vn} = (n +1) (3n + 5) + (n + 1) (3n + 7) = (n +1) [6n + 12] = 6(n + 1) (n + 2)$
$S_{Un} ;_{Vn} = S_{Un} + S_{Vn} = 6 (n + 1) (n + 2)$

Chapter II: The set of the « supposed » prime numbers.

I. The set of the « supposed » prime numbers:

1. definition

The « supposed » prime numbers are 2 ; 3 and numbers which come from the two following formulas :

$$U_n = 6n + 5 ; V_n = 6n + 7 , n \in N$$

2. To identify the « supposed » prime numbers except 2 and 3:

a. Parameters of a « supposed » prime number:

$$U_n = 6n + 5 ; V_n = 6n + 7, n\epsilon N$$

$$\frac{U_n-5}{6} = n \; ; \; \frac{V_n-7}{6} = n \; , n\epsilon \; N$$

b. Consequence:

Let N be a natural number, different of 2 and 3:

If $\frac{N-5}{6} \in N$ or $\frac{N-7}{6} \in N \Rightarrow$ N is a ―supposed" prime number.

3. The set of the « supposed » prime numbers:

This set is formed by 6n + 5 and 6n + 7, n ε N taking into account 2 and 3.

Let Esp be the **set of the « supposed » prime numbers**

$Es_p = \{2 ; 3 ; 6n + 5 ; 6n + 7, n \varepsilon N\}$ or $Es_p = \{2 ; 3 ; 6n - 1 ; 6n + 1, n \varepsilon N^*\}$

Note: This set contains all the prime numbers and the « non » prime numbers.

Let Ep be the set of the prime numbers and Enp be the set of the ―non" prime numbers.

Esp = EpUEnp

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Chapter III : The « non » prime numbers.

I. The « non » prime numbers:

1) Definition

A « non » prime number is a ―supposed" prime that has at minimum three divisors.

2)Relation between two « supposed » non-prime numbers.

a) Relation between two « non » prime U:

$U_1=6n_1+5$, $U_2=6n_2+5$, n ε N,

Let K_1 and K_2 be two supposed prime.

$K_1U_1=K_2U_2 \Rightarrow K_1(6n_1+5)=K_2(6n_2+5)$

$6K_1n_1+5K_1=6K_2n_2+5K_2$

$6(K_1n_1-k_2n_2)=5(k_2-k_1) \Rightarrow 5(k_2-k_1)=6n$

Let $n_3=\frac{n}{5}$, $n_3 \in N \Rightarrow k_2-k_1=6n_3$

$\Rightarrow K_2=6n_3+k_1$

Note: To better illustrate the types of « non » numbers, let us consider V = 6n+1.

•If $K_1=1 \Rightarrow K_2=6n_3+1$ donc $K_2=V \Rightarrow V_1=V_2V_3$

$\Rightarrow [n_1-(6n_3+1)n_2]=5n_3 \Rightarrow n_1-6n_3n_2-n_2=5n_3$

$\Rightarrow n_1=5n_3+6n_3n_2+n_2$

$$\mathbf{U_1=U_2V_3 \Leftrightarrow n_1=5n_3+6n_3n_2+n_2} \quad (1)$$

•If $K_1=5 \Rightarrow K_2=6n_3+5 \Rightarrow K_2=U \Rightarrow 5U_1=U_2U_3$

$\Rightarrow 6[5n_1-(6n_3+5)n_3]=5 \times 6 \times n_3$

$\Rightarrow 5n_1-6n_2n_3-5n_2=5n_3$

$$\Rightarrow \mathbf{5n_1=5n_3+6n_2n_3+5n_2 \Rightarrow 5U_1=U_2U_3} \quad (2)$$

a) Relation between two V:

$K_1V_1=K_2V_2 \Rightarrow K_1(6n_1+1)=K_2(6n_2+1)$

$\Rightarrow 6K_1n_1+K_1=6K_2n_2+K_2$

$\Rightarrow 6(K_1n_1-K_2n_2)=K_2-K_1$

$\Rightarrow K_2=6(K_1n_1-K_2n_2)+K_1 \Rightarrow K_2=6n_3+K_1$

• If $K_1=1 \Rightarrow K_2=6n_3+1 \Rightarrow K_2=V \Rightarrow V_1=V_2V_3$

$\Rightarrow n_3=[n_1-n_2(6n_3+1)]=n_1-6n_2n_3-n_2$

$$\Rightarrow \mathbf{n_3=n_1-6n_2n_3-n_2} \qquad \mathbf{V_1=V_2V_3} \quad (3)$$

• If $K_1=5 \Rightarrow K_2=6n_3+5 \Rightarrow K_2=n_3 \Rightarrow 5V_1=n_3V_2$

$\Rightarrow n_3=n_1K_1-n_2K_2=5n_1-n_2(6n+5)=5n_1-6n_2n_2-5n_2$

$$\mathbf{5n_1=n_3+6n_2n_3+5n_2 \Leftrightarrow 5V_1=U_3V_2} \quad (4)$$

a) Relation between U and V

$K_1U_1=K_2V_2 \Rightarrow K_1(6n_1+5)=K_2(6n_2+1)$

$K_1(6n_1+5)=K_2(6n_2+1) \Rightarrow 6K_1n_1+5K_1=6K_2n_2+K_2$

$6(K_1n_1-K_2n_2)=K_2-5K_1=6n \Rightarrow K_2=6n_3+5K_1$

• Si $K_1=1 \Rightarrow K_2=6n_3+5 \Rightarrow K_2=U_3 \Rightarrow U_1=U_3V_2$ $K_2-5=6n_3$

$n_3 = n_1 - n_2\ (6n_3+5) = n_1 + 6n_2n_3 - 5n_2$

$\Rightarrow$ **$n_1 = n3_3 + 6n_2n_3 + 5n_2 \Leftrightarrow U_1 = U_3V_2$** (5)

• If $K_1 = 5 \Rightarrow \quad K_2 = 6n_3 + 25 = \quad 6n_3 + 24+1 = 6(n_3 + 4) +1 = V_4$,$n_4 = n_3 + 4$

$K_2 - 25 = 6n_3$; $K_2 = 6n_3 + 25$

$5n_1 - (6n_3 + 25)\ n_2 = 6n_3 \Rightarrow 5n_1 = 6n_3 + n_2\ (6n_3 + 25) = 6n_3 + n_2\ (6n_3 + 24+1) = 6n_3 + n_2\ (6n_4 + +1) = 6n_3 +6\ n_2n_4 + n_2$

$\Rightarrow$ **$5n_1 = 6n_3 +6\ n_2n_4 + n_2 \Leftrightarrow 5U_1 = V_4V_2$** (6)

$K_1U_1 = K_2V_2 \Leftrightarrow 6(K_2n_2 - K_1n_1) = 5K_1 - K_2 = 6n_3$

$\Leftrightarrow 5K_1 = 6n_3 + K_2$

Si $K_2 = 5 \Rightarrow K_1 = \frac{6n3+5}{5} = \frac{6n3}{5} + 1 \Rightarrow K_1V_3$

$\Rightarrow V_3U_1 = 5\ V_2$

$5K_1 - 5 = 6n_3 \Rightarrow 6\ [5n_2 - (\frac{6n3}{5} + 1)\ n_1] = 6n_3$

$\Rightarrow 5n_2 - \frac{6n3}{5}$ x $n_1 - \quad n_1 = n_3$

$5n_2 = n_3 + \frac{6n1+n3}{5} + n_1 \Leftrightarrow 5V_2 = U_1V_3$ (7)

If $k_2 = 1 \Rightarrow 5K_1 = 6n_3 + 1$

$\Rightarrow V_3 = 5K_1 \Rightarrow K_1 = \frac{V3}{5} \Rightarrow \frac{V3U1}{5} = V_2 \Rightarrow U_1V_3 = 5V_2$

$6[5n_2 - (\frac{6n3}{5} + 1)n_1] = 6n_3 \Rightarrow 5n_2\ \frac{6n3+n1}{5} - n_1 = n_3$

$5n_2 = n_3 + \frac{6n1\,n3}{5} + n_1 \Leftrightarrow 5V_2 = U_1V_3$ (8)

b)

Note :

The equalities 7 and 8 are equivalent

As well as the equalities1 and 5 are equivalent.

We obtain these following equalities:

1 : $U_1 = U_2U_3$; **2** : $5U_1 = U_2U_3$; **3** : $V_1 = V_2V_3$; **4** : $5V_1 = V_3V_3$;
5 : $U_1V_3 = 5V_2$; **6** : $5U_1 = V_4V_2$.
We see that 3 and 6 are equivalent because $V_2V_4 = V_2V_3 \Rightarrow V_1 = 5U_1$
If we replace $5U_1$ by V_1 in 2 we obtain:

$$\mathbf{V_1 = U_1U\ V_3}$$

We end up with these following height equalities:
$U_1 = U_2V_2$; $5U_1 = U_2U_3$; $V_1 = V_2V_3$; $5V_1 = U_3V_3$; $U_1U_3 = 5V_2$; $5U_1 = V_4V_2$; $V_1 = U_1U_2$.
Three of them represent the « non » prime numbers, it's:
$U_1 = U_2V_2$; $V_1 = V_2V_3$; $V_1 = U_1U_2$.

c) Consequence:

The « non » prime numbers for U are in the form UV and the « non » prime numbers for V are in the form UU or VV.

II. Formulas for the « non » prime numbers:

1) The parameters of the "non" prime numbers:

Instead of $V_n = 6n + 1$, $n \in N$, we choose $V_n = 6n+7$ for reducing $n \geq 1$ to $n \in N$ ($.n \geq 0$)
$U_3 = U_1V_1 \Rightarrow 6n_3 + 5 = (6n_1 + 5)(6n_3 + 7) = 36n_1n_2 + 42n_1 + 30n_2 + 35$
$\Rightarrow 6n_3 = 36n_1n_2 + 42n_1 + 30n_2 + 30$

$$\mathbf{U_3 = U_1U_1 \Rightarrow n_3 = 6n_1n_2 + 7n_1 + 5n_2 + 5}$$

$V_3 = V_1V_2$ ou $V_3 = U_1U_2$
$V_3 = V_1V_2 \Leftrightarrow (6n_3 + 7) = (6n_1 + 7) = 36\ n_1n_2 + 42n_1 + 42n_2 + 49$
$\Leftrightarrow 6n_3 = 36\ n_1n_2 + 42n_1 + 42n_2 + 42$
$\Leftrightarrow n_3 = 6\ n_1n_2 + 7n_1 + 7n_2 + 7$
$\Rightarrow$

$$\mathbf{n_3 = 6\ n_1n_2 + 7(n_1 + n_2) + 7 \Leftrightarrow V_3 = V_1V_2} \qquad (2)$$

$6n_3 + 7 = (6n_1 + 5)(6n_2 + 5) = 6\ n_1n_2 + 30n_1 + 30n_2 + 25$
$= 36\ n_1n_2 + 30(n_1 + n_2) + 25$
$\Rightarrow 6n_3 = 36n_1n_2 + 30\ (n_1 + n_2) + 18$

$\Rightarrow$

$$\mathbf{n_3 = 6\ n_1n_2 + 5(n_1 + n_2) + 3} \qquad (3)$$

2) Formulas for the « non » prime numbers:

$6n_3 + 5$; $n_3 \varepsilon$ **$\{6\ n_1n_2 + 7n_1 + 5\ n_2 + 5$ and n_1 ; $n_2 \varepsilon N^2\}$**
$6n_3 + 7$; $n_3 \varepsilon$ **$\{6\ n_1n_2 + 7(n_1 + n_2) + 7$; $6n_1n_2 + 5(n_1 + n_2) + 3$ and n_1 ; $n_2 \varepsilon N^2\}$**

Conclusion1:

The above formulas show the famous secret of the « non » prime numbers by making people understand the difference between a prime number and a « non » prime number.
The alternation between prime numbers and "non" prime numbers is not a question of interval or periodicity that depends on the parameters nij of the « non » prime numbers.
nij**ε {6ij + 7i + 5j + 5 avec i-j ε N²} u {6ij + 7(i+j) +7 ; 6ij +5(i+j) +3 avec i ; j ε N²}**
Let N be a natural number, N is prime if and only if:

$\frac{N-5}{6}$ **ε N \{6ij + 7i +5j avec i ; j ε N²} or** $\frac{N-7}{6}$ **ε N \{6ij+7(i + j) +7 ; 6ij+7(i+j) +7 avec i ; j ε N²}.**

Chapter IV: Infinite and ordered set of the prime numbers.

I. Infinite and ordered set of the prime numbers :

1) Arrangement of the « supposed » prime numbers :

The couples (6n + 5; 6n + 7, n **ε N**) are ordered and grow following the increasing values of n.
The couple (2; 3) is ordered.
We will need to take into account the couples in order to place the « supposed » prime in order.

2) Infinite and ordered set of the "supposed" prime numbers:

Let Esp be the infinite and ordered set of the "supposed" prime numbers:
Esp = **{**(2 ; 3) ; (6n + 5 ; 6n + 7) avec n**ε N}**

II. Infinite and ordered set of the "supposed" prime numbers:

1) Infinite set of the "non" prime numbers:

a) First form of representation of the set of the « non » prime numbers:

Let Enp be the infinite set of the "non" prime numbers:
Formulas for the « non » prime had been established in the previous chapter.
Enp = {$6n_3 + 5$ avec n_3**ε**{$6n_1n_2 + 7n_1 + 5n_2 + 5$ avec $n_1, n_2 \varepsilon N^2$} ;
$6n_3 + 7$ avec n_3**ε** {$6n_1n_2 + 7(n_1 + n_2) + 7$; $6n_1n_2 + 5(n_1 + n_2) + 3$ avec n_1 ; $n_2 \varepsilon N^2$}

b) Second form of representation of the set of the « non » prime numbers:

We have demonstrated in the previous chapter that the « non » prime numbers are thefollowing products : UU ; VV or UV.
Let i and j be two parameters such as i ; j ε N^2
UiUj: [6i + 5] [6j + 5]; ViVj : [6i + 7] [6j + 7]; UiVj : [6i + 5] [6j + 7]
Enp = {[6i + 5] [6j + 5] ; [6i + 7] [6j + 7] ; [6i + 5] [6j + 7] such as i ; j ε N^2}
Note: The members of this set need to be arranged.

2) Infinite and ordered set of the prime numbers :

Let Ep be the infinite and ordered set of prime numbers:

***First form of representation:**

$Ep = \{(2 ; 3) ; (6n + 5 ; 6n + 7) , n \varepsilon N\} \setminus \{6n_3 + 5 , n\varepsilon \{6n_1n_2 + 7n_1 + 5n_2, n_1 ; n_2\varepsilon N^2\} ; 6n_3 + 7 , n_3\varepsilon \{6n_1n_2 + 7(n_1 + n_2) +3, n_1 ; n_2\varepsilon N^2\}\}$

***Second form of representation:**

$Ep= \{(2 ; 3) ; (6n + 5 ; 6n + 7) , n \varepsilon N\} \setminus \{[6i + 5] [6j + 5] ; [6i + 7] [6j + 7] ; [6i + 5] [6j + 7]$ such as $i ; j \varepsilon N^2\}$

Note: This second form of the representation is simpler than the previous one.

ChapterV: Subset of the infinite and ordered set of the prime numbers :

I. The ordered set of the prime numbers smaller than a given integer :

1) The set of the « supposed » prime smaller than a given integer :

Let M be an integer $\Rightarrow M \varepsilon N$ and $Esp_{< M}$: the set of the prime numbers smaller than M.

$Esp_{< M} = \{(2 ; 3) < M ; (6n + 5, 6n + 7) < M , n \varepsilon N\}$

***<u>Question</u>**: What is the maximum value of n ?

Let n_{max} be the maximum value of n ?

n_{max} is obtain from 6n + 7.

$6n_{max} + 7 < M \Leftrightarrow n_{max} < \frac{M-7}{6}$

The most logical choice for rn_{max} is $n_{max} = E(\frac{M-7}{6})$: that means the integral part of $\frac{M-7}{6}$

$Ep_{< M} = \{(2 ; 3) < M ; (6n + 5 ; 6n + 7) < M$ avec $n \varepsilon \{0 ; - ; E(\frac{M-7}{6})\} \cap N\}$

2) The set of "non" prime numbers smaller than M such as M ε N :

a) The set of "non" prime numbers smaller than M .

Let Enp< M be the set of ~~-n~~on" prime numbers smaller than M

Note: There are two ways to represent this set:

- **The first representation:**

$Enp < M = \{6n_3 + 5 < M$ avec $n_3\varepsilon \{6ij + 7i + 5j + 5$ avec $i ; j\varepsilon N^2\}$;

$6n + 7 < M$ avec $\varepsilon N \{6ij + 7 (i + j) + 7 ; 6ij + 5 (i + j) + 3$ avec $i ; j \varepsilon N^2\}$

- **The second representation:**

$Enp< M = \{[6i + 5] [6j + 5] < M; [6i + 7] [6j + 7] < M; [6i + 5] [6j + 7] < M$ avec $i ; j \varepsilon N^2\}$.

Note: The members of this set need to be arranged.

- **Calculation Method:**

We will propose a calculation method for the second representation.

<u>* Question:</u>

What are the minimum and the maximum values for i and j ?

- [6i + 5] [6j + 5] < M

j_{max} is obtained for r i = 0

$i = 0 \Rightarrow 5\,[6j_{max} + 5] < M \Rightarrow j_{max} < \frac{\frac{M}{5} - 5}{6}$

$\Rightarrow j_{max} < \frac{M-25}{30}$

The most logical choice for jmax is the integral part of $\frac{M-25}{30}$.

$i_{max} = E\left(\frac{M-25}{30}\right)$

In the same way jmax = $E\left(\frac{M-25}{30}\right)$

$$\mathbf{I_{max} = j_{max} = E\left(\frac{M-25}{30}\right)}$$

That imply that [6i + 5] [6j + 5] < M and i ; j ε $\{[0 ; E\left(\frac{M-25}{30}\right)] \cap N\}^2$

- [6i + 7] [6j + 7] < M

J_{max} is obtained for i = 0 ;

$\Rightarrow 7[6j_{max} + 7] < M \Leftrightarrow j_{max} < \frac{M-49}{42}$

jmax = $E\left(\frac{M-49}{42}\right)$

$$\mathbf{I_{max} = j_{max} = E\left(\frac{M-49}{42}\right)}$$

$\Rightarrow$ [6i + 7] [6j + 7] <M eti ; j ; ε $\{[0 ; E\left(\frac{M-49}{42}\right)] \cap N\}^2$

- [6i + 5] [6j + 7] < M

$i=0 \Rightarrow 5\,[6j_{max} + 7] < M \Leftrightarrow 6j_{max} + 7 < \frac{M}{5} \Leftrightarrow j_{max} < \frac{M-35}{30} \Rightarrow j_{max} = E\frac{M-35}{30}$

$j=0 \Rightarrow 5\,[6i_{max} + 5] < M \Leftrightarrow 6i_{max} + 5 < \frac{M}{7} \Leftrightarrow i_{max} < \frac{M-35}{42} \Rightarrow i_{max} = E\frac{M-35}{42}$

$\Rightarrow [6i + 5]\,[6j + 7] < M$ avec $i \in \{[0 ; E(\frac{M-35}{42})] \cap N\}$ et $j \in \{[0 ; E(\frac{M-35}{30})]$

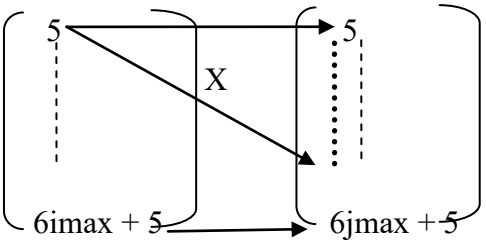
***To calculate:**

$[6i + 5]i_{max} \times [6j + 5]\, j_{max}$; $[6i + 7]i_{max} \times [6j + 7]j_{max}$; $[6i + 5]i_{max} \times [6j + 7]j_{max}$

The method of calculation $[6i + 5]i_{max} \times [6j + 5]\, j_{max} < M$:

- **Illustration 1 :** (to calculate $[6i + 5]\,[6j + 5] < M$

$[6i + 5]i_{max} \times [6j + 5]\, j_{max} < M =$



$< M$

For each i, we will distribute the $6i + 5$ to all the $6j + 5$ until getting a number greater than or equal to M. If the obtained number is greater than M we would eliminate it.

For $i = 0$; it is obvious that all the $5(6j + 5)$ products are lower than M.

Note1:

A similar logic has also been applied to $[6i + 7]i_{max} \times [6j + 7]j_{max}$

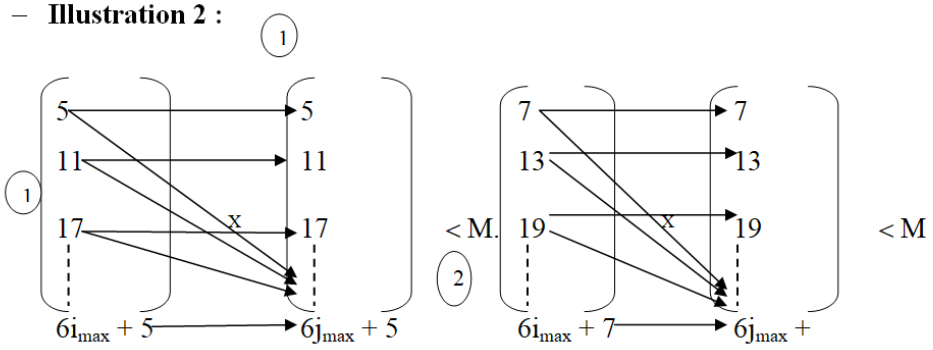
Note2:

For $[6i + 5] \times [6j + 5]$ and $[6i + 7] \times [6j + 7]$

For each i calculation starts with the corresponding j.

Therefore $(6i + 5)^2$ or $(6i + 7)^2$ is the first obtained number.

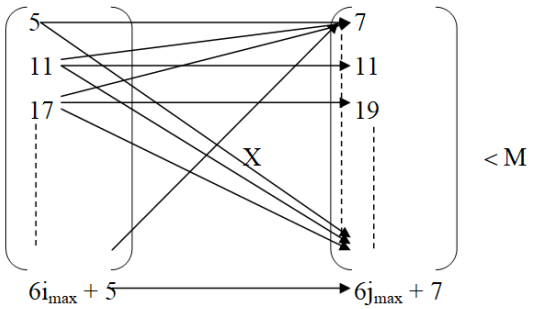
- **Illustration 2 :**



$< M$

Note2: The above illustrations are excluvelly valid for $[6i + 5]i_{max} \times [6j + 5]j_{max}$ and $[6i + 7]i_{max} \times [6j + 7]j_{max}$.

Illustration 3 : For the products $[6i + 5]i_{max}$ $[6j + 7]j_{max}$



***Finally the simplest representation of the set of the « non » prime number is the form bellow*:**

$$\textbf{Enp< M} = \begin{cases} [6i + 5]i_{max} \text{ x } [6j + 5]\, j_{max} < M ,i ; j \in \{[o ; E (\frac{M-25}{30})] \cap N\}^2 ; \\ [6i + 7]i_{max} \text{ x } [6j + 7]j_{max} < M ,i ; j \in \{[o ; E (\frac{M-35}{42})] \cap N\}^2 ; \\ [6i + 5]i_{max} \text{ x } [6j + 7]j_{max} < M ,i \in \{[o ; E (\frac{M-49}{42})] \cap N\} \text{ et} \\ j \in \{[o ; E (\frac{M-49}{30})] \cap N \end{cases}$$

3) The ordered set of the prime numbers smaller than M and M ε N:

Note: There are two ways to represent this set but this following form is simpler than the other.

$$\textbf{Ep< M} = \begin{cases} \{(2 ; 3) < M ; (6n + 5 ; 6n + 7) < M , n \in \{[o ; E (\frac{M-7}{6})] \cap N\}\} \\ [6i + 5]\,[6j + 5] < M ,i ; j \in \{[o ; E (\frac{M-35}{42})] \cap N\}^2 ; \\ [6i + 7]\,[6j + 7] < M ,i ; j \in \{[o ; E (\frac{M-49}{42})] \cap N\}^2 ; \\ [6i + 5]\,[6j + 7] < M ,i ; \quad \in \{[o ; E (\frac{M-35}{42})] \cap N\} \text{ et} \end{cases}$$

$$j\varepsilon \quad \{[o\ ;\ E\ (\frac{M-35}{30})]\cap N\}$$

II. The ordered set of the prime numbers between two whole numbers.

Let M1 and M_2 be two integers such as $M_1 < M_2$

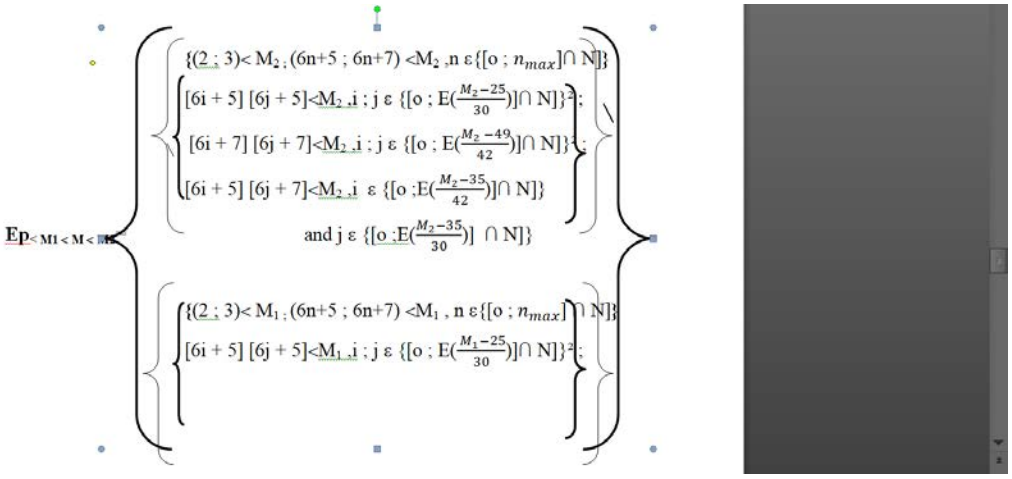
Let M be a prime number between M_1 and $M_2 \Rightarrow M_1 < M < M_2$.

Let Ep< M2 be The ordered set of the prime numbers smaller than.

Let Ep< M1 be the ordered set of the prime numbers smaller than M_1.

Let Ep< M1 < M < M2 be the ordered set of the prime numbers between M_1 and M_2.

Ep < M1 < M < M2 = Ep < M2 \ Ep <



Chapitre VI : Applications

I. To determine the prime numbers smaller than a given integer and the prime numbers between two given integers.

1) To determine the set of the prime numbers bellow than 1000 :

a) To determine the set of the « supposed » prime numbers bellow than 1000 :

$$Esp_{<1000} = \left\{(2; 3)<1000\ ;\ (6n+5\ ;6n+7)<1000\ ,\ n\varepsilon\ \{[o\ ;\ E\ (\frac{1000\ -\ 7}{6})\cap N]\}\right.$$

$E\ (\frac{1000\ -\ 7}{6}) = E\ (165{,}5) = 165$

The last couple is :(6x165+5; 6x165+7)=(995 ;997)

$$Esp_{<1000} = \{(2\ ;3)\ ;\ (5\ ;7)\ ;\ (11\ ;13)\ ;\ (17\ ;19)\ ;\ (23\ ;25)\ ;\ (29\ ;31)\ ;\ (35\ ;37)\ ;\ (41\ ;43)\ ;\ (47\ ;49)\ ;$$
$$(53\ ;55)\ ;\ (59\ ;61)\ ;\ (65\ ;67)\ ;\ (71\ ;73)\ ;\ (77\ ;79)\ ;\ (83\ ;85)\ ;\ (89\ ;91)\ ;\ (95\ ;97)\ ;\ (101\ ;103)\ ;\ (107\ ;109)\ ;$$
$$(113\ ;115)\ ;\ (119\ ;121)\ ;\ (125\ ;127)\ ;\ (131\ ;133)\ ;\ (137;139)\ ;\ (143\ ;145)\ ;\ (149;151)\ ;\ (155\ ;157)\ ;$$

(161 ;163) ; (167 ;169) ; (173 ;175) ; (179 ;181) ; (185 ;187) ; (191 ;193) ; (197 ;199) ; (203 ;205) ; (209 ;211) ; (215 ;217) ; (221 ;223) ; (227 ;229) ; (233 ;235) ; (239 ;241) ; (245 ;247) ; (251 ;253) ; (257 ;259) ; (263 ;265) ; (269 ;271) ; (275 ;277) ; (281 ;283) ; (287 ;289) ; (293 ;295) ; (299 ;301) ; (335 ;337) ; (341 ;343) ; (347 ;349) ; (353 ;355) ; (359 ;361) ; (365 ;367) ; (371 ;373) ; (377 ;379) ; (383 ;385) ; (389 ;391) ; (395 ;397) ; (401 ;403) ; (407 ;409) ; (413 ;415) ; (419 ;421) ; (425 ;427) ; (431 ;433) ; (437 ;439) ; (443 ;445) ; (449 ;451) ; (455 ;457) ; (461 ;463) ; (467 ;469) ; (473 ;475) ; (479 ;481) ; (485 ;487) ; (491 ;493) ; (497 ;499) ; (503 ;505) ; (509 ;511) ; (515 ;517) ; (521 ;523) ; (527 ;529) ; (533 ;535) ; (539 ;541) ; (545 ;547) ; (551 ;553) ; (557 ;559) ; (563 ;565) ; (569 ;571) ; (575 ;577) ; (581 ;583) ; (587 ;589) ; (593 ;595) ; (599 ;601) ; (605 ;607) ; (611 ;613) ; (617 ;619) ; (623 ;625) ; (629 ;631) ; (635 ;637) ; (641 ;643) ; (647 ;649) ; (653 ;655) ; (659 ;661) ; (665 ;667) ; (671 ;673) ; (677 ;679) ; (683 ;685) ; (689 ;691) ; (695 ;697) ; (701 ;703) ; (707 ;709) ; (713 ;715) ; (719 ;721) ; (725 ;727) ; (731 ;733) ; (737 ;739) ; (743 ;745) ; (749 ;751) ; (755 ;757) ; (761 ;763) ; (767 ;769) ; (773 ;775) ; (779 ;781) ; (785 ;787) ; (791 ;793) ; (797 ;799) ; (803 ;805) ; (809 ;811) ; (815 ;817) ; (821 ;823) ; (827 ;829) ; (833 ;835) ; (839 ;841) ; (845 ;847) ; (851 ;853) ; (857 ;859) ; (863 ;865) ; (869 ;871) ; (875 ;877) ; (881 ;883) ; (887 ;889) ; (893 ;895) ; (899 ;901) ; (905 ;907) ; (911 ;913) ; (917 ;919) ; (923 ;925) ; (929 ;931) ; (935 ;937) ; (941 ;943) ; (947 ;949) ; (953 ;955) ; (959 ;961) ; (965 ;967) ; (971 ;973) ; (977 ;979) ; (983 ;985) ; (989 ;991) ; (995 ;997).

b) To determine the set of the « non » prime numbers bellow than 1000 :

M = 1000.

$$Enp< 1000 = \left\{ \begin{array}{l} [6i + 5] \times [6j + 5] < 1000 \, , \, i ; j \in \{[o ; E(\frac{1000-25}{30})] \cap N\}^2 ; \\ [6i + 7] \times [6j + 7] < 1000 \, , \, i ; j \in \{[o ; E(\frac{1000-49}{42})] \cap N\}^2 ; \\ [6i + 5] \times [6j + 7] < 1000 \, , \, i \in \{[o ; E(\frac{1000-35}{42})] \cap N\} \text{ et} \\ \qquad j \in \{[o ; E(\frac{1000-35}{30})] \cap N\} \end{array} \right.$$

$E(\frac{1000-25}{30}) = 32$, $E(\frac{1000-49}{42}) = 22$ et $E(\frac{1000-35}{42}) = 22$, $E(\frac{1000-35}{30}) = 32$.

- $[6i + 5] \times [6j + 5] < 1000 \, , \, i ; j \in \{[o ; 32] \cap N\}$.
- $[6i + 7] \times [6j + 7] < 1000 \, , \, i ; j \in \{[o ; 22] \cap N\}$.
- $[6i + 5] \times [6j + 7] < 1000 \, , \, i ; j \in \{[o ; 22] \cap N\}$ and $j \in \{[o ; 32] \cap N\}$.

$[6i + 5]_{22} x\ [6j + 5]_{22} < 1000 =$ x x < 1000

5	5	25 ; 55 ; 85 ; 115 ;
11	11	
17	17	145 ; 175 ; 205 ;
23	23	235 ; 265 ; 295 ;
29	29	
35	35	325 ; 335 ; 385 ;
41	41	415 ; 445 ; 475 ;
47	47	
53	53	505 ; 535 ; 565 ;
59	59	595 ; 625 ; 655 ;
65	65	
71	71	685 ; 715 ; 745 ;
77	77	775 ; 805 ; 835 ;
83	83	
85	85	865 ; 925 ; 955 ;
95	95	985.121 ; 187 ; 253 ;
101	101	
107	107	319 ; 385 ; 451 ;
113	113	517 ; 583 ; 649 ;
119	119	
125	125	715 ; 781 ; 847 ;
131	131	913 ; 979 ; 289 ;
137	137	
143	143	391 ; 493 ; 595 ;
149	149	
155	155	
161	161	

•$[6i + 7]_{22} x [6j + 7]_{22} < 1000$

7	7
13	13
19	19
25	25
31	31
37	37
43	43
49	49
61	61
67	67
73	73
79	79
85	85
91	91
97	97
103	103
109	109
115	115
121	121

49 ;	91 ;
133 ;	1175 ;
217 ;	259 ;
301 ;	343 ;
385 ;	427 ;
469 ;	511 ;
553 ;	595 ;
637 ;	679 ;
721 ;	763 ;
805 ;	84 ;
889 ;	931 ;
973 ;	169 ;
247 ;	325 ;
403 ;	481 ;
559 ;	637 ;
715 ;	793 ;
871 ;	949 ;
361 ;	475 ;
589 ;	703 ;
817 ;	931 ;
625 ;	775 ;
925 ; 961	

• $[6i + 5]_{22} \times [6j + 7]_{32} < 1000 =$

5
11
17
23
29
35
41
47
53
59
65
71
77
83
89
95
101
107
113
119

7
13
19
25
31
37
43
49
61
67
73
79
85
91
97
103
109
115
121
127
133
139
145
151
157
163
169
175

x < 10

35 ; 65 ; 125 ;
155 ; 185 ; 215 ;
245 ; 275 ; 305 ;
335 ; 365 ; 395 ;
275 ; 305 ; 335 ;
365 ; 395 ; 425 ;
455 ; 485 ; 515 ;
545 ; 575 ; 605 ;
635 ; 665 ; 695 ;
725 ; 755 ; 785 ;
815 ; 845 ; 875 ;
905 ; 935 ; 965 ;
995 ; 77 ; 146 ;
209 ; 275 ;
341 ; 407 ; 473 ;
539 ; 605 ; 671 ;
737 ; 803 ; 869 ;
935 ; 119 ; 221 ;
323 ; 425 ; 527 ;
629 ; 731 ; 833 ;
935 ; 161 ; 299 ;
437 ; 575 ; 713 ;
851 ; 989 ; 203 ;
377 ; 551 ; 725 ;
551 ; 725 ; 899 ;
245 ; 455 ; 665 ;
875 ; 287 ; 533 ;
779 ; 329 ; 611 ;
893 ; 371 ; 689 ;
413 ; 767 ; 455 ;
845 ; 497 ; 923 ;
539 ; 581 ; 623 ;
665 ; 707 ; 749 ;
791 ; 833 ; 875 ;
917 ; 959.

We deduce from the above the « non » prime numbers bellow than 1000:
25 ; 35 ; 49 ; 55 ; 65 ; 77 ; 85 ; 91 ; 95 ; 115 ; 119 ; 121 ; 125 ; 133 ; 143 ; 145 ; 155 ; 161 ; 169 ; 169 ; 175 ; 185 ; 187 ; 203 ; 205 ; 209 ; 215 ; 217 ; 221 ; 235 ; 245 ; 253 ; 259 ; 265 ; 277 ; 287 ; 289 ; 217 ; 221 ; 235 ; 245 ; 247 ; 253 ; 259 ; 265 ; 277 ; 287 ; 289 ; 295 ; 299 ; 301 ; 305 ; 319 ; 323 ; 325 ; 329 ; 335 ; 341 ; 343 ; 355 ; 361 ; 365 ; 371 ; 377 ; 385 ; 391 ; 395 ; 403 ; 407 ; 413 ; 415 ; 425 ; 427 ; 437 ; 445 ; 451 ; 455 ; 469 ; 475 ; 481 ; 485 ; 493 ; 497 ; 505 ; 511 ; 515 ; 517 ; 527 ; 529 ; 533 ; 535 ; 539 ; 545 ; 551 ; 553 ; 559 ; 565 ; 575 ; 581 ; 583 ; 589 ; 595 ; 605 ; 611 ; 623 ; 625 ; 629 ; 635 ; 637 ; 349 ; 665 ; 667 ; 671 ; 679 ; 685 ; 689 ; 695 ; 697 ; 703 ; 707 ; 713 ; 715 ; 721 ; 721 ; 725 ; 731 ; 737 ; 745 ; 749 ; 755 ; 763 ; 767 ; 775 ; 779 ; 781 ; 785 ; 791 ; 713 ; 715 ; 721 ; 725 ; 731 ; 737 ; 745 ; 749 ; 755 ; 763 ; 767 ; 775 ; 779 ; 781 ; 785 ; 791 ; 793 ; 799 ; 803 ; 805 ; 815 ; 817 ; 833 ; 855 ; 841 ; 845 ; 847 ; 851 ; 865 ; 869 ; 871 ; 875 ; 889 ; 893 ; 899 ; 901 ; 905 ; 913 ; 917 ; 923 ; 925 ; 931 ; 935 ; 943 ; 949 ; 955 ; 959 ; 961 ; 965 ; 973 ; 979 ; 985 ; 989 ; 995.

2) To determine the prime numbers bellow than 1000 :

We deduce from the above the prime numbers bellow than 100:
2 ; 3 ; 5 ; 7 ; 11 ; 13 ; 17 ; 19 ; 23 ; 29 ; 31 ; 37 ; 41 ; 43 ; 47 ; 53 ; 59 ; 61 ; 67 ; 71 ;73 ; 79 ; 83 ; 89 ; 97 ; 101 ; 103 ; 107 ; 109 ; 113 ; 127 ; 131 ; 137 ; 139 ; 149 ; 151 ; 157 ; 163 ; 167 ; 173 ; 179 ; 181 ; 191 ; 193 ; 197 ; 199 ; 211 ; 223 ; 227 ; 229 ; 233 ; 239 ; 241 ; 251 ; 257 ; 263 ; 269 ; 271 ; 277 ; 281 ; 283 ; 293 ; 307 ; 311 ; 313 ; 317 ; 331 ; 337 ; 347 ; 349 ; 353 ; 359 ; 367 ; 373 ; 379 ; 383 ; 389 ; 397 ; 401 ; 409 ; 419 ; 421 ; 431 ; 433 ; 439 ; 443 ; 449 ; 453 ; 457 ; 461 ; 463 ; 467 ; 479 ; 487 ; 491 ; 499 ; 503 ; 509 ; 521 ; 523 ; 541 ; 547 ; 557 ; 563 ; 569 ; 571 ; 577 ; 587 ; 593 ; 599 ; 601 ; 607 ; 613 ; 617 ; 619 ; 631 ; 641 ; 647 ; 653 ; 659 ; 661 ; 673 ; 677 ; 683 ; 691 ; 701 ; 709 ; 719 ; 727 ; 733 ; 739 ; 743 ; 751 ; 757 ; 761 ; 769 ; 773 ; 787 ; 797 ; 809 ; 811 ; 821 ; 823 ; 827 ; 829 ; 839 ; 853 ; 857 ; 859 ; 863 ; 877 ; 881 ; 883 ; 887 ; 907 ; 911 ; 919 ; 929 ; 937 ; 941 ; 947 ; 953 ; 967 ; 971 ; 977 ; 983 ; 991 ; 997.

.

Note :

Verification : « table et répartition des nombres premiers inférieurs à 10 000 (via-Google) ».

3) **To determine the prime numbers bellow than 100:**

a) To determine the "supposed" prime numbers bellow than 100:

$$Esp_{<100} = \left\{ (2\ ;\ 3) < 100\ ;\ (6n + 5\ ;\ 6n + 7) < 100 \text{ avec } n\varepsilon \{[o\ ;\ E\left(\frac{100-7}{6}\right) \cap N]\right\}$$

$E\left(\frac{100-7}{6}\right) = E\left(\frac{93}{6}\right) = 15$; the couple (95; 97) is the last couple.

$$\Rightarrow Esp_{<100} = \left\{ \begin{matrix} (2\ ;\ 3)\ ;(5\ ;\ 7)\ ;\ (11\ ;\ 13)\ ;\ (17\ ;\ 19)\ ;\ (23\ ;\ 25)\ ;\ (29\ ;\ 31)\ ;\ (35\ ;\ 37)\ ;\ (41\ ;\ 43) \\ (47\ ;\ 49)\ ;\ (53\ ;\ 55)\ ;\ (59\ ;\ 61)\ ;\ (71\ ;\ 73)\ ;\ (77\ ;\ 79)\ ;\ (83\ ;\ 85)\ ;\ (89\ ;\ 91)\ ; \\ (95\ ;\ 97). \end{matrix} \right\}$$

b) To determine the "non" prime numbers bellow than 100:

M = 100

$$Enp_{<100} = \begin{cases} [6i + 5] \times [6j + 5] < 100 , i ; j \, \varepsilon \{[o ; E(\frac{100-25}{30}) \cap N]\}^2 ; \\ [6i + 7] \times [6j + 7] < 100 , i ; j \, \varepsilon \{[o ; E(\frac{100-49}{42}) \cap N]\}^2 ; \\ [6i + 5] \times [6j + 7] < 100 , i ; j \, \varepsilon \{[o ; E(\frac{100-35}{42}) \cap N]\} \text{ and } \\ \quad j \varepsilon \{[o ; E(\frac{100-35}{30}) \cap N]\} \end{cases}$$

•$[6i + 5]_2 x [6j + 5]_2 < 100$, i ; j ε{o ; 1 ; 2}².
•$[6i + 7]_1 x [6j + 7]_1 < 100$, i ; j ε{o ; 1}².
•$[6i + 5]_1 x [6j + 7]_2 < 100$, i ; j ε {o ; 1 ; 2} and j ε{o ; 1}.

25;
5 5 55;
• $[6i + 5]_2 \times [6j + 5]_2 < 100 = \begin{bmatrix} 5 \\ 11 \\ 17 \end{bmatrix} \times \begin{bmatrix} 5 \\ 11 \\ 17 \end{bmatrix} < 100 = \begin{Bmatrix} 25; & 55; & 85; \\ 55; & 121; & 187; \\ 85; & 187; & 289 \end{Bmatrix}$
55; 187;
121; 289
18

c) To determine the prime numbers bellow than 100:

We deduce from the above the prime numbers bellow than 100:

2 ; 3 ; 5 ; 7 ; 11 ; 13 ; 17 ; 19 ; 23 ; 29 ; 31 ; 37 ; 41 ; 43 ; 47 ; 53 ; 59 ; 61 ; 67 ; 71 ; 73 ; 79 ; 83 ; 89 ; 97.

4) To determine the prime numbers between 100 and 1000 :

$$Ep_{100 < M < 1000} = Ep_{< 1000} \setminus Ep_{<100}$$

We deduce from the above the prime numbers between 100 and 1000:

101 ; 103 ; 107 ; 109 ; 113 ; 127 ; 131 ; 137 ; 139 ; 149 ; 151 ; 157 ; 163 ; 167 ; 173 ; 179 ; 181 ; 191 ; 193 ; 197 ; 199 ; 211 ; 223 ; 227 ; 229 ; 233 ; 239 ; 241 ; 251 ; 257 ; 263 ; 269 ; 271 ; 277 ; 281 ; 283 ; 293 ; 307 ; 311 ; 313 ; 317 ; 331 ; 337 ; 347 ; 349 ; 353 ; 359 ; 367 ; 373 ; 379 ; 383 ; 389 ; 397 ; 401 ; 409 ; 419 ; 421 ; 431 ; 433 ; 439 ; 443 ; 449 ; 453 ; 457 ; 461 ; 463 ; 467 ; 479 ; 487 ; 491 ; 499 ; 503 ; 509 ; 521 ; 523 ; 541 ; 547 ; 557 ; 563 ; 569 ; 571 ; 577 ; 587 ; 593 ; 599 ; 601 ; 607 ; 613 ; 617 ; 619 ; 631 ; 641 ; 647 ; 653 ; 659 ; 661 ; 673 ; 677 ; 683 ; 691 ; 701 ; 709 ; 719 ; 727 ; 733 ; 739 ; 743 ; 751 ; 757 ; 761 ; 769 ; 773 ; 787 ; 797 ; 809 ; 811 ; 821 ; 823 ; 827 ; 829 ; 839 ; 853 ; 857 ; 859 ; 863 ; 877 ; 881 ; 883 ; 887 ; 907 ; 911 ; 919 ; 929 ; 937 ; 941 ; 947 ; 953 ; 967 ; 971 ; 977 ; 983 ; 991 ; 997.

Conclusion:

The results of this work (the integral article…) permit us to have simple method for:
Determining the prime numbers smaller than and given integer.
Determining the prime numbers between two integers..
Understanding the even prime
Building the chain of the prime numbers…

Note: There are two other articles and the four articles form a book entitled entitle the natural numbers.

Combatting Food Insecurity on a Mid-sized Public University Campus in the Midwest

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Abstract

The purpose of this paper is to share case study results on the impact of a campus garden and food pantry in relieving food insecurity. Students and faculty at a rural university in Western Kansas took steps to decrease food insecurity on the college grounds through the establishment of a campus garden and food pantry. Over a two-year period, the garden was relocated and expanded to provide easy access to faculty, staff, and students. The campus food pantry was enhanced to include fresh and frozen foods and well as staple items. Survey results showed an increase in participation of both the garden and food pantry over the two-year period.

Keywords: Food Insecurity, Hunger, College, Campus

Introduction

Students, faculty, and staff at a rural state comprehensive institution in Mid-western Kansas have been committed to addressing food insecurity issues faced by students, faculty, and staff. The Victor E. Garden was created to provide greater access to fresh produce for the campus community. A campus food pantry, known as the Tiger Food Exchange, was set up to provide access to food and information about food and hunger issues. The initial implementation of both the Victor E. Garden and Tiger Food Exchange were a result of students with a desire to combat perceived food insecurity on the college campus. In response to interest, the administration at this rural University formed the Campus Food and Hunger Initiatives Committee, comprised of faculty, staff, and students across several disciplines, and charged with

addressing food insecurity across campus.

Review of the Literature

Several studies have highlighted the concerns faced by food-insecure students. Project coordinators in this case study desired to create avenues for accessible food sources for students, faculty, and staff struggling with food insecurity. Martinez (2016) concluded that students in the California University system were more likely to experience food insecurity than a typical household. Food insecurity affects students in a number of areas. Reviewing both a suburban and urban community college, Maroto (2013) found that over 50% of participants were food insecure. In a further evaluation, Maroto's research noted that food insecurity was associated with poor academic performance at the suburban site. The location for the case study in this article was a rural mid-western University that lacks the resources of an urban setting. Project coordinators desired to incorporate resources into their University that may be more readily available to students in urban institutions. Further compounding the need for resources was the committee's aspiration to address the health concerns caused food insecurity. Laitner et al. (2016), found that students experiencing food insecurity have poorer health habits while Hughes, Serebryanikova, Donaldson, & Leveritt (2011), found food insecure students rated their overall health lower than other students who considered themselves to be food secure.

Food insecurity is a problem in many countries, and food insecure individuals in the U.S., as well as abroad, may rely on food banks to alleviate that insecurity. For example, Tarasuk, Dachner, & Loopstra (2012) examined research and survey results surrounding the use of Canadian food assistance programs in conjunction with social assistance programs. Those authors contend that though food banks do not completely resolve the needs of food insecure individuals, ~~t~~he food bank legacy also appears intertwined with the social welfare state's deterioration in assuring adequate health and social security for its citizens" (p. 1414). This case study aimed to evaluate the use of a campus food pantry as a supplemental resource for food insecure individuals on a college campus.

Bazerghi, McKay, and Dunn (2016) conducted a systematic review of food bank use in addressing food insecurity. The authors note that ~~w~~hile food banks have an important role to play in providing immediate solutions to severe food deprivation, they are limited in their capacity to improve overall food security outcomes due to the limited provision of nutrient-dense foods in insufficient amounts, especially from dairy, vegetables, and fruits" (p. 732). Zick-Smith (2015) found that food rescues were a positive supplement for fruits and vegetables to food insecure individuals. A goal of the Tiger Food Exchange in this case study was

to increase fruit and vegetable consumption to students, faculty, and staff by utilizing the Victor E. Garden produce. The pantry in this case study addressed this issue by supplementing typical non-perishable food pantry items both through a Fresh Food Friday event and through supplementing the pantry supplies with fresh vegetables and herbs from the campus community garden.

Purpose of the Project

In 2014, the Campus Food and Hunger Initiatives Committee applied for and received a 2-year Healthy Living grant of $66,000 from the Kansas Health Foundation. The project goal included: 1) increased production of sustainably grown garden produce in the campus community garden, 2) expansion of healthy and fresh food options available in the campus food pantry, and 3) the availability of critical educational workshops to help obese and/or food insecure households to make better food choices on limited budgets. The grant team consisted of faculty from a variety of disciplines including Agriculture, Nursing, and Political Science. Three student coordinators were hired to oversee the garden, food pantry, and marketing.

Tiger Food Exchange

The Tiger Food Exchange is housed in the campus‘ Forsyth Library, and it provides an accessible, safe, and educational environment in which students, faculty, and staff can readily access healthy food as well as nutrition information. The library provides a centrally secure location for the food pantry. The pantry, which originally supplied only non-perishable goods such as canned fruits and vegetables, was expanded to include a space for fresh, refrigerated, and frozen foods. Both a refrigerator and freezer are now present in the pantry, and the pantry storage space houses two additional chest freezers. Meat is either donated or purchased through local vendors or from the University farm. The Tiger Food Exchange also provides a space to distribute garden produce.

The Fresh Food Fridays program is available during the school year on Fridays. Project staff and volunteers distribute fresh foods such as fruits and vegetables, string cheese, or yogurt cups. On occasion, project staff and volunteers prepare breakfast burritos, soups, or other small meals. Crockpots and hot plates are available in the Tiger Food Exchange for food distribution events. Over time the pantry has benefited from a wide range of community donations. These donations come from both the campus community as well as local businesses and churches. Vendors, including the campus food service provider, have been charitable in donating produce, refrigerated items, and canned goods that are nearing expiration.

The addition of a large office and storage space not only made it possible to add chest freezer space, but it also provided space for excess canned goods as well as toiletry and other donated items. The food pantry itself now has a smaller display of available products, which has reduced the opportunity for abuse and theft. When the entire stock of food was available in the pantry, we had experienced a minor problem with visitors to the pantry taking excessive volumes of food at one time as well as efforts to vandalize the chest freezer to access frozen meats. The smaller selection of available items in the pantry has diminished these abuses, and pantry staff are readily able to monitor the shelves and replenish as needed from items in storage. Food drives have become an amazing source of stock for the pantry. Faculty and staff participate in a food drive during the fall convocation while many student organizations hold food drives throughout the year.

Figure 1: Food donations in the pantry.

Figures 2-4: Fresh produce in the pantry refrigerator, canned goods in the pantry, and a meal served in the pantry courtesy donations from several local businesses, campus food service, and the Kansas Health Foundation grant.

Victor E. Garden

The Victor E. Garden provides the campus community gardening greenspace as well as a place to enhance gardening information and skill. The garden also provides healthy produce for the campus community. The Healthy Living grant provided relocation of the garden to a scenic, accessible area of campus. The garden space was expanded to increase the production and variety of vegetables, and raised beds were built to help with weed control. A storage shed and small greenhouse serve to house supplies and start plants. Drip irrigation and mulch make the garden more water efficient. A committee led by the garden student coordinator determines which types of vegetables to plant each year. The garden contains a variety of season extenders which allow students to start seedlings in early spring. Garden workdays and evenings are scheduled and shared with the campus community through emails. Easily available to consumers by walking or driving, patrons wishing to partake in produce volunteer time helping in the garden. An artistic bicycle rack is present to allow for bike access. The garden yields a variety of vegetables including herbs, peppers, tomatoes, squash, onions, carrots, and lettuce.

Figure 5: Spring raised beds with peppers and potatoes

Educational Workshops

Eight educational workshops over the two-year grant period offered students, faculty, and staff the opportunity to learn about healthy, low-cost eating. The educational topics included: 1) eating on a budget, 2) low-fat holiday cooking, 3) freezer cooking, 4) gardening in Kansas, 5) avoiding the Freshman 10, 6) safe canning, 7) crockpot cooking and 8) the history and future of the Victor E. Garden. Workshops were marketed across campus via email and through marketing flyers. These flyers were given in bulk to instructors for distribution in their courses.

Early in the two-year grant period, faculty determined that participation in educational workshops was lower than expected. Faculty prepared healthy meals in conjunction with the workshops to enhance attendance.

Workshop coordinators tailored menus around the topic presented. These efforts dramatically increased workshop attendance.

Evaluation Methods

Over the two-year period, coordinators evaluated the Victor E. Garden and Tiger Food Exchange through a Food Habits survey. Initially, these surveys were handed out at the Student Health Center. Due to initially low response rates, a revision to the Institutional Review Board (IRB) protocol allowed the grant team to distribute the surveys at both the Tiger Food Exchange and at the educational workshops. The Food Habits survey examined participants‘ eating habits and evaluated their use of the Tiger Food Exchange, Fresh Food Fresh Fridays, educational workshops, and the Victor E. Garden. Participants were

asked to estimate their

fruit and vegetable intake and to determine if their health was affected by insufficient access to healthy foods.

The educational workshops included pre- and post-surveys to evaluate each workshop. Before the educational workshops, participants were asked to rate their diet and to evaluate if the upcoming workshop had the potential for learning new information. Following the workshop, participants were asked if they would make a change in their lifestyle as a result of the workshop. Both surveys were approved by the University‘s IRB.

Results

The grant team wished to measure the number of survey respondents reporting no fruit or vegetable intake each day. During the first year of the grant, 13% of respondents reported eating zero fruits each day. During the second year of the grant, 8.7% of respondent report eating zero fruits each day. Likewise, during the first year of the grant, 17% of respondents reported eating zero vegetables each day. During the second year of the grant, only 6% of respondents reported eating zero vegetables each day. Project initiatives aimed at increasing fruit and vegetable consumption included: 1) stocking the Tiger Food Exchange with canned fruits and vegetables, 2) growing fresh vegetables in the Victor E. Garden, 3) distributing Victor E. Garden produce in the Tiger Food Exchange, 4) offering the Fresh Food Friday program, 5) posting nutritional information that emphasized the importance of eating fruits and vegetables, and 6) offering educational programming that emphasized the value of eating fresh fruits and vegetables.

Additionally, the grant team desired increased use of the Tiger Food Exchange. Information regarding student, faculty and staff use of the Tiger Food Exchange was collected as part of a food insecurity survey conducted each year for four consecutive years. In 2015, 12.8% of the respondents reported that they had accessed the Tiger Food Exchange and 5.8% of the respondents reported that they had accessed the Victor E. Garden. Campus participation was encouraged through numerous efforts to raise campus-wide awareness of the Victor E. Garden and Tiger Food Exchange. Activities included: 1) communication efforts (social media, news media, web presence, local news stories, weekly campus-wide emails), 2) adding food and hunger information/activities to the "First 40 Days" Freshman Experience program, 3) educational programs,
4) Fresh Food Friday programs, 5) relocating the pantry to a visible spot in the library, and 6) re-locating the garden to a significantly more visible location on campus. The Food Insecurity Survey has not been administered since 2015, so it is not known whether pantry usage has increased, but anecdotal evidence suggests that awareness and use of the pantry have increased since 2015.

Finally, the grant team wished to increase healthy eating habits across the campus community. This

objective was measured through a survey question that looked at the participants‘ eating habits. During the first year of the grant, 19% of participants reported that they did not engage in healthy eating habits. During the second year of the grant, 13.8% of participants reported that they did not engage in healthy eating habits. Factors that contributed to the success of this objective include: 1) the availability of food in the Tiger Food Exchange, 2) the popularity of the Fresh Food Fridays program, 3) the purchase of pork and other meats made available through the pantry, 4) the purchase and posting of nutritional posters in the pantry, and 5) educational programming.

Limitations

Surveys were handed out at the Student Health Center, Tiger Food Exchange, and during educational workshops. Surveys, though voluntary, were available to students, faculty, and staff each time they entered a venue. The grant team acknowledges that while the surveys showed positive results for each objective, the research design did not allow for tracking of individual results. Therefore, participants were not tracked from year one to year two and may have answered the survey more than once.

Conclusions & Applications to other Venues

Campus use of and support for this project has been fantastic. Sustainability of the projects has been assured through the enhanced financial commitments of the institution and the local community. Keys to success included the employment of reliable student coordinators and clear communication with the campus community regarding pantry needs and volunteering opportunities. The grant team is excited to continue this project with the support of the student body and institution.

Project coordinators offer this case study as an important contribution to the literature, offering a successful model for combatting food insecurity on a college campus. Project coordinators assert that this model applies to a variety of venues across the world. The implementation of a food pantry and community garden can be translated to other settings including workplaces, churches, community social service programs, and schools. The help-and-take philosophy allows for the continuation of resources despite limited financial support from the institution. Ingredients for success include available land and water as well as participants willing to collaborate for a community effort. As seen in this case study, the results can increase fresh food and vegetables to food insecure individuals.

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Influence of Instructional Strategies used by Teachers in Implementation of Life Skills Education Curriculum on Academic Performance in Public Primary Schools in Matinyani Sub-County, Kitui County, Kenya

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ABSTRACT

The purpose of this study was to evaluate the influence of instructional strategies used by teachers in implementation of life skills education curriculum on academic performance in public primary schools in Matinyani Sub-County, Kitui County Kenya. Descriptive survey research design was adopted for this study. The target population was 27 head teachers and 81 class teachers in Matinyani sub-county. Simple random sampling method was used to select 81 class teachers and purposive sampling was used to select 27 head teachers to get a representative sample of 108 respondents. Questionnaires and interviews were used to collect data. Data was analyzed using statistical package for social sciences (SPSS) version 21.0 and presented in tables and charts. The findings were that most of the primary school teachers do not use participatory instructional strategies in teaching life skills education and this affects the overall academic performance of the pupils. The ministry of education should ensure implementation of life skills education curriculum in order to promote participatory learning. The findings of this study will shed light to all educational stakeholders in promoting quality education.

Key words: Instructional strategies, Implementation, Life skills, Academic performance

1. Introduction

Education is the means by which individuals are equipped with knowledge, skills and values that enable them to become productive citizens. Education is therefore very important in the development of both the individual and the nation. Early childhood and adolescence stages of life are critical formative years for the development of behavior and skills in an individual (UNICEF, 2010). During this period, learners in preschool and primary schools, including those with learning difficulties face varied challenges that need to be addressed. These challenges among others include negative peer pressure, gender bias, violence, early marriages, teenage pregnancies indiscipline, early sexual onset, drug and substance abuse, rape, incest and the HIV Aids pandemic. These challenges are compounded by various factors such as complex developmental changes during adolescence, lack of positive role models, negative mass media influence and inadequate and unreliable sources of information especially on human sexuality. A combination of these challenges render the youth vulnerable to social and health risk , such as HIV infection and other

related sexuality transmitted disease (WHO, 2010). Life skills education equips an individual with the ability to cope and overcome psychological and social challenges in the course of life.

Many countries are now considering the development of life skills education in response to the need to reform traditional education systems which appear to be out of step with the realities of modern social and economic life. According to WHO (2011) wide-ranging application of life skills education in primary prevention of violence in schools and student drop out has resulted to better foundation for learning skills that are in greater demand in today‘s society. Throughout the Eastern and Southern Africa Region (ESAR), there has been a growing awareness that life skill education for children and adolescents have for a long time been largely; neglected in education programmes. The formal education system prioritizes the imparting of academic knowledge. However, it has become increasingly clear that such prioritization of academic knowledge without acquisition of psychosocial skills is an inadequate way of preparing young people for complex challenges that exist in our world today. Mondo (2006) says that for effective curriculum implementation there is need to change the attitudes of policy makers, administrators and teachers. Therefore there is need for the pupils to be able to develop positive values, attitudes, skills and behavior in order to help them effectively deal with the challenges of everyday life.

In Kenya, the Ministry of Education (MOE) has long been aware of the need to adopt life skills education as a remedy to these psychosocial challenges. The main goals of the life skills approach is to enhance young people‘s abilities to take responsibility for making choices, resisting negative peer pressure and avoiding risk behavior. Through life skills education, learners are expected to acquire and develop skills such as critical thinking, problem solving, decision making, interpersonal relationships stress and anxiety management, effective communication, self-esteem and assertiveness (Arends, 1997). The teaching method should be learner centred learner friendly, gender sensitive, interactive and participatory.

The life skills education syllabus and the teachers guide suggest that teachers use participatory teaching and learning methods in which learners identify their own problems, discuss solutions, plan and carry out effective action programme (MOE, 2012). The participatory teaching and learning methods assume that learning is best achieved by actively involving learners during lessons. According to studies of Abobo (2012), the findings show that the participatory teaching and learning strategies recommended for the teaching of life skills education which includes: case studies, brain storming, field visits, pen discussions, storytelling, song, group discussion debates, posters, role play, games, projects, poetry recitals and drama.

Although the life skills curriculum is an excellent idea, its proper implementation is not automatically guaranteed. Good innovative programmes have failed in the past because of flaws in the implementation process. The implementation of life skills curriculum in primary schools will therefore prepare pupils to be able to attain both the vision 2030 and millennium development goals of education.

2. Objective of the study

This study aimed at establishing the influence of instructional strategies used by teachers in implementation of life skills education curriculum on academic performance in public primary schools in Matinyani Sub-County

3. Methodology

This study adopted a descriptive survey research design. The study targeted a population of 27 head teachers and 3 class teachers from each school of the 27 public primary schools in Matinyani Sub County. A total of 108 respondents were selected by use of purposive sampling and simple random sampling. Questionnaires and interviews were used for collection of the desired data whose analysis was done using SPSS version 21.0. Percentages and frequencies were employed in data analysis whose results were presented in tables.

4. Results and Discussions of the Study

The study sought information on the influence of instructional strategies used by teachers in implementation of life skills education curriculum on academic performance in public primary schools in Matinyani Sub County. To achieve this objective the respondents were required to indicate the instructional strategies used in their schools in teaching life skills. The results were as shown in Table 1

Table 1
Instructional Strategies used in Teaching Life Skills Education

Strategy	Frequency	Percent (%)
Participatory	48	44.4
Non- Participatory	60	55.6
Total	**108**	**100.0**

Table 1 shows that majority (55.6%) of teachers used non-participatory strategy in teaching life skills education while 44.6 % used participatory strategy where pupils are involved in the learning process. Some of the participatory strategies include: storytelling, drama, role play, reciting poems among others. This made the pupils to like the life skills education.

The researcher further obtained responses where the respondents indicated the extent to which they agreed with the following statements on a scale of 1 to 5 where, 1- Strongly Disagree, 2- Disagree, 3-Neutral, 4 Agree and 5- Strongly Agree

The results were as shown in Table 2.

Table 2: The Extent to which Instructional Strategies are used in Teaching Life Skills Education

Statement	1	2	3	4	5
Teachers use participatory instructional strategies to improve pupils' academic performance	3(8.3%)	3(8.3%)	2(5.6%)	10(27.8%)	18(50%)
Pupils enjoy classes where they are involved in the learning process	2(5.6%)	3(8.3%)	2(5.6%)	9(25%)	20(55.6%)
Pupils are not motivated to attend lessons where they don't participate in the learning process	10(27.8%)	5(13.9%)	4(11.1%)	6(16.7%)	11(30.6%)
Teachers are encouraged to use participatory instructional strategies	2(5.6%)	3(8.3%)	1(2.8%)	10(27.8%)	20(55.6%)
Mean responses	**4(11.1%)**	**3(8.3)%**	**2(5.6)**	**9(25%)**	**18(50%)**

Source: Researcher Field Data (2016)

Table 2 shows that 50% of the respondents strongly agreed that teachers who use participatory instructional strategies improve pupils' academic performance and pupils enjoy those classes where they are involved in the learning process. Also pupils are not motivated to attend lessons where they will not participate in the learning process and teachers are not encouraged to use participatory instructional strategies. Participatory instructional strategies enable pupils to interact with each other as well as the teacher thus creating interest in the learning process. Therefore there is need to implement life skills curriculum because it is likely to improve academic performance of learners even in other subjects.

These results agree with Abobo (2012) who argued that the participatory teaching and learning methods recommend for the teaching of life skills education which includes: field visits, brainstorming, pen discussions, storytelling, songs, group discussion, debates, role play, projects, poetry recitals and drama. Teaching in classroom is not a one-off encounter. Therefore teachers are required to develop procedures for regulating the complex dynamics of pupil-pupil and teacher-pupil relationships. This is well achieved through the use of participatory instructional strategies in Life skills education which is transferred to other subjects. Participatory instructional strategies allow teaching to convey messages and values that may reach well beyond those of the particular learning tasks which give a lesson in its formal focus. By sharing life skills, pupils become more effective and able to discover their own strengths and interests in life.

The study revealed that more than half of the schools use non participatory methods of teaching and this hinders pupils' retention. This means that pupils are not properly guided in the acquisition of skills such as decision making, conflict resolution and communication skills. As a result pupils are unable to reach full personal development which has implication on the overall academic performance.

5. Conclusion

Based on the findings of this study, it can be concluded that most of the primary school teachers in Matinyani Sub County do not use participatory instructional strategies in teaching life skills education. This affects the pupils' interest in learning as well as the overall academic performance. Additionally, both teachers and pupils spend much time in non participatory instructional strategies where pupils have little or no time to build social skills away from books. Worse still, the pupils rely on teachers wholly to provide knowledge because learning is basically teacher centred making the pupils passive recipients of knowledge as they only listen to the teacher.

6. Recommendations

The following recommendations emanated from the findings of this study:

i. Curriculum planners, developers and designers should evaluate the various instructional strategies for teaching and learning to ensure holistic development of a learner.

ii. The Ministry of Education should ensure implementation of life skills education curriculum is done appropriately within the time frame of each level. At the same time, teachers should adhere to the appropriate implementation of curriculum in order to ensure participatory learning.

iii. Learning should be natural for the learners to get actively involved in the learning experiences.

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The Sandcastle Classroom: An Aesthetic Perspective of the Classroom as Temporary Art

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Have you ever seen a sandcastle? I mean a professional-sandcastle-artist sandcastle?

Millions
upon millions
upon millions
of little pieces of rock
stone
sand
that come together making one single cohesive larger-than-life marker?
An Ebenezer of the imagination.
It is packed
pressed
molded
with care and consideration to every little piece
feature
detail.
Yet its temporality is striking
perplexing.
What would possess one to spend hours
upon hours
upon hours
assembling the layers[i] of that piece of art
with the full knowledge that with the first
heavy rain
big wave
mischievous teenager
it will topple
tumble
return
back to the ground to once again become a smooth
flat
shapeless
pathway for the many thelassophiles frequenting the sandy beach?
The sand castle creator is keenly cognizant
mindful

aware
of the impermanence of their creation.[ii]
What exists in the very act of creation that brings them satisfaction
pleasure
fulfillment?

What is it that they hope to share with the few who will participate in the enjoyment of their masterpiece? What is it that gives the creation of this temporary piece of art value?

It is with the sandcastle in mind that I engage with John Dewey[iii], Drew Leder[iv], Kenneth Burke[v], Elaine Scarry[vi] and others in a dialogue around the notion of the classroom as a piece of temporary art. This ~~e~~ssay" suggests that the act of lesson planning, executing the instruction, and all experiences in a classroom compose a form of art, and the temporal unfolding and passing of the classroom climate and gathering of particular students is likened to other forms of temporary art such as a sandcastle. The teacher is the artist. Classroom activities are the medium. The students are the audience. What has been cultivated is a carefully planned piece of art. I suggest that viewing the medium[vii] of classroom activities through the lens of temporary art can encourage the teacher to create a class that is not only more engaging and stimulating, but more valuable, and inspires the teacher to take great care in the creative crafting of the classroom culture.

The Classroom as Art

To sing is to perform
display
enact
my skills for others to see
observe
participate
with, me.
To paint
draw
carve
is to create a tangible
touchable
tactilic
expression of some idea
thought
value
that is important to me.
In the very creation of this art I celebrate the union of past
present

future,[viii]
and I communicate
transform
interact
with those who witness and result in the experience.[ix]

To teach is to perform
display
enact
my knowledge for others to gain
glean
gather
with, me.
To instruct
lecture
lead
is to create an abstract
tangible
practical
expression of some idea
thought
value
that is important to humanity.
In the very creation of this art I celebrate the union of past
present
future[x]
and I communicate
transform
interact
with those who witness and result in the experience;[xi]

Creating doors to learning[xii]

I do not remember the details of first class that I ever taught. I do know it was a home school speech class that was organized through a local home school co-op. I adapted the lesson plans of my high school speech teacher to make them fit my schedule and the ability or inability of my students. I used some of the same activities, some of the same assignments, and most of the same lesson plans. I was a mini-Mrs. Basinger. I do, however, remember many details from my first experience teaching a college class some five or six years later. I used the generic course syllabus, and was required to give the same assignments

and exams. However, the lesson plans were largely my own. I used original in-class activities, Power Points, and teaching methods.

I compare this to the first song I played on the guitar. John Denver‘s (or Peter Paul & Mary‘s if you prefer) *Leaving on a Jet Plane.* My dad taught me the chords of G, C, and D, and then showed me what order to play them and how to strum the strings. This song became my ―go-to" party song, and to this day I enjoy playing it for a crowd. Looking ahead 4-5 years to when I wrote my first original song, I see similarities in my evolution as a teacher and my evolution as a musician. The first song I wrote used the chords G, C, D, but also incorporated F#m, and A. The melody was distinctly different, but the song as a whole was in the same key and followed the same basic pattern: Verse, chorus, verse, chorus, verse, chorus, partial chorus. I can‘t say that I did that intentionally, but I modeled my song after what I knew and liked. Dewey asserts that this is part of what art is; taking the known (old) and adding to it the unknown (new) in utilizing a medium to elicit fresh meanings and experiences.[xiii]This is the basic premise behind how people learn and retain information.[xiv]The value of art comes from this need for something new.[xv]

When I taught that first college class, I took a little of what I had been taught, and incorporated my own style and ―flair for the dramatic" (a direct quotation from my Rate My Professor page) to make a new classroom that is distinctly mine. This comparison between songwriting and teaching leads me to consider the teacher as an artist, and the classroom as the work of art.

There are many elements in the process of teaching that resemble artful expression, and many characteristics of the classroom that may embody aesthetic activity. Dewey says the very act of doing can be art.[xvi] He further suggests that the quality of the activity is what propels the ―doing" to have value.[xvii]In my opinion, few accomplishments have greater value than enabling students to operate successfully in the world.

The very act of coming together[xviii]in a classroom to learn and experience humanity together is art.[xix]Dewey echoes Aristotle in *The Poetics*[xx]in arguing that a major component of art is the selection of significant material.[xxi]Is this not what a teacher does when planning their lessons? We browse through our accumulated knowledge and decide which material is paramount in the context of what we hope our students will learn. We then arrange that information in the manner we believe will be most effective for the students to experience it. It is this process that Kenneth Burke argues is a part of the ―crescendo" of our experience.[xxii]

Dewey makes perhaps the most compelling argument for the classroom as a form of art when he writes ―It is by way of communication that art becomes the incomparable organ of instruction."[xxiii]He continues to acknowledge what I also consider a travesty: viewing education in this way is seldom done, and is to some repelling.[xxiv]The presence of imagination in the instruction of a classroom should be embraced and utilized by instructors as it is a part of human discovery.[xxv]George Braque makes a usefully perplexing statement: ―Art is meant to disturb."[xxvi]In being disturbed, we are challenged to question the way we thought something was. This should be the role of a teacher: to challenge his or her students to think outside of their current understanding and combine that old knowledge with the new,[xxvii] thus teaching them and expanding their knowledge – a disturbance of their status quo.

The Temporality of Teaching

I sense the impermanence
taste the staleness
touch the empty chairs
hear the silent room
smell the lingering mix of body odors and cologne and perfume
left by the students who have just walked out of the classroom on this last day of class.
I mourn the ~~l~~oss" of my friends, for some of them have become like friends.
Faces I have seen every other day for the past 15 weeks
become faces I might see as I walk to lunch
sip coffee
am out for a drink.
I mourn the ~~l~~oss" of the created culture that has been the bedrock
basis
foundation
for every word that comes from my mouth in that room.
The space will never again be the same.
It will be different
I will be different
they will be different
changed
transformed.
I mourn the ~~l~~oss" of my well-spent energy
time
effort
thoughts.
Those bodies will never again be together in that way.
They have received from me what I developed and served with them
and gleaned only what they could in such a short amount of time.
Our time was brief
fleeting
momentary
And in the midst of this temporality – I find art.

I have made what I believe to be a strong case for the classroom as an art form through the eyes of John Dewey. However, the classroom holds more in common with the notion of temporary art than it does with the more traditional arts. The classroom is a temporary medium. A touring exhibit in the lives of students. Not unlike sidewalk chalk, or an ice sculpture, or the Tibetan monks who meticulously place grains of sand to create one of the most beautiful artworks the planet has seen, only to mix the colored particles back together shortly after completion.

If the classroom is experienced with the senses, as we can easily agree it is, we must consider that the senses fade.[xxviii] They are temporary. Embodied experiences only last for a moment or two. Keeping in

mind the short amount of time that a teacher/artist has their students/audience under their direct influence, we cannot ignore that the sensational experiences sponsored by the teacher are only but a fleeting moment in the students‘ lives. Not to mention that very time spent in class each day, the experiences themselves, are a sensory experience that lasts only as long as the 50 or 90 minute class period.

This distinction between the classroom as temporary versus permanent is important to grasp when you consider that the intent of the artist who creates a permanent art fixture is very different from that of an art piece made with full awareness of its fragility and impending passing. We, as beings, continually keep the endgame in mind.[xxix] Artists are no exception. Yet, with an endgame that will not last, purpose can be questioned. A painter has a creation that can be displayed for people to see for thousands of years (assuming it is carefully preserved). The wood carver has a figurine or cigar box that can be set on a shelf and enjoyed or used for generations. The sand artist, on the other hand, has a castle that will soon be as flat and formless as when he started. Their checkmate moment looks very different than that of their counterparts.

The teacher has several weeks, or in some cases months, to design and plan a three or four month long interactive art piece that will be a powerful medium for a time. However, following the last day of class as the students take their final exam, give one last presentation, or engage in one more discussion, the art, the experience, is over. Gone. Kaput. The culture and environment that the teacher/artist so carefully crafted and executed ceases to exist. Only in very rare cases will those same students ever be in the same class with that same teacher again.

Deana Dannels writes that, as a teacher, she recognizes her impermanence.[xxx] ―I‘m there then gone" she says, drawing attention to the *fact* that we are but a ―blip on the student‘s screen."[xxxi]This is not easy to grasp, because we hope that we will have a lasting impact on the lives of those persons who enter our classroom. Yet no matter what we do, there is only so much our audience members will retain. However, this contingency should not prevent us from executing the highest quality of art/classroom that we can possibly create.

At the end of the semester, I sit back and hope that what I have said, what we have done together, and the lessons I imparted on the students will stick. I have no control over the twenty-five or so young people who have devoted their time to me. Selfishly, I think of the time I devoted to them. I gave them at least four months of my attention - likely more, considering the preparation I have done before the semester began. I toiled over the lesson plans. I stayed up late making PowerPoints. I thought until my brain hurt trying to come up with a way to manipulate materials in my medium to relate everything to course content[xxxii]and to ideas that I can only hope they find important. I sweat in un-air-conditioned classrooms. I bled from paper cuts. These four months were laboriously spent creating an environment that is conducive to learning, creating a class culture where students feel like they can ask questions and learn from each other, creating activities that will not only teach a topic, but complement the preceding lesson and prepare students for lessons to come. Only to have them walk away and never look back.

The Artist/Teacher

The teacher is an artist.

They create a culture
climate
environment
personality
in which students
other people
an audience
can learn
grow
understand each other and the subject at hand.

There is no stopping knowledge
creativity
growth
in my classroom.
I strive to thrive.
I strive to bring a light
to the dark minds
of bright people who
never knew
what they were missing.
I create
imagine
conjure.
I think
teach
learn
repeat.

The teacher is the artist. The artist and teacher alike labor and toil over the details of what they want their creation to look and feel and smell and sound like. I, the artist/teacher, desire to impress upon my audience/students a message[xxxiii] and I must select the best medium for the occasion. Which color do I use? Which activity do I lead the class in? What means do I employ? What type of senses to I utilize? Oil? Videos? Chalk? Lecture? Canvas? Discussion? Wood? Experiential activity? Interactive art? Interactive space? No matter the medium, I can create art that is formed for a purpose,[xxxiv] that is chosen carefully for maximum impact.[xxxv]

The possibilities are endless. There are many media that an artist/teacher can utilize to impact their audience/students. Each educator employs the medium they are most accustomed to, or find most effective, for the medium carries the whole of the art.[xxxvi] A painter would be amiss to attempt a wood carving if he or she had no experience putting blade to wood. A teacher would be at a disadvantage trying to write a beautiful lecture for a graduate school seminar if he or she had never taught more than reading to 1st graders. Teachers/artists must know their strengths and their guiding philosophies,[xxxvii] but must also know what methods suit their students. An artist must prepare the channel for those who will receive

it.[xxxviii]

Take the sandcastle artist. In order to make a beautiful sandcastle, the sand artist must prepare.[xxxix]They must plan their location, not too close to the shoreline, but close enough to have easily-accessible water, gather supplies such as buckets, molds,[xl] and other tools. They have to pick the right day, and time of day to avoid weather that would prematurely destroy their creation. The sand artist has to painstakingly layer sand combined with just the right amount of water in just the right place.[xli]No two sand creations will be the same; the density and coarseness of the sand is different at every beach.[xlii]Additionally, of course, a sand artist must plan what their sandcastle will look like.[xliii]The process is tedious but highly rewarding. When they have completed the castle, they step back, take a picture,[xliv] and allow nature to run its course. This is how the sand artist punctuates their experience.[xlv]

Take the classroom teacher. In order to make an effective classroom, the instructor must prepare. They must prepare the room arrangement[xlvi], desks not too close together, but close enough to foster appropriate discussion, gather supplies[xlvii]such as PowerPoints, handouts, expo markers, and video clips. They must consider the time of day and budget their time in class carefully to avoid overloading students with information that would devour their attention span. The teacher has to painstakingly consider every student and their learning style, and the best way to engage with the content. No two classrooms will ever be the same; the demographics and personalities of the students are different every semester. Additionally, of course, a teacher must plan to shape what their classroom culture will feel like.[xlviii]The process is tedious but highly rewarding. When they have completed the semester, they step back, enter grades, and allow nature to run its course. This is how the teacher punctuates their experience.[xlix]

Gloria Anzaldua contends that we are ~~–p~~regnant with story", (Dewey says ~~–p~~regnant with meaning"[l]) and that it is the imagination that consummates that story.[li]This illustration of being with child, carrying in our womb a story or meaning, speaks of the teacher/artist's responsibility to allow their imagination to impregnate their mind with the gift to share a narrative. That newborn story not only will be valuable but essential to the students/audience. It is a responsibility of the teacher to serve a dose of the ~~–m~~edicine of art"[lii] that cures our audiences of a lack of knowledge with a ~~–tr~~ansformative power".[liii]Yet, without the catalyst of imagination to spark that story of the knowledge we hope to share, we, and consequently our students, are left barren.

It is clear to me that the role of the artist is quite similar to that of the teacher. In fact, I see no reason why they are not inseparable. It is in the use of imagination that the teacher and the artist become one.

The Student/Audience

What is the students' part
role
responsibility
in the art
creation
collage of education?
The classroom space is their museum.
They come to the classroom to witness

partake
consume
the creation of the teacher
who is witnessing
reveling in
beholding
the creation of the pupil.
If this is the endgame[liv]
it should go by another name.
It is not an end, but a beginning.
It is a place where students can experience self
and experience others
simultaneously,[lv]
while simultaneously being dared to recognize truth.[lvi]
This experience is not passive
inactive
docile.
It requires something of the audience/student.

On a visit to Chicago some years ago I went into one of the city's many art museums. There were a number of interactive art pieces that asked patrons of the museum to touch, change, and participate in the art. Ever since then I have been fascinated with interactive art. The classroom is no exception. The question here is what part do the *students* play in this particular style of art? This interactive artwork cannot exist without an audience, and this audience is the reason for the art. Without it, I would not teach/create. Without the audience I would simply be talking to myself. This would still serve a purpose, as art for the sake of art is still important.[lvii] I would ~~b~~become vicariously the receiving audience".[lviii]However, in the case of a teacher, there is considerably less value in delivering a lecture to an empty room.

The mind does not know that it does not know.[lix]This is the state of the student. As a doctoral student, I have often referred to a particular practice or theory as ~~n~~ew" only to be reproached by a professor saying that the idea has actually been around for quite a while. It was not a new idea, but it was new to me, and I had no idea that I didn't know what I didn't know until I did. It took my experience with the knowledge of the more educated than I to bring my work in progress to ~~c~~ompletion"[lx] – if such completion is ever possible. Yet the teacher alone could not make me learn, I had to play a part. The part of an inquisitive receiver of a message from a source – the three parts of Dewey's description of art.[lxi]

The art that takes place in the classroom is consumed and digested by eager recipients; or shall I say participants. Yet without the attentiveness of the student/participant, the art may as well be rote memorization. The quality of the art/classroom does not rely solely on the artist/teacher. The participant/student must also invest time and artistic energy into the consumption of and engagement with the artist's creation. When the class has ended, they will never again be able to relive that experience, save in careful reflection of what imagination has left behind.[lxii]

When students come into the space, they must learn together and participate in class. This engagement

with the art created by the teacher positions students as an active audience. They participate in the lecture by listening, watching, and internalizing the material. They participate in the activities by speaking, sharing, and responding to the ideas. They participate in the content as they digest, reflect on, and apply the principles to their assignments and hopefully to their life.

It seems as though it could go without saying, but I feel inclined to emphasize that the student/participant must show up. Without the presence of the audience, the art may as well be chicken scratchings. Many teachers have encountered the absent student who e-mails later that day –Did I miss anything important?" This question perplexes me endlessly. If I have been successful in creating a meaningful installment in my series of art/classes, it is not sensible nor practical for me to relay to the student what they missed without reenacting the entire class. The best I can do is tell them the topic of what we talked about, direct them to the assigned readings, and relay to them pertinent housekeeping items. It would be like a person skipping a trip to MoMA and asking what they missed. The most obliging response might offer is, –Paint and other mediums on canvas and other surfaces forming images of objects and ideas with various color and texture." If this barebones description of MoMA is as pathetic to you as it is to me, rest assured that I accord the same value to participation in my classroom/art as I do in an attentive visit to MoMA.

Without the student/participant, the teacher/artist would have no purpose for their art. The student is the reason a teacher exists. What has been cultivated by the teacher is a carefully planned piece of art that has the single purpose of developing the personhood of the student. The needs of students, their need for knowledge, must be satisfied.[lxiii]Still, let us not forget the necessary role of the student in this interactive art: to participate, receive, and co-construct the message of the sender.[lxiv]

The Co-Creation of the Art/Classroom

Learning
Thinking } Simultaneously
Teaching

Simultaneously we experience self and other[lxv]
communicate
capitulate
to the call
of the course
on which we have set our sights.
No fight is too small
for us all
to take together.
Were it not for a teacher who taught me to
think
teach
learn
repeat

I would not have a fighting chance,
and my pupils would not have a fighting chance.
They are just a glance
away from finding out that there are other ways to succeed
accomplish
do,
though far less rewarding.
The experience they embody when they walk into my classroom
will never leave them;
Or so rests my hope.
When it is over, I throw
them to the lions
in hope that they can muster the prayers of a Daniel
to shut the mouths of the ravenous beasts
that would feast
on ignorance
naivety
bliss
that blinds the mind's eye.

Were it not for the artist who stands in front of the room
and shares their knowledge
experience
ideas
hopes,
and the audience who observes
interacts
responds,
each member of this community would topple like a sandcastle with the first light rain.

I started a theatre company some years ago and have created an audience, as Dewey would say,[lxvi] that has some level of expectation when they come to my shows. Anzaldua develops this concept through the eyes of an author who ~~m~~must write what readers haven't been taught to read yet."[lxvii] I did not start my theatre with what I thought my audience would want to see. I started it with something *I* wanted them to see. I have created that audience by building a reputation and proving a standard. Those patrons now come to see my shows to see art. The audience is eager to participate in my live theatre. This shared experience of the artist (myself) and the audience (my patrons) is parallel to the shared experience of the teacher/artist and the student/audience. The creator must adapt to the audience, but the audience must be guided to appreciate and respect the created.

Bill Rawlins suggests that teaching is a ~~w~~way of knowing about human communication."[lxviii] You cannot separate the act of teaching from the act of learning. Dewey argues that ~~in~~ great art, there is no limit set to the individualization of parts within parts."[lxix] In any art – interactive, fine, theatre, the classroom – each participant, both teachers and students, plays a role that adds depth and value to the completion of

the work being done. To suggest that one or the other stakeholder is of greater importance devalues the ~~–re~~making of the experience of the community"[lxx] that can only exist in the unity of individuals.[lxxi]The classroom must be a collaborative effort between the teacher/artist and the student/audience as they are continually crossing into each other's worlds.[lxxii]

Final Thoughts

A sandcastle with all its beauty
charm
temporary status
will inevitably cease to exist;
leaving nothing but a memory.

But a classroom that is art with all its ideas
knowledge
temporary locale
will hopefully never be forgotten;
Leaving everything inside a memory.[lxxiii]

You see a sandcastle and a classroom are *not* the same.

I call the classroom temporary art, yes, but it is an art that lasts.

It is not a sandcastle classroom.

It is a soft sculpture that can be put on display in the lives of those who participated in it.

It may be changed over time.
With new tools
knowledge
facts
life
acts
of a new artist.
The world becomes alive
as I experience the world[lxxiv]

When the student becomes the artist
That is the end of the classroom
and the beginning of a new bloom.
When the once audience member becomes the performer
the nursery of their budding youth germinates and yields to the orchard of the ripe fruit.

The trite has no home here.

The fight has begun here.
The role of the former artist has been completed.
Their experience has been punctuated.
A new classroom has begun even for the new artist, the former audience/participants.
Not just one in which they are an artist, but a different classroom in which they are the pupil.
The teacher can now learn from the pupils.

So where does this leave us? There must be some greater value to this perspective of a not-so-sandcastle classroom/art. As with any project, art or otherwise, but specifically art, I must learn from each completed piece. Just as I talk to the patrons of my theatre to hear what they liked and/or disliked about the production, a teacher must do the same with their students. Serious reflection[lxxv] and self-assessment as an instructor is vital to progress,[lxxvi] but gaining valuable insights from students and even colleagues who may have observed you teach can help the artist in you. While it would be foolish to think that every single class/artwork I teach/create is, as a whole, better than the last, it is not foolish to believe that I am a better teacher/artist for revised and repeated offerings. Whether you are a first-time teacher, a tenured professor with 30 or more years under your belt, or anyone in between, considering your classroom as art that can be refined time after time is crucial to your success and the success of your students. You must become a better artist every time. We must become better artists every time.

Secondly, the whole matter of the classroom as a piece of temporary art comes down to your attitude as an artist. Artists have a message, a medium, and an audience.[lxxvii] As teacher/artists, what we do to send that message in our chosen medium to the students entrusted to us determines the fate of knowledge. If teachers were not artists, but instead were scientists who created formulas for learning, or skilled laborers who master a subject and deliver a blueprint for learning, or machines that simply memorize information and facilitate the transfer of that information, there would be no genuine learning. No construction of knowledge. No understanding of application and personal growth. Human progress requires more than individuals knowing their part in the world and executing their role with the perfection of *Brave New World.*

Teaching as art and the teacher as an artist is not a new concept. I can see it in the teachers and classrooms that have led our world to where it is today. The greatest influencers of the ancient, classical, or modern worlds are not products of rote memorization, they are artists. In their eyes, the world was their canvas on which to created innovative change and progress. Sophocles, daVinci, Bono, Maya Angelou each have made contributions to the progress of the world either through their art, or in some cases fields entirely separate from their training. Such artists have made a wiser, smarter, humanized, and hopefully more caring world. Not every artist/teacher will have the impact of these ―greats.” You and I should not be disappointed when we do not explicitly see the same results as these names. That should not stop us from striving to create artwork that speaks meaningfully to those who would participate: our students. We rest in the knowledge that ―Education has remained the most crucial contributor to social, political and economic development of any nation,” one student at a time.[lxxviii]

It is here in the final paragraph of this essay that the analogy of the sandcastle classroom begins to crumble, making way for a more stable future. There is evidence that the temporality of the classroom has

permanent results. ―Works of art are elaborate mechanisms for defining social relationships, sustaining social rules, and strengthening social values."[lxxix] This is the very essence of a classroom. A classroom is quite an elaborate mechanism that establishes relationships in a society, forms social rules that the teacher and student must operate under, and instills values that students carry with them into society. The art ―does not cease when the direct act of perception stops",[lxxx] but rather it is evoked as a substance that ―can enter the experiences of others and enable them to have more intense and fully rounded experiences of their own."[lxxxi] At the end of the semester when my students leave the classroom for the last time, and they cease to physically perceive me and the knowledge I possess and share, they carry with them the meaning that will only continue to become clear after my work is done.[lxxxii] One goal of every teacher/artist should be to make, create, foster, be, a work of art.

My students may forget me.
They may forget what I said
    did
        shared.
Yet I will think of them every day.
If not by name, I will carry with me the lessons
    ideas
        meaning
they have given me.
I carry with me the hope
    desire
        faith
That they also pack in their daily bags some residual imagination[lxxxiii]
left behind by my humble instruction.
Going forward
        onward
            upward
I pledge to teach
    speak
        share
The knowledge I have learned
        created
        generated.
There is much more to be learned
    created
        generated.
I hope that others can teach
    speak
        share
the knowledge they discover.

My classroom/art is a challenge to me.
My classroom/art is a challenge to my students.

All art, aids in the creation of a collective life.[lxxxiv]

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[i] Bill Knight, professional sand castle creator, personal conversation with the author, November 22, 2016.

[ii] Ibid.

[iii] John Dewey, *Art as Experience* (New York: Penguin, 2005).

[iv] Drew Leder, *The Absent Body* (Chicago: University Chicago Press, 1990).

[v] Kenneth Burke, *Counter-Statement* (Berkley: University of California Press, 1968).

[vi] Elaine Scarry, *The Body in Pain: The Making and Unmaking of the World* (Oxford: Oxford University Press, USA, 1985).

[vii] Ibid,198.

[viii] Ibid, 17.

[ix] Ibid, 22.

[x] Ibid, 17.

[xi] Ibid, 22.

[xii] Ibid, 76.

[xiii] Ibid, 109.

[xiv] Ronald Yaros, ―Is it the Medium or the Message? Structuring Complex News to Enhance Engagement and Situational Understanding by Nonexperts,"*Communication Research* 33, no.4 (2006): 288.

[xv] John Dewey, *Art as Experience* (New York: Penguin, 2005), 109.

[xvi] Ibid, 222.

[xvii] Ibid, 232.

[xviii] Ibid, 17.

[xix] Ibid, 32.

[xx] Judith Yaross Lee, personal conversation with the author, December 1, 2016.

[xxi] John Dewey, *Art as Experience* (New York: Penguin, 2005), 216.

[xxii] Kenneth Burke, *Counter-Statement* (Berkley: University of California Press, 1968), 45.

[xxiii] John Dewey, *Art as Experience* (New York: Penguin, 2005), 361.

[xxiv] Ibid.

[xxv] Elaine Scarry, *The Body in Pain: The Making and Unmaking of the World* (Oxford: Oxford University Press, USA, 1985), 306.

[xxvi] George Baraque, *Le Jour et la Nuit (The Day and the Night),* (Paris: Gallimard, 1952).

[xxvii] John Dewey, *Art as Experience* (New York: Penguin, 2005), 109.

[xxviii] Drew Leder, *The Absent Body* (Chicago: University Chicago Press, 1990), 38.

[xxix] Ibid, 33.

[xxx]Deana Dannels, *8 Essential Questions Teachers Ask: A Guidebook for Communicating with Students,* (New York: Oxford University Press, 2015), 200.

[xxxi] Ibid.

[xxxii] Brandi N. Frisby, and Matthew Martin. ―Instructor-Student and Student-Student Rapport in the Classroom."

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[xxxiii] Kenneth Burke, *Counter-Statement* (Berkley: University of California Press, 1968), 54.

[xxxiv] John Dewey, *Art as Experience* (New York: Penguin, 2005), 198.

[xxxv] Ibid, 216.

[xxxvi] Ibid, 203.

[xxxvii] Ibid, 333.

[xxxviii] Ibid, 102.

[xxxix] Bill Knight, personal conversation with the author, November 22, 2016.

[xl] Ibid.

[xli] Ibid.

[xlii] Ibid.

[xliii] Ibid.

[xliv] Ibid.

[xlv] William Rawlins, lecture notes, September 12, 2016.

[xlvi] Selma Dagtas, "Factors Affecting Student Success in Small Collage-Classroom Settings," *International Journal for Innovation Education and Research* 2, no. 12 (2014): 120.

[xlvii] Erinn Bentley, "The Wish List: Articulating and Responding to New Teachers' Concerns," *English Journal* 102, no. 3 (2013), 35.

[xlviii] Christine W. Koth, Catherine P. Bradshaw, and Philip J. Leaf, "A Multilevel Study of Predictors of Student Perceptions of School Climate: The Effect of Classroom-Level Factors," *Journal of Educational Psychology* 100, no. 1 (2008), 96.

[xlix] William K. Rawlins, lecture notes, September 12, 2016.

[l] John Dewey, *Art as Experience* (New York: Penguin, 2005), 123.

[li] Gloria Anzuldua, *Light in the Dark/Luz en lo Orscuro: Rewriting Identity, Spirituality, Reality* (London: Duke University Press, 2015), 26.

[lii] Ibid, 10.

[liii] Ibid.

[liv] Drew Leder, *The Absent Body* (Chicago: University Chicago Press, 1990), 33

[lv] Gregory Shepherd, *Communication as Transcendence* (Thousand Oak, California: Sage Publications, 2006), 25.

[lvi] Drew Leder, *The Absent Body* (Chicago: University Chicago Press, 1990), 107.

[lvii] Kenneth Burke, *Counter-Statement* (Berkley: University of California Press, 1968), 63.

[lviii] John Dewey, *Art as Experience* (New York: Penguin, 2005), 111.

[lix] William K. Rawlins, lecture notes, September 19, 2016.

[lx] John Dewey, *Art as Experience* (New York: Penguin, 2005), 110.

[lxi] Ibid, 111.

[lxii] Elaine Scarry, *The Body in Pain: The Making and Unmaking of the World* (Oxford: Oxford University Press, USA, 1985), 306.

[lxiii] John Dewey, *Art as Experience* (New York: Penguin, 2005), 226.

[lxiv] Ibid, 111.

[lxv] Gregory Shepherd, *Communication as Transcendence* (Thousand Oak, California: Sage Publications, 2006), 25.

[lxvi] John Dewey, *Art as Experience* (New York: Penguin, 2005), 109.

[lxvii] Gloria Anzuldua, *Light in the Dark/Luz en lo Orscuro: Rewriting Identity, Spirituality, Reality* (London: Duke University Press, 2015), 110.

[lxviii] William, Rawlins, "Teaching as Evidence of Learning," *Western Journal of Communication* 60, no. 2 (1996), 188.

[lxix] John Dewey, *Art as Experience* (New York: Penguin, 2005), 212.

[lxx] Ibid, 84.

[lxxi] Ibid, 212.

[lxxii] Gloria Anzuldua, *Light in the Dark/Luz en lo Orscuro: Rewriting Identity, Spirituality, Reality* (London: Duke University Press, 2015), 79.

[lxxiii] John Dewey, *Art as Experience* (New York: Penguin, 2005), 145.

[lxxiv] Drew Leder, *The Absent Body* (Chicago: University Chicago Press, 1990), 166.

[lxxv]Barbora Popovicova, "Application of Self-Reflection in Education of Pre-Service Teachers," *International Journal for Innovation Education and Research* 4, no. 2 (2016), 19

[lxxvi] Nida Denson, Thomas Loveday, and Helen Dalton. "Student Evaluation of Courses: What Predicts Satisfaction?" *Higher Education Research & Development* 29, no. 4 (2010): 339.

[lxxvii] John Dewey, *Art as Experience* (New York: Penguin, 2005), 111.

[lxxviii] Ibrahim Khatete, "Education Has Remained the Most Crucial Contributor to Social, Political and Economic Development of Any Nation," *International Journal for Innovation Education and Research* 2, no. 2 (2014), 21.

[lxxix] Clifford Geertz, *Local Knowledge: Further Essays in Interpretive Anthropology* (New York: Basic Books, 2000), 99.

[lxxx] John Dewey, *Art as Experience* (New York: Penguin, 2005), 145.

[lxxxi] Ibid, 113.

[lxxxii] Ibid.

[lxxxiii] Elaine Scarry, *The Body in Pain: The Making and Unmaking of the World* (Oxford: Oxford University Press, USA, 1985), 306.

[lxxxiv] John Dewey, *Art as Experience* (New York: Penguin, 2005), 84.

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Intertwining Development concepts and Socio-Cultural Alienation: An ethno-linguistic analysis of cultural identity Crisis in Sub-Saharan African Countries

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Abstract

It would be inappropriate to discuss issues of development without taking an overview of some of the factors that influence it. From our analysis of development strategies and projects carried out in developing countries, a study of the views and concepts of development in various parts of Africa south of the Sahara in general and Cameroon in particular reveals a tremendous degree of cultural value degradation. This study seeks to show to what extend popular notions of development lead to cultural alienation but without any real social impact in developing countries. In this study, I will equally analyse the prevailing situation of acculturation in Cameroon, provide some salient examples of adulterated development models which have not helped in reducing the general poverty index of the country.

The paper equally has as objective to demonstratethat western concepts of development are at the centre of African cultural alienation and how this shift is more of disillusionment.

Revisiting what some scholars like Verhelst (1990) Gheddo(1973) have clearly demonstrated in their works that the Western concept of development is a cultural illusion inferring that Africans should consider themselves as not only consumers but also creators of their own meaningful development independently of the western ideologies, this paper thus examines the implication of such a situation within the global context of cultural alienation, and the limited technological developments observed in African states south of the Sahara.

Key words: Cultural Alienation, disillusionment, environmental discrepancies, folkloric epiphenomenon, cultural imperialism.

1. Introduction

Insistences on the cultural uniqueness of different peoples abound in linguistic variance, cultural differences, and technological capacities, social and environmental discrepancies. These aspects have been used to legitimize an international division of development and to maintain the current international economic order. The problem in my understanding is not this division but what seem to, or what is happening to this order. For me, if I should go by the above working definition of development, there appears to be a very close link between development and cultural identity. Let us therefore tackle it,

within the framework of defining the term culture, whose very ambiguity reveals its extremely polysemic nature. This is vital, since the argument of the present paper relies essentially on a broad definition of culture before extending to cross-cultural communication. It is, therefore, not a question of culture in the narrow sense of the word, seen as a prestige commodity often reserved for an elite, or as a more or less folkloric epiphenomenon, but of culture in the wider sense of the word. In this respect, culture is actively present in every aspect of life: know-how, technical knowledge, customs of food and dress, religion, mentality, values, language, symbols, socio-political and economic behavior, indigenous methods of taking decisions and exercising power, methods of production and economic relations, and so on. It is important for us to include these concepts since the theories of development employed up till now often presuppose a much narrower notion. Though some international organizations like UNESCO and development agencies like USAID publications give the appearance of being aware of this problem by stressing the need to respect the local culture of communities, a closer look shows that what they mean by this boils down to art, music, dance and literature. Western development scholars have not really acknowledged that each people might have, as Gboku & Lekoko(2007) put it, ~~–a~~ technical, socio-economic and juridico-political culture which is peculiar to them and which it is wrong to suppress, even in the name of development" or democratic reforms. Present strategic programs geared towards sustainable development are having damaging effects on the cultural values that water the life spring of African nations and makes western development concepts the greatest catalyst of African cultural alienation

1.1. UNDERSTANDING DEVELOPMENT: AFRICAN SOCIOCULTURAL PERSPECTIVE.

The basic problem of African countries south of the Sahara, that has ever relinquished them from the landmark of global development to the dreaded status of unprogressive stagnated nations of the world is not in my opinion underdevelopment which is a result and not a cause just like the persistent multiphasic world economic/political crisis and the inadequacies of the international organizations network. The basic problem as analyzed is the assassination of African civilizations whose societies up till date are in a state of identity crises, lost in the wilderness of development like a body without a soul. It is time that African political leaders, economic planners and social development experts torn between their original societies, that they have to serve and another or other mirage-societies which they rely on for support and towards which they are irresistibly attracted for being colonial masters of nations or who have pledged total support for the governments in exchange for the natural resources of the lands. It is time that these opinion leaders ask themselves certain questions; they who make absolute decisions in the name of their people, it is time they asked themselves if their choices are more valid than the profound needs and aspirations of the vast majority of their populations.

This is a real challenge for present African decision markers if they have to move African nations out of the present devastating economic situation. There is no doubt that our present leaders are aware of the fact that current development policies lead to the destruction of the personality and integrity of the African peoples which, in certain aspects, is even more serious than that brought about by colonization. In this same vain, Bhola and Gômez (2008) in *Signposts to literacy for sustainable development* declare

that:

All over the planet, the cultural integrity and vitality of the different human groups find themselves threatened by development strategies which stress economic growth and institutional efficiency at all cost…. Too often the values of the developing nations are irredeemably damaged by models of social change based on consumption, competition, acquisition and on the manipulation of human aspirations.

UNESCO, conscious of this state of affairs has been seeking a new approach to development and cultural preservation through programs like the World Decade for Cultural Development 1988-97, to try to promote a global approach to development. Other international Organizations like the Society for International Development have also come up with cultural identity preservation programs, but disturbingly remains the difficulty of preserving African cultural values which are not only nerve binders for these communities but the very canons on which any sustainable African development concept must be nailed on if it has to bring about some meaningful changes.

Regrettably, after fifty years of mis-development being celebrated under the banner of African nations fifty years of independence, many African scholars especially those who have studied abroad and understand the values of social development are becoming more critical on the catching-up theory of development which conspicuously is guilty of excessive Eurocentrism. It is unnecessary here to reiterate this theory of development-as-Westernization of Africa, which has not only failed in its ambition to rescue Sub Saharan Africa from poverty, but also dangerously increased its dependence in economic, political and cultural terms as well as, in certain cases, accelerated the disturbing depletion of its natural resources and quality of life.

What is less obvious is that the theory of dependence and the practice of self-development resulting from a process of independence are also tainted by a kind of cultural imperialism which is all the more persistent for being unconscious in the minds of many African leaders or members of governments who believe themselves to be anti-imperialist. The failure to set up a strong cultural policy that reinforces a determined and constructed self-reliance development strategy has rendered African cultural frames weak and vulnerable to western concepts that rather annihilate and devastate our cultures - the social fabrics on which genuine African development must be built.

2. DEVELOPMENT: A CULTURAL ALIENATION

Cultural groups and social scholars have recently been sounding the alarm with increasing frequency. Not only do they feel their cultural identity threatened by the ideology and the alienating mechanisms of international capitalism, but also by the weight of globalization which does not only have a devastating effect on youths behavior but equally neglects the people‘s cultural and spiritual heritage.

Relating to the works of African social development consciousness-raising literacy programs, Desmond, S. and Elfert, M. (2008) argue that, when development programs are not rigorously applied to shared cultural values and principles, they lead to the compulsory introduction of foreign ideas. According to them,these foreign ideas allow an unconscious surfacing of the key words which are problematic for the members of a given community, and the use of these words to awaken a critical, militant awareness regarding the alienation and exploitation to which they are subjected. There is a tacit recognition in

practice that these programs do not fit into the culture of the groups in question. One might be tempted to well ask if the result is not the imposition of a new depository of concepts whose contents are meant to be liberating but whose origins are foreign. One falls back into a bank account perspective, where one gives and the other receives, one thinks and the other is thought. That is why understandable, programs of this nature are doomed to failure.

When I look around me, the reality of this statement can be seen in the histrionic projects ranching from HIV/AIDS to the Roll Back Malaria, initiated and implemented by the Cameroun government since 2003 and where expected results have never been achieved due to over domineering Western ideologies in the conception and implementation strategies. Although there have along been many Cameroonians involved in the development and implementation phases of these projects, they themselves are so ignorant aboutparticular local culture that ended up as socio-cultural barriers to the overall implementation of the projects and obtaining the expected results. The general tendency in Cameroon is that, when people from different ethnic groups or culture are called to implement a project in a different region other than that of their ethnic origin there is bound to be a social resistance to the project no matter the impact the incidence may have on the receiving population.

The failure of so many rural extension programs in Sub-Saharan Africa is also a cause for concern. The cases are rare, too rare in terms of the efforts expended of peasant or urban groups genuinely engaged in a radical process aimed at liberation in the long term. At the macro-social level, results are even poorer. Without underestimating the responsibility of imperialism in the situation, one is forced to acknowledge that attempts to resolve the problem – independent trade unionism, militant peasant movements, civil rights committees, liberation projects – are both rare and precarious. It must be admitted that solidarity work and NGO projects in Sub Saharan Africa seldom arouse much enthusiasm. So many failures baffle those who would like to see the African masses liberate themselves from exploitation, hunger and sickness.

So many blighted hopes in sub-Saharan Africa call for a critical look at reconciling development and indigenous culture, to carry out an in-depth analysis of the extent to which the revolutions that have taken place, the regimes that have resulted from them and the programs launched by those regimes have been of a truly indigenous, and therefore popular, nature. For the disciples of globalization, a concept that developing nations are still struggling to fit themselves into without any real power to bargain what so ever to their advantage, this critical appraisal or in-depth analysis also involves a personal examination of conscience.

Should development move the receiving communities from their sociocultural norms or should it reinforce these norms with foreign insights - Eurocentrism and mimicry?

The theory and practice of development as modernization and catching-up have mainly failed in their bid to help the masses of the developing nations. On the contrary, they have helped to maintain and even aggravate the often appalling social conditions in which they find themselves. The approaches resulting from analyses and strategies of development as liberation reveal shortcomings, partly due to Eurocentrism considered as imperialistic. Since nearly all models of development are conceived from the lens of Western preconceptions the indigenous cultures of the receiving communities have been largely

neglected. There is an urgent need to pay much greater attention to these than we have in the past. The reason being that, when communities do not match development programs with their immediate needs, any attempt to impose such a project will infringe on their customary life style and provoke resistance to the change needed.

For any development program to be sustained within the Sub Saharan African context, there is the need to recognize the enduring quality of indigenous cultures and discovering their vitality. Without this, we will be unable to appreciate the extent to which they succeed in putting up a fearful resistance to development projects conceived in the West, a resistance which often explains the mishaps that befall such projects. We therefore notice how indigenous cultures are more than just obstacles to a development that tries to impose cultural alienation.

2.1. INDIGENOUS CULTURES AS FOUNDATIONS FOR ALTERNATIVE DEVELOPMENT

We shall look here at their powers of resistance and creative vitality in the realms of global economy. In the vast area of social life, a choice has to be made, since it is impossible to deal with everything here. The choice fell on traditional forms of practical know-how as an aspect of social life. It may well be that people‘s capacity to ensure their self-development and, particularly, their self-sufficiency in food, may depend on recognizing this know-how.

African nations‘ indigenous cultures contain within them the seeds necessary to give birth to societies which differ from the standardized and devitalized model that has spread over the world. But what exactly are these differences?

In defining what characterizes non-Western/Northern peoples and distinguishes them from whatever constitutes both the beauty and the deficiencies of the European/American spirit, the Indian philosopher Panikkar has used the terms *anthropocentric* and *cosmocentric*. The distinction is a useful one since from it derives everything one can say of Western development ideology when, embarking on the great adventure of globalization, he places himself at the centre of the universe: his linear as opposed to cyclic conception of the universe; his need to conquer nature and others as opposed to a taste for harmony with the environment; the priority accorded to doing and having as opposed to a sense of being. For some, it all began with the Sophists, the Greek philosophers of the 4th century BC who propounded the following: ―have the strongest possible desires and find the means to satisfy them”. Since then, growth and progress have never stopped, along with material consumption.

Henceforth, unlike the cultures of other continents, the only relationship man will envisage with nature is that of domination, and he will never cease to aspire to and covet the omnipotence of the gods.

This is what Garaudy calls the ―secession of the West”, implying by this that the other peoples of the world possess a set of common values different from those now prevailing in the West. It is these people who inhabit what is nowadays called the Third World or sometimes politely framed as developing countries.

Culture and tradition is the hallmark of African civilization. Whereas the scientific and technological West tends to reduce the world to a collection of objects to be mastered, the African concept of development sees it as a single body to which it itself belongs. The African world has a fundamentally

different conception of the human body and nature, of development and history. People do not look so much to the future as to the past or rather the present in all its profundity. This is not the case with Western /Northern concepts of development which are very different from the rest of the world which they are in the questdominate and –develop" in the belief that they are bringing _civilization'. Nowadays we are realizing that, although there has certainly been intense cultural deracination and a great deal of borrowing, there has been, for all that, no real process of Westernization in depth.

2.2. AFRICAN DEVELOPMENT INITIATIVE WITHIN THE GLOBAL CONTEXT

That Africans possess specific preconceptions and methods of economic organization is beyond doubt. What is less clear and much more problematic is the way values and patterns of traditional economic behavior have endured in their complex modern societies.

In sub Saharan Africa, failures to increase productivity are countless. One African in two suffers from hunger. A recent study devoted to Cameroon, but which is relevant to all sub-Saharan Africa, shows that the situation has greatly deteriorated in the last thirty years. The real value of Cameroon's Gross National Product now reaches only one-third of that of 1990. The agricultural sector has regressed in absolute figures and in relation to other sectors of the economy, especially the non-productive ones. Unemployment has increased in a public sector with 60% of youth population unemployed. The average worker's salary is now worth less than 60% of its value in 1990. Transport and marketing systems have been disarticulated. Hence the importance of unofficial, alternative channels of income and provisioning, especially since the cost price of cash products is too low to be an incentive for farmers. The disparity between town and country, between certain advantaged regions and the rest of Cameroon and between the privileged minority and the masses has been accentuated. Vast areas of the interior have been virtually excluded. The same study is crammed with negative examples: the deforestation of increasingly large areas outside the towns, the de-electrification of the urban centres of the interior, the de-equipping of rural areas, and so on. The growth in productivity that Africa so urgently needs has therefore not been achieved. It is this which absolves the cultural question of any accusation of being academic or irrelevant, whatever the _realists' may think. In reality, instead of progress in Cameroon/ Africa, there often seems to have been deterioration, regression with regard to the imported economic model and, notably, a return to an economy of self-subsistence.

Some private companies employ their staff for only a few hours a day so as to allow them to work the family land or kitchen garden, which often seems to be the only sure source of subsistence. Thus monetary economy is losing ground and in some places one witnesses the partial return of the barter system. The African peasant's economic behavior patterns seem to involve a delicate balancing act between the economic rationality prevalent in the West and certain non-rational social pressures or even beliefs which escape the more utilitarian, materialist and individualistic logic of Western capitalism. Understanding this rationality from outside poses two problems: one has to abandon a technico-rational view of the world meanwhile avoiding the pitfall of the myth of paradise lost that ignores the harsh reality of the power relationships in play (mechanisms of exploitation and domination, and so on). Obviously, the recession witnessed in Africa cannot be exclusively attributed to non-progressive

rationality. If peasants return to self-subsistence, it is also due to the fact that galloping inflation and persistent devaluations of local currencies have eroded the value of money and that the continual exploitation of the peasantry by the towns has ended by making them ‗delink'. But recognizing these factors does not allow us to dismiss certain alternative socio-economic patterns of behavior.

The African is so anxious to maintain the harmony of the social group to which he belongs that he brings into play a series of subtle behavior patterns whose aim is to avoid excelling or being superior, which would endanger the coherence of the group. Those who have worked in the field have observed this attitude, whether it be in matters of economic production or in any other domain. The sense of community takes precedence over individualism and the competitive spirit.

Development projects in Sub Saharan Africa often fail because they set up exogenous structures and try to introduce goals which are alien to tradition and to the local perception of needs. The economic successes of ethnic groups like the Bamileke in Cameroon confirm the above. The basis of their success appears to have been their powerful tradition and an extremely close-knit kinship system.

Another subject that demands consideration is the number of central treasurers and ministers who have disappeared with public funds, the high prevalence of corruption, the extent to which public funds are misappropriated, all these reveal an attitude so widespread that it cannot be analyzed in ethnical terms alone, nor can it be solved solely by repressive measures. Surely it calls for consideration of the cultural aspect of the traditional African attitude to money. Are we not forced to see here a kind of non-cooperation with the monetary system, or, at least, a very different perception of it? The general tendency in Sub Saharan Africa is that, anyone who has access to money comes under great social pressure. He or she is obliged to share the benefits with his innumerable and less fortunate brothers and cousins. Misappropriation of funds is, therefore, not entirely a question of personal enrichment as in the West, but is rather a question of obligations of social solidarity deeply rooted in tradition. Loyalty to the clan is seen as more important than loyalty to the employer, whether it be the state, the capitalist boss or a development project.

3. AFRICAN SOCIOCULTURAL CONCEPTION OF ECONOMIC DEVELOPMENT

The question of a truly African conception of economy development has yet to be established. Hopkins rightly warns African intellectuals against ―eulturism" and merely looking to the past for solutions to Africa's current problems. He reminds them that whatever remains alive of African culture is in actual fact up held by a people oppressed and exploited by a system as modern as it is familiar, that must be resisted. While warning against romantic dreams about economics in the abstract, he himself, nevertheless, acknowledges that the problems confronting African people is the notion that Africans are negotiating reality with a Eurocentric consciousness. This Eurocentric consciousness, while projected as normal, is actually a major source of the social, political, economic, health and psychological problems of Africans. Hopkins believes that every African, man or woman, can make very good use of Western rationality and will not be indifferent to it as long as he or she does not feel their identity is being threatened. Having a long history of being plundered, they want to be sure of the path on which they are embarking; otherwise they prefer to stick to familiar things. It is their very survival that is at stake! Each

time the meaning of life is brought into question, the African will turn to traditional references. Hopkins, whom one could hardly accuse of being obsessed with the past, thus recognizes the importance and the persistence of African tradition.

This survival instinct is coupled with the great African myths and archetypes whose wisdom Europeans can vaguely perceive. But to do so, they must remove their blinkers. It is only thus that Western nation will cease to reproach so-called underdeveloped countries of their notorious _lack of initiative and responsibility‘. For their part, Western/Northern countries have paid a terrible price for progress. Sigmund Freud has given it a name: anxiety. Now, it must be pointed out that certain prohibitions peculiar to the West have no currency in the African village. There, the infant is king. The mother‘s breast is always nearby and available; the warm, constant presence of the mother gives the child a feeling of total security. To survive, it has only to melt into the maternal bosom represented by the group, the community. But the penalty to be paid for not making one‘s children unhappy, for not living under constant stress, is low yield per hectare, insufficient speed on the assembly line, both mortal sins vis-à-vis _the demands of global development‘.

Traditional patterns of economic behavior in Africa, and in many populations around the world survive and resist. Renouncing the accumulation of possessions, these communities esteem harmony above wealth, intuitively feeling that such accumulation will bring in its wake jealousy, conflict and fragmentation of the social body. This is not necessarily an idyllic attitude. The retaliatory measures taken in Africa against personal ambition are well known, as well as against creative imagination and originality. In this domain, accusations of sorcery play an effective and formidable role. It is not a question of idealizing traditional reality, but of finally recognizing it as such, different, disturbing and often full of a wisdom that the modern world could well use.

Reacting to the tendency of development activists to confuse poverty and misery, some people have tried to revalorize simple means and modest goals.

This is the case with Adama and Glanz (2010) who argue for a model of society not centered on the race for power and profit, but on a frugal well-being, incorporating the values of local culture. There is no question of denying the need to combat dire poverty of the kind that destroys body and soul, but of throwing new light on ways of life which, although not Western, are nonetheless far from worthless. On the contrary, such ways of life constitute the expression of peoples‘ culture and of their real aspirations. They are, therefore, apt to be more efficient, as is evidenced by the growing importance of the _informal sectors‘ in the economics of developing countries south of the Sahara.

What conclusions can we reach from these observations on the _convivial economies‘ of the Third world? Basically, that there are other economic cultures than those of capitalism or socialism. Non-Western cultures perceive economy in their own ways, which vary according to the productivist, individualistic, materialistic mentality. Such cultures are based on values of conviviality, sobriety and mutual aid, on mechanisms aimed at maintaining social stability at all cost, on acceptance of hierarchies and respect for the natural order, on a sense of solidarity reinforced by adherence to a particular lineal, residential or religious group. At times, these cultures are vehicles for an acute sense of equality, at other times for acts of jealous repression of any expression of individual success. They foster loyalty and sacrifice to other

ideals than those propounded by Western ethics.

It is important first of all not to make judgments, not to consider a particular characteristic inferior or superior. Rather, it is a question of observing closely, for these alternative economic behavior patterns are the cause of many failures as well as the key to unexpected successes. Today, an Africanist agronomist as well informed as some western scholars can state that growth in productivity will not be guaranteed by Western-style productivist agriculture. Perhaps it is not inevitable therefore, that the economic model currently dominant should spread across the entire planet. Nor indeed, is it desirable that it should spread, for even in the West this model is far from having proved its ability to produce, over and above the GNP, the famous _Gross National Happiness' that was dreamt of in at the verge of independence. Furthermore, because of the way it forcibly establishes itself everywhere, this model has become an obstacle to the right to be different.

There is much food for thought in all the preceding, not only for economists, state planners and development bureaucrats, but also for the organizers of urban and rural grass-roots communities, and all those engaged in relations of solidarity with them. Without abandoning their socio-economic analyses, NGOs must intensify their sense of dialogue and be on their guard against any inopportune tendency to expect others to display reactions and behavior patterns similar to those of their own Western culture. The enormous muddle that almost everywhere accompanies the introduction of foreign technology and machines is well known. Who has not come across _ready-to-operate' factories or other _turn-key' projects operating at less than half their capacity, or witnessed the tragi-comic spectacle of the tractor stranded somewhere in a village, rusted by tropical rains and already overgrown by weeds, parts of it having been rescued by the local blacksmith for some completely unrelated purpose? Not all foreign technology is good for African consumption.

3.1. THE CULTURAL DIMENSION OF TECHNOLOGY DEVELOPMENT

Traditional, non-imported agricultural systems have worked for centuries and managed in the past to feed the populations concerned. Today, malnutrition and famine are spreading, especially in Black Africa. This is due to various factors, such as wars and political instability, repressive governments, the exploitation of the countryside by the towns and their dealers, the deterioration of the terms of trade and the international economic (dis)order, the irregularity of rainfall and in certain cases, demographic explosions. But another, equally decisive factor is agricultural research and training. These generally emphasize cash-crops and recommend monocultures for export (coffee, tea, cotton, etc.) while ignoring the farming systems established over the ages by local populations. By farming systems is meant here the types of production which take into account climate, biological capital, soil and equipment and which assure productivity by means of specific combinations of soil and plant and by crop rotation and ingenious cyclical changes of location. The training given to peasants usually takes into account only the plant in question, killing off everything that surrounds it. In the tropics, such a practice is disastrous. This is why the local peasants practice polyculture, where everything grows side by side in apparent disorder but which produces the organic matter the soil needs. To the Western mind, poverty equals ignorance, one producing the other and vice versa. Moreover, as we have seen, _developers' consider virtually all non-Western life-styles as

tainted by _poverty‘. This belief is extremely widespread but is often a wrong, since Eurocentric interpretation of social reality, experts and general public alike constantly trot out insulting fallacies along the lines of _the minute you turn your back, the peasants, through mistrust or fickleness, do the opposite of what you told them; you can‘t trust these people; they are ignorant because they don‘t have any education, they‘re illiterate; they‘re poor and dirty because they‘re lazy; they have no sense of responsibility and need guidance; we have to teach them and take culture and education to them! These elitist reactions stem from an essentially apolitical conception of development according to which poverty is to be tackled only by means of rural adult education programs, functional literacy campaigns, courses on hygiene and nutrition, classes in embroidery and pattern cutting and so on. In certain contexts, such activities can be useful when they derive from a concept of liberation. Otherwise, they allow a discreet veil to be drawn over the real causes of the problems, too politically sensitive to be tackled. Progressive NGOs no longer make such mistakes. They have dismantled the economic mechanisms that cause poverty. But have they examined the cultural dimension of the problems? That is the question.

3.2. POLITICS: STATELESS NATIONS AND NATIONLESS STATES

If different peoples have developed their own specific cultural characteristics in the economic and technological fields, the same applies to the legal and political arenas. Although profoundly influenced by the Western juridico-political system that dominates all states in the modern world, tradition remains a factor that still has to be taken into account. It is not as though state organization was unknown before the arrival of the Whites. The Zulus, the Khmer and the Incas all had strong states. Other groups lived in societies without states, or had types of intermediate organization (chieftaincies enjoying varying degrees of power). Most, however, had in common the safeguarding of public consensus, the balance of power and, if necessary, regional autonomy. The authorities were _multiple, specialized and interdependent‘ states Etienne Le Roy, a specialist in African law. Nowadays, it has become obvious that most Africans hardly recognize themselves in the states their colonizers have bequeathed to them. Since the state sees itself as the driving force of development, the latter consequently finds itself profoundly handicapped. The frequency coups d‘état reveals not only the behind-the-scenes intrigues of neo-colonialism, but also the shallowness of the regimes‘ roots in society, the unsuitable nature of their methods of government and the very nature of their power.

In reality, the post-colonial _state-idolatry‘ is equaled only by the profound absence of legitimacy of the authorities. An artificial entity, from the points of view of both its frontiers and its history, the African state, far from being the product of a long and spontaneous process of nation-building, exists in itself, and very often for itself and for the bourgeoisie which has taken control of it. The people are elsewhere and define themselves by a sub-or trans-state identity. The party system and the accompanying ideology, far from bringing people together and mobilizing them, exacerbate the repressive, alien nature of the state. National feeling is extremely weak. How many people nowadays think of themselves as Cameroonians, Central Africans Chadians? As an elderly trader puts it, _To me, Cameroon is just means tribalism and corruption. A case study carried out in Cameroon on the relationship between ethnicity and state reveals how paradoxical these terms have become nowadays. The state imposes centralization and

homogenization; ethnic groups demand the right to their differences and autonomy. Another colonial contribution, no less inappropriate than the state, is law. Although traditional societies have produced a rich, flexible legal system, well adapted to circumstances and, what is more, much less hostile to change than has been admitted, modern states have generally imposed a new legal system. This system, because it is state-oriented and imbued with foreign concepts, is inappropriate and incomprehensible to the great mass of society. Fun has quite rightly been poked at this _fantasy law' whose ambition to change behavior patterns and encourage development is illusory. The term _fantasy law' dates from 1920 and refers to the civil code which the Dutch tried in vain to impose on the populations of Indonesia. Since then, there has been little improvement, although several African states have tried to integrate certain aspects of indigenous law into their modern legislation or into a unified judicial system. In so doing, they have usually devitalized them for, rather than simply being a set of rules, indigenous law is a _way of being', often irreducible to an article of law or a court decision in the Western sense.

What can we make of these observations on the state and law? First of all, let us establish the fact that the state apparatus and the legal system imported by colonization is characterized by centralization of power and –particularly when civil codes have been enacted, in the continental, Napoleonic tradition- by standardizing of customs. Independent states have generally clung to the imported legal tradition inherited from their former rulers. They often reinforced the centralizing, unifying tendencies bequeathed by their authoritarian forerunners. In countries endowed with a certain cultural homogeneity, centralization and standardization have, perhaps, some chance of functioning even if this is not necessarily desirable. In most countries, however, there is a plurality of cultures and consequently of indigenous legal systems. Furthermore, the decision-making process relies, in many non-European cultures, on consensus. It involves a slow, careful attempt to safeguard the collective harmony, whereas the Western-style process of decision-making, by majority over minority, represents for them a sort of brutality, lastingly harmful to the social body. Western juridico-political culture, although omnipresent, therefore does not suit all the peoples of the world.

All of which leads one to believe that many states would be well advised to promote administrative decentralization and legal pluralism, thus recognizing and valorizing the cultural communities who inhabit their territories. The legal system, if it is truly to serve people, their liberties and their specificities, ought to be endogenous, relatively plural and – when no widely accepted indigenous legislative power exists – essentially _customary' and judge-made. In any case, the legal systems of Sub- SaharanAfrican countries ought to depart from the Napoleonic model by which a given code freezes, devitalizes and standardizes customs, and imposes a state-oriented rationality.

3.3. GENERAL RECOMMENDATIONS

If Africa offers striking examples of the alien, inappropriate and often despoiling nature of the state, as a research project in legal anthropology carried out in west Cameroon recently concluded, then Africa ought to call upon its age-old experience to limit the role of the state both in its manifestations of authoritarianism and in its tendency to allow the exploitation of its nationals to take place under its auspices. Failing such changes, there will be yet more direct confrontation, or spontaneous strategies of

evasion, by-passing and diverting state institutions. There is, therefore, a pressing need for civil society to rally and assume the role from which it should never have abdicated. African development scholars must work to reverse the centralized reducing diversity to unity model of the state which is the major cause of the obstacles to development, adopt new strategies and policies of self-development more respectful of local dynamics and overall pluralism that include legal pluralism.

Instead of opposing clanism as a source of parasitism and tribalism as worthless and a threat to modernity and the state, it would be better, according to consider the possibility that the larger African cultural groupings might constitute appropriate focuses of political life and power. There is therefore a pressing need to decentralize and deflate the state inherited from the colonizers. Africans must cease therefore to deplore the multiplicity of tribal and ethnic groups, for it is precisely these ethnic groupings which will allow the existence and the vitality of decentralized political entities, which, in their turn, ought to be founded on the participation of smaller ethnic groups.

4. CONCLUSION

As we have seen, the values, institutions and behavior patterns, as well as the means and techniques of production of the various peoples of the South, are full of potential for creating alternative models of society. They have also helped in real terms to check, deflect or slow down the advent of the monoculture type of society which ―development" would have brought them. Judging by the state in which certain countries, such as Cameroon, find themselves, one might well ask if we are not witnessing ―pseudo-development" and, in fact, the collapse of entire sections of Western-style modernity. We are witnessing, on the one hand, the deterioration of institutions of Western origin: the State, written law, public office, wage-earning and market economy, parliamentary democracy, technology in the areas of health and transport, commerce and industry, and so on. On the other hand, we can observe the vitality of the values and behavior patterns based on elements of local culture. This state of affairs raises important questions. The Westernization of certain countries seems to have been, in some fields, a purely superficial veneer. Eurocentric blindness, along with the setting up of neo-colonial elites fashioned along Western lines has meant that we have often taken for deep-rooted and widespread a process which was in fact nothing but a superficial varnish.

Some countries, instead of making progress, are regressing in the eyes of the ―developers". Yet, what have been called obstacles to development might well represent and unconscious reaction to the anticipated dangers of uniformization and a deep-rooted resistance to alienation. Who knows! Such resistance is perhaps fed by the instinctive feeling that a society fundamentally based on power struggle and caught up in a technologicalization that imposes its own rules and rhythms on human beings, is ultimately doomed to self -destruction. Certain peoples seem to resort to non-cooperation in order to oppose alien development. Their attitude could be interpreted as a kind of civil disobedience, in opposition to the obligation to develop in the Western manner.

It is time to recognize and pay tribute to these silent, multi-faceted forms of resistance which various peoples oppose to the impositions and seductions that threaten their cultural values. In some countries, the populations pretend to comply but, behind the scenes, there takes place a sort of subversion of the

logic accompanying the imported object or institution. Reginald Hopkins aptly speaks of ―phagocytism", a term used in chemistry whereby one cell absorbs and destroys another, and indeed one sometimes wonders who has actually absorbed whom. Desmond and Elfert also point out, in the two-way traffic between the original culture and the white institutions, all kinds of distortions contaminations, desecrations and corruptions of the system imposed from outside. It is in this light that I strongly advocate that all efforts at this level geared towards Sub Saharan African renaissance should be underpinned by a common culture and, consequently, towards a more real sense of nationhood and development.

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K-12 Toolbox: Questions That Guide Instructional Practice

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Abstract

The importance of quality teaching in the nation's public schools is receiving unprecedented attention. School districts are doing whatever they can to grow and retain effective teachers by providing the necessary resources and support to ensure teacher success. With this in mind, the Buhler School District set out to create a useful and research-based tool to help teachers with the fundamentals of classroom instruction. The K-12 Toolbox provides a series of guiding questions developed from accepted best practices in classroom instruction. The rich conversations and reflection inspired by the Toolbox's questions are designed to help teachers lead students to higher order thinking and improved learning.

Introduction/Background

The importance of effective teaching in the nation's public schools is receiving unprecedented attention. In remarks to the U.S. Hispanic Chamber of Commerce in 2009, President Obama said, *"From the moment students enter a school, the most important factor in their success is not the color of their skin or the income of their parents, it's the person standing at the front of the classroom."* In the same year, former Secretary of Education, Arne Duncan, in remarks to the National Education Association stated, *"Our challenge is to make sure every child in America is learning from an effective teacher—no matter what it takes."*

When a district hires a teacher, one of its many responsibilities is to provide resources, professional learning opportunities, and peer support to ensure that the teacher will be fully prepared to engage and inspire students in the classroom (Liesveld, 2005). New and experienced teachers, alike, need the tools to create engaging lessons, a grasp of the best teaching strategies common to all successful teachers, and the ability to understand what separates good teaching from bad (Robinson, 2009). In 2011, the Buhler School District administrators and instructional support staff sought to provide these tools, and more, for their teachers.

Due to cuts in state funding for education, the Buhler district had not been able to replace the retiring assistant superintendent for curriculum and instruction two years earlier. The cuts to state funding coincided with the beginning of the new College and Career Ready Standards (the Kansas version of the

national Common Core Standards). These new standards were going to change instructional practice, not just in Kansas, but across the nation. The new standards brought increased instructional demands for classroom teachers and contributed to the call for change in instructional practice. It was during this period of transition that the Buhler team leaders, instructional leaders, principals and central office staff dedicated themselves to the task of moving Buhler educators from a teacher-driven model of instruction to a more student-centered, 21st Century model for effective teaching.

Over a period of several months, these determined educators collaborated to create a research-based set of strategies, a K-12 Toolbox, providing teachers with replicable and evidence-based approaches for improving instruction (SASS, 2008). The K-12 Toolbox is a carefully selected assortment of guiding questions designed to prompt teachers to examine their instructional practice and focus on the needs and interests of students. With this assortment of guiding questions, Buhler teachers could have at their fingertips a Toolbox of best practice approaches designed to showcase their students' untapped learning potential. The guiding questions encourage rich conversations for professional learning communities as well as for one-on-one teacher dialogue, inspiring both new and seasoned teachers to reflect on lessons and activities that lead students to higher order thinking and meaningful learning.

Process

The procedure for creating the K-12 Toolbox started with a vision for improving instruction even in times of financial stress. This work coincided with the adoption of the Kansas College and Career Standards, which provided Buhler educators with a rich opportunity to re-examine instructional practices across grade levels and content areas.

Teacher and district leaders examined Charlotte Danielson's Framework for Professional Practice (–Danielson>> The Framework", 2011), Robert Marzano's Framework of Effective Instruction (Marzano, 2007), the Insight Core Framework from Insight Education Group (Group, 2016), and the Baltimore City Public Schools' Instructional Framework (2011). After lengthy dialogue about each model or component, the brainstorming and creation of initial drafts of the Toolbox began. Instructional best practices were central to the creation of the guiding questions as the process of developing the strategies progressed through various stages (Stronge, 2004). The strategies began as statements, then were re-written as guiding questions, and edited numerous times until the Toolbox represented a comprehensive, yet user-friendly, and practical instrument for improving instruction.

The guiding questions were placed within one of the following three categories*:* ***Planning, Teaching, and Reflecting*** (Baltimore City Framework, 2011).Within these three categories, each individual question was subsequently placed with one of the Five Rs: **Relationships, Relevance, Responsive Culture, Rigor, and Results**, which constitute the new Kansas Education Systems Accreditation (KESA) (KESA Educational Framework, 2016) framework for the five-year accreditation process. The KESA Framework involves a systems approach to accreditation where districts are awarded a rating based on growth. KESA authors wrote, –We believe that the Five Rs are equivalent to each other in their importance to the quality

of a system and that they encompass every concept contained in the ideas of quality education and continual improvement. Everything that educational leaders and stakeholders do, say, believe, model, teach, expect, and desire about education can be classified in at least one of the Five Rs" (KESA Educational Framework, 2016).

Classification of the guiding questions into three categories and further alignment of the questions with the KESA Five Rs (KESA Educational Framework, 2016), allows a teacher or instructional support facilitator to hone in on a specific area for improvement. For example, a teacher may be good at planning but struggles with many of the elements involved in the delivery of instruction. Similarly, that same teacher may be good at building relationships, but struggles to make his/her lessons relevant in the lives of students. The ability to pinpoint certain components of the K-12 toolbox for instructional improvement enables this instructional tool to be inclusive and comprehensive, yet practical.

The K-12 Toolbox

The three components of the K-12 Toolbox are ***Planning, Teaching, and Reflecting***. A spiral approach is intended. A thorough and thoughtful reflection about the classroom instruction leads back to careful planning and the spiraling continues with the next lesson taught.

PLANNING

What do I expect my students to learn?

Planning ensures greater success of the lesson. Planning clarifies goals and provides steps to achieve the goals. Careful lesson design and structured planning are absolutely necessary to meet the individual needs of students.

Relationships

P1. Have I chosen instructional strategies according to how each student learns?
P2. Am I reaching out to my colleagues for ideas?

Relevance

P3. Is the lesson content relevant?
P4. How will I use technology to engage students and help them learn?

Responsive Culture

P5. Does my classroom environment promote curiosity and creativity?
P6. Does the classroom environment promote independence and self-directed learning?
P7. How have I planned for active learning?
P8. How will I establish classroom routines and smooth transitions to maximize learning time?

Rigor

P9. Is the lesson challenging and engaging?
P10. How will the lesson connect different subject areas?

Results

P11. Have I built flexibility into the lesson so I meet the needs of a variety of learners?

P12. How can I help students set personal learning goals?

TEACHING

How will I know they are learning?

Quality teaching requires knowledge of the subjects to be taught, of the skills to be developed, and of the curriculum and materials that organize and embody that content. Teachers must possess the skills, capacities and dispositions to employ such knowledge wisely in the interest of students.

Relationships

T1.Do I create a positive, caring classroom environment for my students?

T2.Do my students feel respected even when redirected or disciplined?

Relevance

T3.Do my students understand how the lesson relates to everyday life?

T4.Do my instructional strategies, tools, tasks, and activities engage my students?

Responsive Culture

T5.Do my students know that taking risks or making mistakes is an important part of learning?

T6.Do my students take ownership for their own progress by setting and tracking learning goals?

T7.Do I have my students work in pairs, groups, teams, and individually?

T8.Do my students have ample opportunities to explore their creativity?

Rigor

T9.Do my students support their answers with evidence?

T10.Do my students have the tools and building blocks to be successful as they move to more challenging content?

Results

T11.Are my students understanding the lesson content?

REFLECTING

How will I respond if they don't learn?

How will I respond if they already know it?

John Dewey said, ―We do not learn from experience . . . we learn from reflecting on experience." The questions below allow teachers to think critically about how to change future classes for the better.

Relationships

R1. Am I conferencing with each student regularly?

R2. Am I keeping parents informed?

Relevance

R3. Was the lesson relevant?

Responsive Culture

R4. How can I regularly celebrate student learning?

R5. Do my questions and assignments inspire my students to be curious learners?

Rigor

R6. Was I prepared with resources and supporting materials when presenting the lesson?

R7. Am I creating a culture of learning?

Results

R8. What data do I have to indicate whether or not the students understood the lesson content?

R9. Are there skills or concepts that need to be retaught?

R10. Did I give students immediate feedback on their progress?

R11. How do the students feel they are doing?

Application

The K-12 Toolbox was not designed for the purpose of evaluating teachers. The intent is for the Toolbox to be formative in nature, providing teachers, instructional coaches, and administrators with a non-threatening and user-friendly instrument for the improvement of classroom instruction. Teachers, instructional coaches, and principals use the guiding questions to focus on areas in need of improvement. In its third year of implementation, feedback from teachers, principals and superintendents is very important to the process. A handful of school districts across Kansas are already taking the lead by utilizing a version of the K-12 Toolbox to help their classroom teachers discover new and engaging classroom strategies. Teachers and Administrators in Buhler, Haysville, Halstead, Valley Center, and other school districts across Kansas have expressed appreciation for the K-12 Toolbox.

> A Buhler High School Math Team Leader had this to say about the K-12 Toolbox, "The framework provided us with a reflective tool that connected the domains of teaching with the 5 Rs of instructional practice. I listed all the questions in random order and then we each identified our 5 strengths and our 5 weaknesses. We then looked at the Toolbox framework and made connections and reflections to which R had most of our strengths and which R had most of our weaknesses. Using this information, our math team had an honest conversation about what we can learn from each other and listed all of our strengths and weaknesses as a department to analyze if we were heavy in one domain or R as a department."

A Halstead, Kansas principal stated, "I especially enjoyed learning about the K-12 Toolbox. This is something all of my teachers can use," and an instructional coach commented, "Our school has been looking for a tool that will help us support our teachers and give them specific and practical ways to improve their instruction." A Buhler Middle School teacher said it this way, "The K-12 Toolbox speaks to the careful balance educators must maintain, recognizing that many factors within the control of the teacher play a role in student success."

Brad Neuenswander, Deputy Commissioner of Education for KSDE, has provided copies of the K-12 Toolbox's guiding questions to several school districts in Kansas. Listing each of the Toolbox questions under one of the Five Rs (Relationships; Relevance; Responsive Culture; Rigor; Results) was inspired by the Deputy Commissioner's vision to include the Five Rs in the KESA Accreditation process (KESA Educational Framework, 2016).

The K-12Toolbox.org website was designed with input from a range of teachers, principals, instructional designers, and educational consultants. Since the launching of the K-12Toolbox.org website in October, 2016, the site has received over four thousand visits. The website provides easily accessible support for teachers and administrators as they work together to provide classroom lessons that mirror best practice and engage students.

Summary

One of the many responsibilities of a school district is to provide resources and support that promote the success of any teacher the district hires. Taking that responsibility to heart, teacher leaders and administrators in the Buhler School District collaborated over several months to create a research-based set of strategies, a K-12 Toolbox, providing teachers with replicable and evidence-based approaches for improving instruction. Designed as a positive and practical approach to best practices, the K-12 Toolbox is a user-friendly guide for instructional delivery in the classroom. Beginning in fall of 2016, educators have been able to instantly access targeted videos, articles, and resources for each of the Toolbox's guiding questions. This innovation provides easily accessible support for teachers seeking proven instructional strategies.

As President Obama proclaimed, nothing is more important than having a quality teacher standing in front of every classroom. Donald O. Clifton, former Gallup Chairman, may have said it best, –Our greatest contribution is to be sure there is a teacher in every classroom who cares that every student, every day, learns and grows and feels like a real human being" (Clifton, 2014).

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Representation of homoaffective relationships in Brazilian telenovelas

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Abstract

The presence of homosexual characters in Brazilian telenovelas has been gaining prominence in recent years and arousing intense debates in society. The aim of this study is to analyze the representation of homoaffective relationships in telenovelas from the perspective of their presence, relevance and discussion. This study consisted of the analysis of the scenes of homosexual couple Teresa and Estela in the telenovela Ambitious Women (GLOBO NETWORK, 2015), in comparison with the literature and other same-gender relationships in telenovelas. The analysis evidences an increase in the representativeness of homoaffective relationships in telenovelas, however the representation of these relationships still remains subjected to a heteronormative logic.

Keywords: telenovelas; homoaffectiveness; representation.

1. Introduction

The presence of LGBT (Lesbian, Gay, Bisexual, Transvestite, Transsexual and Transgender) characters in television media is marked by a series of questions that range from the use of socially diffused stereotypes to a kind of "sexual invisibility" and, more recently, by an attempt to "normalize" or even to "standardize" same-gender relationships by means of a forced heteronormative framework. The role of the media on the LGBT issue gains importance as it builds and consolidates stereotypes, but it also proposes discussions and mobilizes viewers to reflect on aspects that are considered taboo, especially in a predominantly conservative society such as Brazil.

Telenovelas have always played a prominent role in the television media, mainly with the consolidation of Globo Network as of the 1970s. Although they have been losing their audiences systematically in recent years due to the advent of new media, especially the Internet, telenovelas are far from no longer having a relevant impact on the issues they present and which, most of the times, resonate in Brazilian society. In spite of the continuous telenovela audience drop, the questions raised by them gain more and

more prominence and are resignified in the scope of the Internet.

On the one hand, social transformations lead to the insertion of new themes and representations in telenovelas - such as the visibility of black people, special needs people, the LGBT segment, socially excluded people and others, who besides being part of the social issue are ultimately potential viewers and consumers. On the other hand, television needs to deal with falling audiences and with a significantly conservative portion of Brazilian society, which struggles to keep several groups away from visibility. Moreover, advertisers, who maintain the functioning of television media by financial investments and who often adopt an imperial royal posture, constitute another group that pushes, controls and commands the programs presented in national network.

This entire complex network, with so many different actors involved, appears in the work of Simões (2004), who highlights the question of who, in fact, determines the direction of television. According to the author, everyone runs the TV: the owners, who assemble teams, direct and invest; the viewers, with their unconfessed or unconscious preferences, which increase or decrease the audience ratings; the advertisers, who buy the audience of one channel or another; and also the state, which is the agent that grants the operation of the channels.

Within this intricate context, it is of utmost importance to analyze the role of television media from different perspectives, including how the representation of homoaffective relationships and the social discussions that arise from them take place. The presence of homosexual characters in telenovelas has increased significantly in the last decades, just as the variety of ways in which they are presented. According to Beleli (2009), by incorporating same-gender relationships, telenovelas also produce a call to identification. Thus, on the one hand, increasing the visibility of this social group means advancing in the conquest of their rights and in their forms of representation, but on the other hand, identification often encapsulates subjects in a model that refers to heterosexual relationships ruled by predefined practices, which would not need to be evaluated within their characteristic and proper context of homoaffective relationships, when in fact, they do.

Braga (2010) brings up the discussion about the representation of the first lesbian couple in the Brazilian telenovelas, presented in the telenovela Anything Goes (GLOBO NETWORK, 1988/1989). In this study, the author raises a series of questions about the homoaffective relationship lived between the characters Laís and Cecilia, such as: non-stereotyped gestures, presentation of the relationship naturally and within a heteronormative and monogamous model, construction of the relationship verbally rather than visually in order not to shock the viewer, and the discussion of the right to inheritance, making a counterpoint between moral and legal issues. Fernandes and Brandão (2010) studied the evolution of the representation of homosexual characters in telenovelas between 1970 and 2010, highlighting the progress achieved between 2003 and 2005, which, however, did not show continuity in the following period 2005-2010. The authors seek to categorize homosexual characters within the theory of archetypes, prototypes and stereotypes. Tonon (2006) presents his analysis on homoaffectiveness from the point of view of cultural studies, with respect to the understanding of the identity according to Stuart Hall, and adds the contributions of Michel Foucault on how sexuality acts in the constitution of identities and subjectivities.

In 2015, Globo Network aired the telenovela Ambitious Women (GLOBO NETWORK, 2015), written by Gilberto Braga (same author of Anything Goes, 1988/1989), Ricardo Linhares and João Ximenes Braga, which presented another lesbian couple in the plot, resuming the same theme approached in Anything Goes, as well as in other television works by the same author. This article analyzes the presence of these homosexual characters in this 2015 Brazilian telenovela, especially between chapters 1 and 35.

2. Homosexual characters in telenovelas

In Ambitious Women (GLOBO NETWORK, 2015), contrary to what had been done in previous telenovelas, the authors made an option to show the lesbian couple early in the first chapter. The characters Teresa (Fernanda Montenegro) and Estela (Nathália Thimberg) live a monogamous, long-lasting and stable 35-year relationship. The presentation of the couple occurs at 06 minutes and 40 seconds of the first chapter. The great expectation surrounding the two-octogenarian lesbian couple was heavily mentioned in the media prior to the telenovela's launch and certainly contributed somehow to an overestimation of the impact of their appearance on the narrative.

From a strictly technical point of view, the scene lasted 2 minutes and 10 seconds, which is considerably long for television standards, as takes tend to be short. However, in what concerns to the content of the scene, the presentation of the couple was rather trivial. The two characters meet at home in their room after a long day of work and the dialogue between them is about the everyday life, about what each one did throughout the day, about Teresa‘s job and Estela's concerns about her daughter's problems. The affection approach is marked by the environment in which the conversation takes place (the couple's bedroom), the way they treat each other (Estela uses the expression "my love" to refer to Teresa) and it culminates with a kiss that lasts approximately 10 seconds, plus 5 seconds of a final hug. This time is quite long if compared to the kisses seen in recent shows involving homosexual characters.

The scene of the octogenarian lesbian kiss featured in chapter one of the telenovela was the catalyst for labyrinthine reactions that unveiled and revealed how society - or most of it - views in the social and political field the affection between people of the same gender and love in old age. It should be highlighted that the effects of the "gay kiss" were heated and intense, even mobilizing conservative parliamentarians in different spheres of power, who started a campaign in order to boycott the telenovela or approved letters of repudiation of the plot in the wake of the conservative/reactionary discourse that defends the values of the traditional family. On the side of minority rights advocates and especially the LGBT cause, the reactions were also intense, both in favor, due to the opportunity of the visibility offered to the cause in prime time on TV, and opposed, due to the standardized or normalized form of representation of the couple.

In what concerns to the differences between the telenovelas, it is clear that there are many similarities between the lesbian couple presented in Anything Goes (1988/1989) and the lesbian couple of Ambitious Women (2015), since both works were written by the same author. However, there are significant differences between such characters. In Anything Goes, the homosexual characters were close to the central plot of the story, but they had a clearly supporting role, in which they were close friends with the protagonist. In Ambitious Women, the importance of the couple represented is greater, since one of them (Estela) is the mother of the protagonist/antagonist of the story, Beatriz (Gloria Pires), and Estela´s partner, Teresa, is worried and suspicious of the unethical attitudes of her stepdaughter. That is, by comparing the two plots, there was an increase in the importance of the homosexual couple within the narrative structure, as they take a more central position.

Besides this improvement in the characters‘ relevance within the plot, other comparisons are also possible. According to Braga (2010), the homosexual couple in Anything Goes stands out for a series of

characteristics such as: non-stereotyped gestures, natural presentation of the relationship within a heteronormative and monogamous model, and the construction of the relationship verbally instead of physically in order not to shock the viewer. In Ambitious Women, the main author seems to repeat the same prescription adopted in the previous telenovela, but with a remarkable difference: he chooses to show the construction of the relationship in a gestural/visual way and highlights it strongly by placing the couple's initial scene in the opening of the telenovela with a kiss between the characters.

In that sense, there was a clear change of perspective, in which the author believes that, 27 years after the first plot, the transformations of Brazilian society were significant enough to allow a homosexual couple to be represented in a visual way, albeit subtly, with a short kiss and discrete scenes of affection. At first glance, this seems to be one of the most crucial aspects that Ambitious Women shows about homoaffective representation.

On the one hand, the author‘s intention of promoting the expressions of affection between the couples in a homosexual relationship is marked by recent telenovelas in which the taboo of the "gay kiss" seems to have been overcome (TRAIL OF LIES, 2013/2014; HELENA‘S SHADOW, 2014; EMPIRE, 2014/2015). On the other hand, the reaction of the more conservative sectors of society has proved to be very strong, either by the arguments on social networks, by the moves of the Evangelical Parliamentary Front in the National Congress, or by the position of the City Councils of cities located in the states of Tocantins and Bahia, which approved letters of repudiation of the work exhibited by Globo Network.

These social transformations indicate, given the controversy aroused by the octogenarian lesbian couple, that a significant part of the population is still anachronistically obedient to a traditionalist culture, which is characteristic of the times of a provincial Brazil.

A letter of repudiation issued by the Evangelical Parliamentary Front about the scene performed by the actresses Fernanda Montenegro and Nathália Thimberg, both 85 years old, circulated in social networks three days after the kiss in the first chapter of Ambitious Women (2015). Such kiss was responsible for scandalizing the Brazilian people more than the scenes of bribery, betrayal, racism, gold-digging, premeditated "accident", and murder, all of them sharing the same first chapter.

> The aforementioned telenovela, as well as others previously shown by Globo Network, has a clear intention of confronting Christians in their convictions and principles, trying to impose to almost the entire Brazilian society the idiom they call ~~a~~nother way of loving", which is contrary to our customs, practices and traditions. The evangelical front asks Christians and all those who feel 'violated by the constant moral rapes imposed by the liberal media' not to watch this telenovela and to boycott its advertisers. (Castro, G., 2015)

It is curious to note that the real violence represented in the first chapter of the telenovela - bribery, racism, murder – was ignored by the judgment of the respectful gentlemen who occupy prestige seats in national politics, not representing major threats to Brazilian society. It is also worth noting that the prestige of the actresses, two great icons of the performing arts, did not free them from exclamations like "disgusting", "horrible", "now the world is over", but on the contrary, their prestige seemed to enhance such reactions.

The aggravating point is that, this time, besides being gay, the characters who performed the kiss are elderly people. The difference between this prejudice and others is that it is already institutionalized, even by the media themselves. According to Christophe and Camarano (2010), in May 2010, at the launch of a film by Woody Allen, who was 74 years old at the time, the world media - including the Brazilian one - repeated to exhaustion the celebrated filmmaker's statement: "There is no advantage to getting older. You don't get smarter, you don't get wiser, you don't get mellower, you don't get more kindly - nothing happens. But your back hurts more, you get more indigestion, your eyesight isn't as good and you need a hearing aid. It's a bad business getting older and I would advise you not to do it if you can avoid it." In a society that cultivates youth and seeks to extend young vigor, nourishing and nurtured by market interests, talking about sex in old age is still taboo. This is what Goldani (2010) calls —challenges of age prejudice": the veneration of youth by most Western societies often makes aging an object of shame, something ridiculous and disgusting. The author also cites a study by Valente (2008), which reveals that the increase in cases of HIV-positive patients was large among the elderly, since AIDS programs are essentially aimed at young or middle-aged people and ignore the elderly, assuming that they are not sexually active.

Although it is impossible to map the intentionality of the author, his plot gains prominence by unveiling and revealing old prejudices still rooted in a twenty-first-century Brazil: the affection between people of the same gender and pleasure in old age, among others. For example, one may compare the current enthusiastic and violent repercussions with those of the couple represented by the actresses Sílvia Pfeifer and Christiane Torloni in The Babel Tower (1998/1999), whose profile was similar to the current couple formed by Estela and Teresa. The plot, just like the current one, chronicled the love relationship between two rich, independent and feminine women, who were already in a stable relationship as from the beginning of the telenovela.

The main dissimilarity between the couples concerns to their age and their importance in the development of the plot. "It must have been this damn prejudice!" - This is the last line that Rafaela Katz, stylist, portrayed by the actress Christiane Torloni, pronounces before the mall explodes. At the time, Luis Mott, president of the Gay Group of Bahia, in an interview with Folha TV, on July 12, 1998, stated that society even "admits lesbianism among second-class actresses, but intolerance is manifested when it involves first class stars. "In the year zero of the 80's, in an interview granted to the Playboy Magazine about his telenovela Jellyfish, Gilberto Braga, the same author of Ambitious Women, when asked about the "audience ratings dictatorship" replied: "But I think that this dictatorship will exist even if I leave the television and start working in the theater, cinema or doing anything else, because I will always be concerned about success, money and about pleasing people. I reason a lot with Globo TV, because I want more or less the same thing: I want people to like the telenovela." Given the repercussions, which are similar to those of 16 years ago, what will be the current response of the television media to the high rates of disapproval and low audience ratings?

An attempt of response may already be seen in the episodes that aired in the second month of exhibition of the telenovela Ambitious Women. Traditionally, Globo Network promotes —discussion groups" concerning its telenovelas in order to make changes in their scripts aimed at reaching the highest audience possible for its audiovisual products. These discussion groups are made up exclusively of

women, mostly older housewives, who preferably have a strong bond with telenovelas. Among innumerous considerations made in the first discussion group on Ambitious Women, and that considerably changed the direction of the telenovela, it is the relationship between Teresa and Estela. The viewers heard do not disapprove or reject the characters in the narrative structure; they actually appreciate the ethical and exemplary way the couple raises their son Rafael (Chay Suede), which is clearly an advance in relation to previous works. However, the viewers express their disapproval in relation to the display of affection (kisses, caresses, hugs, etc.) between the lesbian couple. This is a clear conservative message that they (the viewers) are willing to accept a ―different" type of couple in the telenovela's narrative structure though within certain limits; that is, as long as there is no visual sign of the affection that unites the characters.

For this point of discussion, it is worth noting some aspects regarding the advances and setbacks in the analyzed work, and the way it interacts with society through its representation of minorities. The interaction with society is visible when analyzing different scenes of the telenovela, in which through different characters, the author reflects the conservative discourse back to the society. The family unit consisting of Consuelo (Arlete Sales), Aderbal (Marcos Palmeira), Maria José (Laila Garin) and Laís (Luisa Arraes) is the main example of that. The plot presents these characters as being part of a traditional Brazilian family, defender of morals and principles, extremely religious, but that hides a social hypocrisy. Besides possessing an enormous load of the most varied social prejudices, this family unit is also involved in political corruption, revealing narratives that the media themselves, through their different means of communication, bring to the center of social debates in the current Brazilian scenario.

As a narrative resource, the author directly connects this family, conservative and immoral at the same time, with the family of Teresa, Estela and Rafael, which represents a liberal family arrangement that defends real human and civil rights values not those dictated by good morals and customs. The lack of character of Consuelo's family is simultaneously a critic to the conservative part of society, which is still full of prejudgments and does not like to be seen as reactionary, intransigent and prejudiced, as well as a ―ladder" to point out the correct values of Teresa's family as a way to facilitate the acceptance of homoaffective families.

In what concerns to representation, the most noticeable advance in Ambitious Women is the partial acceptance of the characters in relation to previous works, in which homosexual characters had to die – Cecília, in Anything Goes (1988/1989), or Leila and Rafaela, in The Babel Tower (1998/1999). Nonetheless, a setback is evident as this partial acceptance is based on the moral strength of the characters and the scenes of affection between them are rejected. Beleli, Pereira and Sobrinho (2015) state that the acceptance of minorities in telenovelas is marked by intense ―negotiation" with the audience and Globo Network's interests. In one hand, Globo knows its immense power to influence the mass of viewers and uses it continually in its television structure. Therefore, the representation of excluded groups, such as LGBT, black people, women and others, is inserted in the television schedule as a last resort, in an attempt to broaden this potential consumer audience that has undeniably increased over the last few years. On the other hand, Globo Network has a commitment with the most conservative part of the audience. In fact, the network is committed to audience ratings in first place, so it cannot displease this part of the audience. Thus, its conciliatory strategy is to include excluded groups in its telenovelas – meeting the demands of this potential consumer audience – though under a ―sanitized" or ―standardized"

conception.

3. The heteronormative representation of homoaffectiva relations

The fact is that the characters did not go unnoticed; either by the advance they promoted, but chiefly by the innumerous demonstrations of prejudice that surfaced during the exhibition of the telenovela. It is impossible to map the intentionality of the author, but a 10-second kiss between the couple raised a series of heated discussions in the country that had remained concealed for a long time. Despite the discussion rose, it is important to highlight that the standardization of homoaffective relationships is strongly represented in the Ambitious Women's plot. The depiction of the couple as heteronormative is evident in many scenes of the telenovela. Teresa is clearly "the head of the family". She is depicted as being the strongest one of the couple whereas Estela is the weakest. This is shown, for instance, in Teresa's speech in front of the school principal, who asks the couple to hide their relationship due to the bullying their son has been suffering in school (chapter 2); in Teresa's critical stance in relation to Beatriz (her partner's daughter); and even in Teresa's position at the dinner table: she is always at the head of the table. In turn, Estela is portrayed as the most fragile in the relationship. She hides her daughter's mistakes, she is insecure in her dialogues, she is even robbed when the couple walks by the shore, besides, of course, being the "bride", the one in charge of the wedding's arrangements (role usually reserved to women in heterosexual relations) since Teresa has a more important career that demands much more time from her (role usually of a man in the patriarchal society).

According to Stuart Hall (2006), we live an identity crisis and this is due to the new ways individuals express their desires. The representations, associated to and broadcast by the media in their more diverse contexts, exert a lot of, when not predominant, influence on the construction of human identity(ies), even though their depiction is still attached, even if subconsciously, to heteronormative standards. The media are thus, created by and creator of heternormative discourses that are relentlessly reproduced as "natural", putting in evidence, even when silenced, the behaviors out of their standard. This full of prejudices and excluding normative trend enables us to confirm what society understands as "right" concerning to sexual orientation, in a territory of fabricated, deviant and stigmatized identities.

Media uphold the discourse, the in-formation and, consequently, the consolidation of the control and the opposition. The consolidation of opposition happens when denial starts, for instance, when someone tolerates the relationship but denies the existence of the "gay kiss", which ended up not happening again – as a desire of the viewers – not even within the heteronormative narrative, in which a kiss could never be left out. As a consequence, in Teresa and Estela's wedding, the right to kiss the bride was denied to the bride.

Thus, it is the individual's responsibility to balance its subjective desires with the objective "needs" of culture, in which identity is, according to Hall (2006), the result of the tensions that end up composing the social scenario out there. Therefore, people transform their feelings in objects when, through mechanical, and usually subconscious behaviors they reproduce, in art and in life, only one possible type of acceptable relationship, disregarding the innumerous possibilities of affection. So, media position themselves as a tool present in different spaces that dictates the behaviors people should follow, and use

these same spaces to invisibilize, marginalize and deny the existence of groups that do not comply to their molds.

Contrary to the other heterocentric representations present in several contexts of the behavior of the couple interpreted by the actresses Fernanda Montenegro and Natalia Thimberg, in a clear attempt to ―normalize" the homoaffective relationship that goes beyond acceptable norms, their wedding did not have a kiss between the brides. According to one of the authors, Ricardo Linhares, the viewers taking part in the survey group liked the characters, but did not want to see the actresses exchanging affection on television. Telenovela writers nowadays have the role, as described by Goffman (1988), of being the ―speakers", agents or agencies responsible for representing persons with a particular stigmas. One of the characteristics of these representatives is to convince the audience to use a more flexible social label in relation to the category in question, for instance:

> (...) The New York League for the Hard of Hearing agreed to use only such terms as hard of hearing, impaired haring, and hearing loss; to excise the word deaf from their conversation, their correspondence and other writings, their teaching and their speeches in public. It worked. New York in general gradually begun to use the new vocabulary. Straight thinking was on the way (Warfield, apud GOFFMAN, 1988, p. 34).

This is how Brazilian telenovelas are. They paint the colorful shades of reality gray, such as the gay cause, when they embrace the viewers' screams of refusal. In this fictional push- pull, mediated by audience, they attend the desires of the most liberal part at times and of the most conservative part at others.

The analysis of the scenes highlights other key points, such as Lauro's (Denis Carvalho) rejection to his mother's (Teresa) homoaffective relationship; the appreciation of the homosexual wedding as a way to validate this type of relationship; the constant reassurance that only love gives people enough power to overcome prejudice; the homophobic actions against the lesbian couple's son (Rafael); and the homosexual couple's acceptance by Laís because of her private affection for Rafael.

Every aspect mentioned above makes up this narrative of ―standardization" or ―encapsulation" that the media dictate as mandatory for the acceptance of the outcasts. In several chapters, Teresa has doubts whether she should invite her biological son Lauro or not to her wedding, as they had fallen out with each other 35 years ago in an emotionally violent way when she decided to go through with her homoaffective relationship with Estela. Despite Teresa giving up, Estela and Rafael invite Lauro, without her consent. He does not show any sign that he will show up at the wedding, but unexpectedly appears and not only accepts his mother homoaffective relationship but also walks her down the aisle. At this point of the plot, chapter 35, the changes proposed by the discussion groups had already been in effect and the speeding up of the telenovela in order to increase the audience made Laura and Teresa's scenes editing too fast; as a result, a troubled relationship of 35 years of conflicts and distance is resolved in a few moments. The long conflict is resolved in the simple line in which Lauro says he has changed and now accepts his mother's relationship. Then, after the wedding, mother and son spend some time together and recall the good memories of a distant past. In the following chapter, Lauro, who had made a lot of effort to be in the wedding due to his poor health conditions, dies. Lauro's almost instant death after the

wedding works as a way to not dig deeper into the discussion on his sudden acceptance, after 35 year, of the validity of his mother‘s homoaffective relationship.

Unfortunately, another discussion that could lead to a deeper reflection on prejudice, the relationship between Laís and Rafael, also ends up falling into standardization. Rafael avoids telling Laís that he has two mothers but she ends up finding it out during the plot. Such revelation leads to one of the longest scenes (13 minutes) related to the homosexual couple in the telenovela, in which there is a strong clash between Rafael‘s humanitarian values and the influence of Laís‘ conservative education, which culminates in the couple drifting away from each other. Instead of using the intense argument between these characters to deconstruct homophobia, the author decided to, a few chapters later, reconcile them without any further questioning from both sides, based on the premise of private affection; that is, Laís makes an effort to overcome her prejudice against Rafael‘s mothers, not because she judges their relationship correct or acceptable, but only because she has affection for Rafael. To sum up, the message in Laís‘ attitude is that she will try to accept Rafael‘s lesbian mothers, not because they deserve respect and understanding, as any human being does, but because they are the mothers of the man she loves, and therefore, not accepting them would imply in losing her loved one.

At last, the plot puts in evidence the consequences of Teresa and Estela‘s homoaffective relationship on Rafael. This correlation appears on Guto‘s (Bruno Grizoni) homophobic attitudes towards Rafael. This is a common behavior in conservative social conduct, which tries to justify its dogmas against homoaffectiveness claiming that homosexual parents influence their children‘s sexuality, especially during childhood.

Under this bias, the storyline throws back to society what is strongly implied in its prejudice: the assurance that Rafael would be homosexual due to being raised by homosexual mothers and a clear intention to deconstruct this idea, since Rafael is not only heterosexual but also endowed with maturity and an enviable character, the opposite of Guto, raised by a traditional family.

4. Conclusion

The octogenarian lesbian couple, shown and represented in Ambitious Women by two outstanding actresses, was not blown up in a shopping mall neither died in a car accident, but it lost, gradually, the spotlight and visibility, as an answer to the voices echoed by those who have eyes, who know, but do not want and pretend not to see. In this sense, the work analyzed is contradictory in essence, as it brings up important issues to the center of discussion and at the same time depicts a distorted representation in favor and interest of others, to which most viewers are blind.

Synthetically, Ambitious Women has made advances on the issue of representativeness/visibility of homoaffective relations in an unprecedented scale in Brazilian telenovelas. It is evident, in the reassurance of the political nature of homoaffective marriage, in the representation of the homosexual couple by well-established actresses, and in the inclusion of the homoaffective topic associated with other prejudices (such as gender and age), a clear attempt to advance on the discussion against homophobia, either the open homophobia of conservative groups or the concealed one of middle groups of society. In the opposite direction of these advances, it is the encapsulation of the representation of the homosexual

couple within a heteronormative logic, the –sanitization" of the characters through the exacerbation of character and constitution of a solid family unit and professional prestige, the excessive use of the argument that only love gives people enough power to overcome prejudice, the unfeasibility of visual affection in order to please a more conservative audience and the lack of further development of the discussion on homoaffectiveness acceptance, which is reduced to the scope of private affection and leaves behind the social dimension of the problem.

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Enhancing Engineering Education through Design-Driven Curriculum

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Abstract

In China, there is a strong demand for reforming higher engineering education both from industry and tertiary education perspective. School of Mechanical Engineering (ME), Shanghai Jiao Tong University (SJTU) is ongoing developing design-driven curricula to enhance engineering education through project-based teaching, learning and assessment. More than 3000 students have completed over 600 projects in various courses since 2014. Of these projects, solving open-end problem accounts for about 25%, developing simple products about 25%, focusing on creative mechanism about 25%, and industry sponsored projects about 25%. Evaluation from industry at project showcase and students' self-assessment showed the positive effects of the undergoing reform of undergraduate courses conducted by ME, SJTU on the enhancement of engineering education.

Keywords: Engineering education, engineering design, project-based learning, design-driven learning, mechanical engineering

1. Introduction

Traditionally, mechanical engineering students took some courses separately to acquire professional knowledge which are relatively independent to each other. Take the design or manufacturing courses, engineering design courses mainly included engineering graphics, mechanical principles, and machinery design. On the other hand, manufacturing courses included engineering materials, machinery manufacturing technologies, manufacturing equipment, the principles and tools of cutting, etc. The design or manufacturing knowledge mastered by different students are thus vary a lot. As a consequence, they could not develop a global concept of mechanical products and systems, which further hinder them to develop the global optimization ability. However, the whole life cycle including the design stage and manufacturing stage for modern products is highly integrated. Therefore, it requires the reform and re-integration of the knowledge system and training mode of mechanical engineering courses.

According to the feedback from the employers of engineering graduates in China, the main problems of those graduates after being employed are as follows: 1) long training cycle, they usually lack the understanding of modern enterprise culture and the work process; 2) poor experience of team work, as a consequence of an unsatisfactory communication and coordination ability; 3) Their capabilities of solving practical problems are poor and they are short of creativity abilities; 4) They tend to seek job blindly and are not confident. What's more, they have few ideas about the work they will encounter in the future.

Through analyzing the problems mentioned above, the higher engineering education of China is facing urgent challenges: 1) to cultivate students with the comprehensive and innovative thinking, the systematic global concept development ability; 2) to further enhance the students' engineering practice and creativity ability; 3)to further strengthen the integration of engineering education and industry needs (i.e. Industry-University Collaboration);4) to further elevate the engineering capacity of the relevant education team, in particular, the involved young teachers; 5) to adapt to the trend of economic globalization and cultivate more engineering talents with international competitiveness.

In fact, developing countries like China but also many other developed ones (e.g. the US) are all facing the challenge of re-thinking of engineering education [1-3]. The CIDO stand is the reforming of engineering education with focusing on the evolution of requires of society and engineering [1]. Design thinking approach is also another learning and teaching approach with focusing on team-based real world problem-solving [4]. In all these examples of engineering education, Project-Based Learning was adopted. As summarized in [5] PBL cultivates students with several skill, e.g. team work skill, problem solving ability communications skill, self-assessment, etc. Literature examination and courses benchmarking also show that project-based learning (PBL) and teaching are widely applied in engineering education [6-9].

School of Mechanical Engineering (ME), Shanghai Jiao Tong University (SJTU) is ongoing developing design-driven curriculum to enhance engineering education through project-based teaching, learning and assessment. More than 3000 students have completed more than 600 projects in these courses. This paper reports on the experience of the authors on the design, organizing, management and teaching of design-driven courses at School of Mechanical Engineering, Shanghai Jiao Tong University in China.

2. Courses Design

2.1. Objective of Courses

The overall objective of reforming engineering education at ME, SJTU is to cultivate qualified innovators with focusing on the ever evolution of technical, social and natural environment, as shown in Fig. 1.

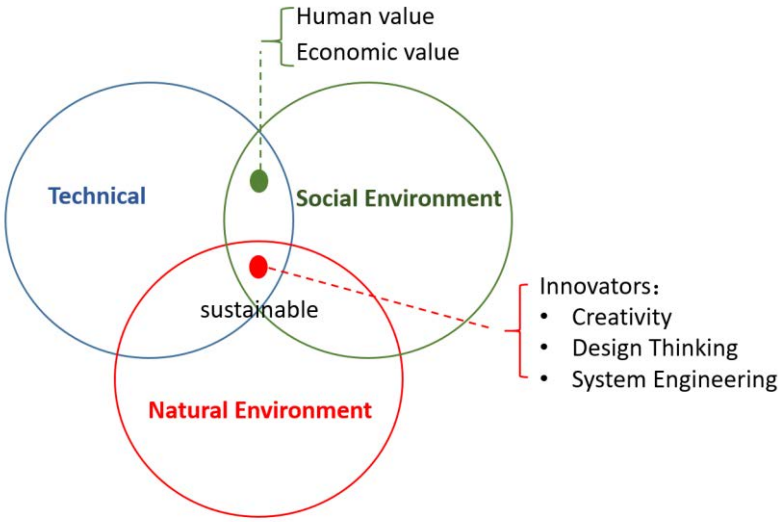

Fig. 1. Objective of enhancing engineering education at ME, SJTU

However, in the traditional curriculum-oriented training model, teaching plan is often treated as core and alterable. Teachers usually focus on the good arrangement of every class and the evaluation of class effect. As shown in Fig. 2, the goal-oriented training model (project-based learning and teaching mode), starts from the social needs with the purpose of making the graduates achieve certain requirements on abilities. The teaching plan clearly reflects the support of the graduation requirements. The meaning of "good" arrangement of classes is the actors effective completion of the corresponding task with given resources, which can led to achieve the goal of training qualified innovators.

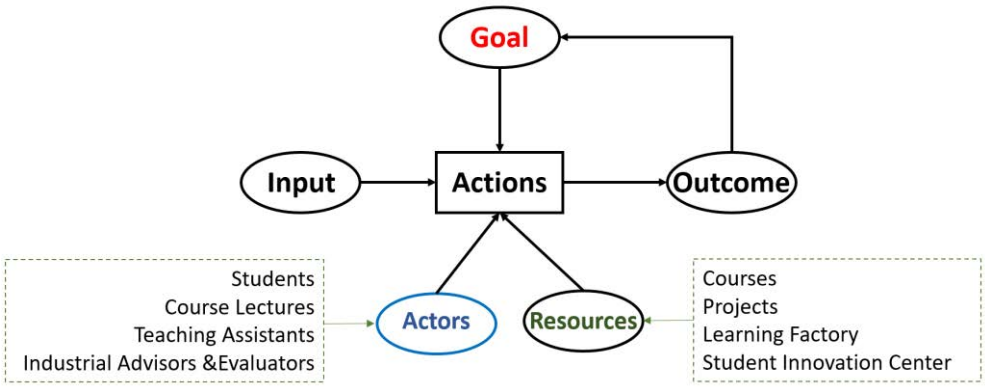

Fig. 2. New training model

2.2. The Overall Structure of the Design-driven Courses

The design-driven courses in ME SJTU consists of four step-by-step courses for the education of different levels of undergraduates, i.e. Introduction to Engineering for freshman, Design and Manufacturing I for sophomore, Design and Manufacturing II for junior and Design and Manufacturing III for senior. Fig.3 presents the overall structure of the courses.

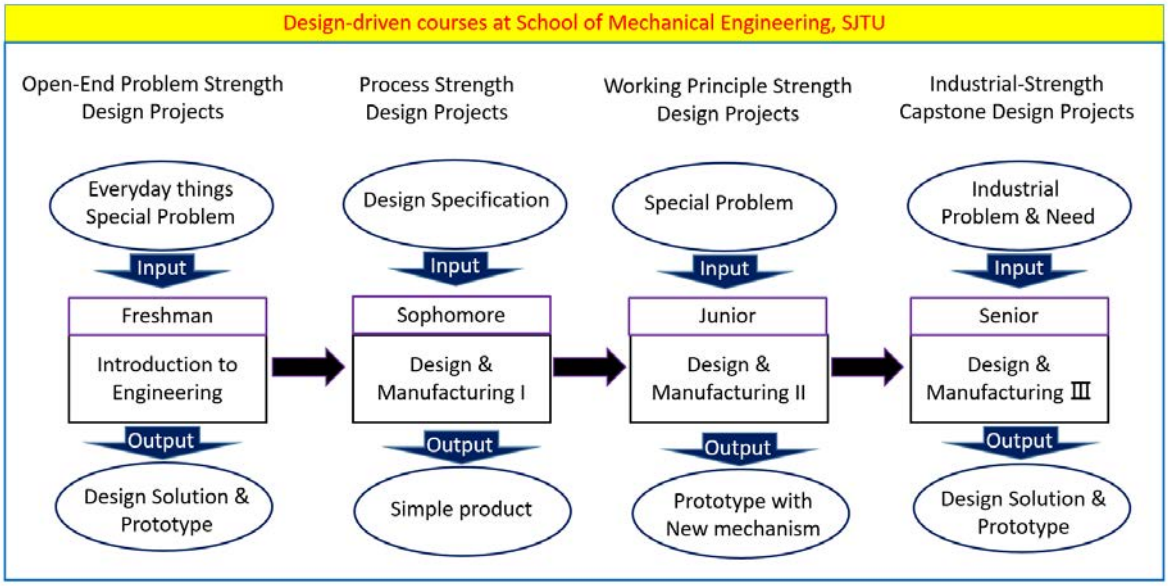

Fig.3.Overall structure and function of design-driven courses

Details description of the objective and key topics of the core design-driven courses are:

- **Introduction to Engineering**

Course objective: to focus on engineering cognition and cultivate the engineering thinking ability

Key topics:

- The responsibilities and challenges of engineers
- The ways and standards of scientific and technological exchanges
- The concepts and process of engineering design
- The fundamental concepts and process of manufacturing

- **Design and Manufacturing** I

Course objective: to focus on the design and development of simple products

Key topics:

- Methods and tools for engineering design
- Design representation and engineering drawings
- Fundamental knowledge of processing and materials
- Understanding and drawing of production diagram
- 3D modelling and related software

- **Design and Manufacturing** II

Course objective: to focus on the design and development of mechanism systems

Key topics:

- Characteristics and design methods of common mechanical structures
- Dynamic analysis of mechanical systems
- Characteristics and design methods of common components
- Requirements, methods and steps of mechanical design
- Production, assembly and debugging of mechanical systems

- **Design and Manufacturing** III

Course objective: to focus on the design and development of composite mechanical and electrical systems.

Key topics:

- The process and organization of the product design and development
- Coordination of multi-disciplinary tasks
- The protection of patents and intellectual property
- Economics issues in product design and development
- Industrial design process management

2.3. Assessment

In the four categories of design driven courses, the following assessments of leaning outcomes are developed.

- *In course assessment*. Blend assessment approach is adopted in course, which consists of process review from teachers, teaching assistant, peer reviews on several millstones (e.g., clarifying the requirements, conceptual design, prototype and final showcase) among teams.
- *Project showcase assessment*. In the showcase, more than 150 selected projects are exhibited in the stadium of SJTU. The learning outcomes of each project are assessed and validated by key stakeholders, i.e., experts from industry, teachers from courses and other university, and peers from showcase projects and the online reviewers from all the courses. Three level of Outstanding Project Award and the Best Creative Award and Best Student Favorite Award will be selected.
- *Reflections from students.* Students evaluate their personal gains after taking part in the design driven course.

3. Facilities for Design-Driven Courses

The information asymmetry between managers and students leads to the problem that a lot of teaching resources and facilities are not used in a timely manner. In order to integrate teaching resources so that the service can be offered to teachers and students to the greatest extent, the internet based resource information management platform (http://me.sjtu.edu.cn:8095), the learning factory and student innovation center are developed to help users (students and teachers) to find the right resource in supporting their course or projects, see Fig. 4.

(a)Learning factory (b) Student innovation center

Fig. 4. Learning factory and student innovation center

Only for the learning factory, since the official start in October 2012, the factory received 192 students in 2012, 1094 people in 2013; about 1400 visitors in 2014. With the operation of the appointment system for the information management service platform "learning factory" and the promotion of project learning, the "learning factory" is expected to serve more and more visitors in the upcoming years.

4. Implementation

4.1. Course Development

The core objective of ***Introduction to Engineering Course*** is to cultivate students' engineering cognitive abilities and design abilities. It‘s also aimed at improving their innovation abilities, inspiring them to experience the creative way of thinking and stimulating their creativity. This course will help the first year engineering students have a general knowledge of engineering, get to know the relationship between science and engineering, understand the basic concepts and general process of the preparation, manufacturing or construction of some engineering project. They will constantly try to find solutions to open-ended questions through Project-based learning approach. Fig. 5 presents different level of targets of the Introduction to Engineering course.

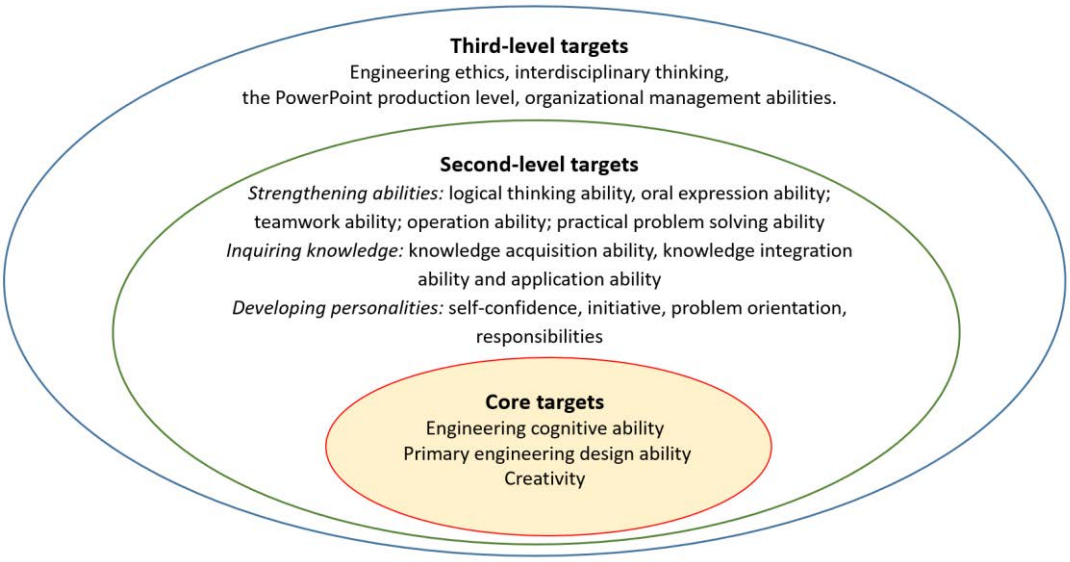

Fig.5. Three level objectives of Introduction to Engineering

Figure 6 outlines the organization of design drive course. As shown in Fig. 6, students are working together through project-based learning approach for problem solving with the support of teacher, teaching assistant and other resources. Their outcome will be assessed by multi-stakeholders.

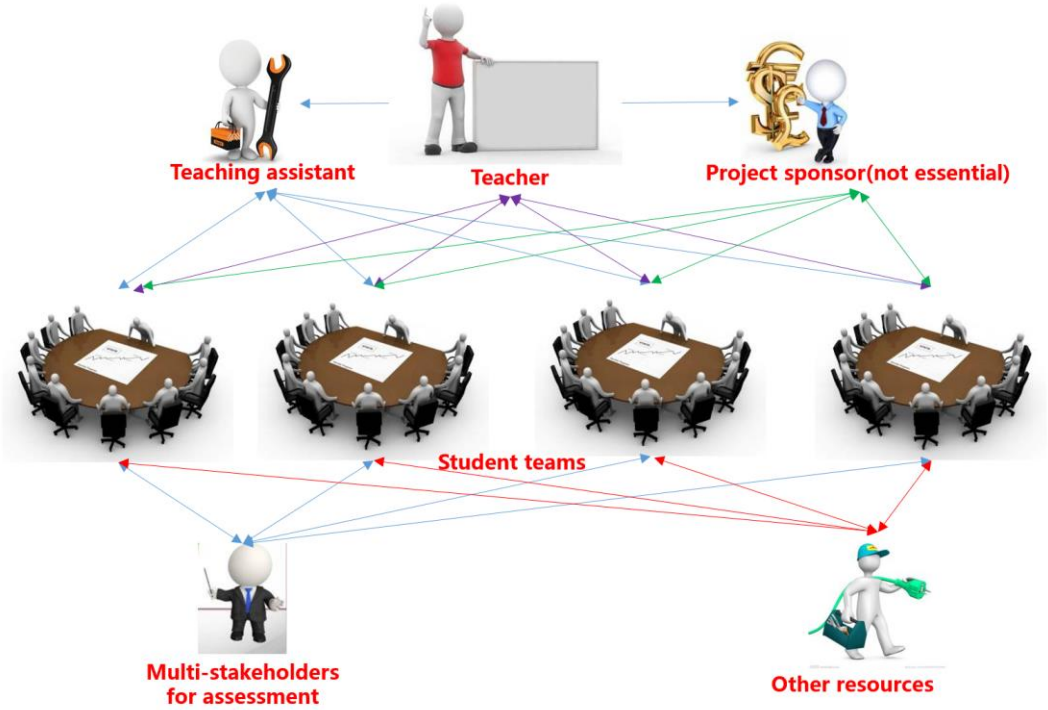

Fig. 6. Organization of course

4.2. Implementation of Design-driven Course

Figure 7 presents process of student centered learning and abilities cultivating in one of design-driven course. As shown in Fig. 7, four types of learning approaches are developed, i.e. learning by observing, learning by doing, learning by sharing and learning by discussing.

Fig. 7. Team and project-based learning approach

As shown in Fig. 8, four kinds of abilities are promoted in the design driven courses, i.e., presentation ability, prototype and showcase ability, communication skills and peer review assessment.

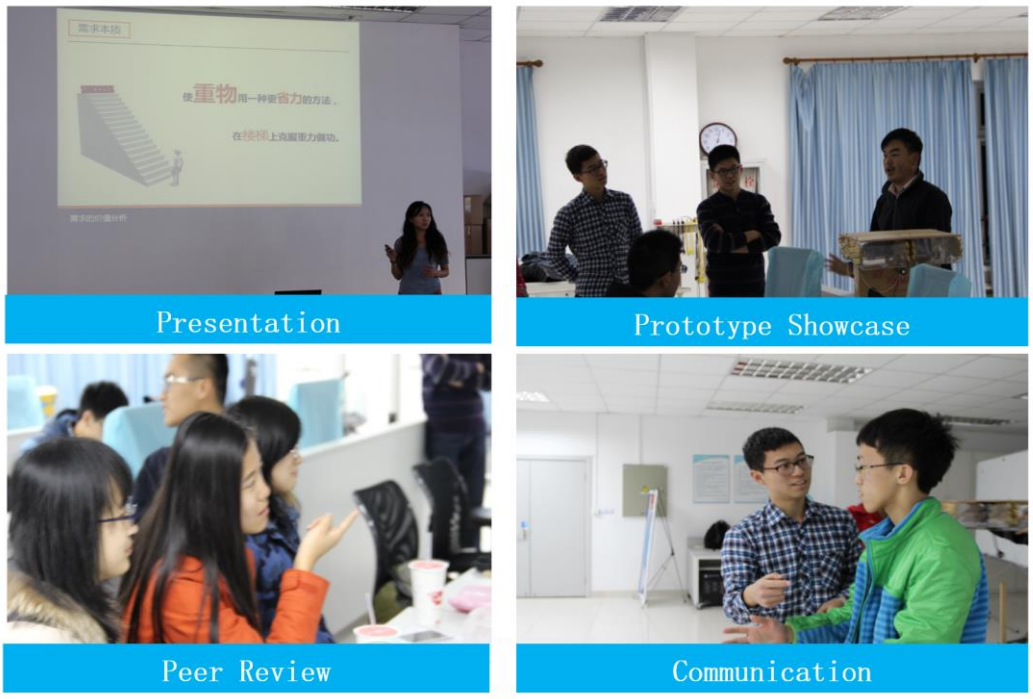

Fig.8. Cultivate abilities based on student centered approach

4.3. Outcome and assessment

- Outcome

The design of a planet lamp (the team has filed a national patent application) is presented to showcase of the outcome of an innovative product. In operation, the motor drives the output shaft 1 to rotate the helical gear 2 at an equal angular speed, thereby driving the gear ring 4 to perform unequal angular rotation. The friction ring 8 is fixedly connected to the gear ring 4 and the friction convex ring 8 Friction between the

friction wheel 5 friction transmissions, due to adjacent friction convex ring rotation angular velocity is different, it can drive the friction wheel for rotation and revolution. The friction wheel 5 revolves around the center of the lamp, and the sub-lamp 6 connected with the friction wheel 5 makes the rotation of the friction wheel 5 as the center, and the rotation and revolution of the sub-lamp 6 are realized. According to the assessment of experts, this product got the Third Prize of Outstanding Project.

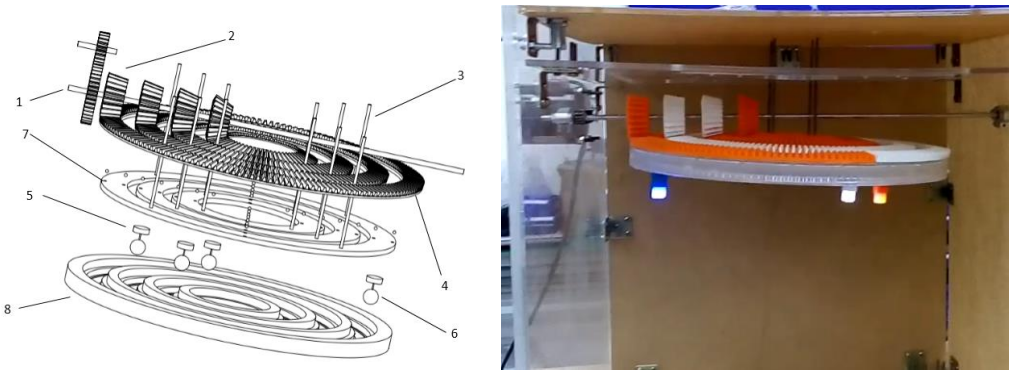

Fig. 9. Outcome of teamwork

- Reflections

Senior Student A, "These subjects are quite different from traditional subjects, which mainly use test and homework to judge a student and give the final grades. Most of us are supposed to be a good researcher or engineer, so it is essential for us to join and organize a project, to train the skill that used in real project. Some of us who may not be good at exam can find their talent in taking projects, and it can arise our confidence in research. What's more, we can realize that in a project, which role are we playing, a leader, a tech superior or somebody who always has brilliant idea. We find what we are good at, both what we are short of."

Senior Student B "As a mechanical engineering student, I think the courses such as Introduction to Engineering and Design and Manufacturing are the most challenging but also the most important courses for an engineering student. In these courses I learnt how to sufficiently analyze engineering specifications, apply basic engineering knowledge and mathematical analysis into practice, come up with appropriate solutions and solve unexpected problems during the process of design or manufacturing. In addition, I also learnt a lot of communication and group work skills which are very useful for engineers. Actually, in each project, we may meet various problems that are hard to be solved, but team work can help to enhance the speed of resolution. Finally, these courses helped me improving my self-confidence after finishing each project and achieving each objective."

After taking one of or all of the design-driven courses, the awareness of students to participate in the technology innovation activities was raised year by year. In recent years, students have won prizes for many times in the national and international competitions of science and technology, such as the National College Student Competition for Energy Conservation and Emission Reduction.

5. Conclusion and Future Works

This paper presents the latest experience of engineering education reforming in China, i.e. designing a series of courses with focusing on project-based teaching, learning and assessment. Four years practice at

School of Mechanical Engineering, Shanghai Jiao Tong University show that design-driven course has positive influence on the cultivating of engineering students with system thinking and creative ability, problem solving-ability, teamwork and communication skill. Assessment from industry showed that the reform of engineering education can bridge the previously existed gap between industry and university.
The ongoing work focuses on four directions. Firstly, more relevant teaching methods and facilities will be employed and developed to improve classroom teaching. Secondly, to keep on negotiating with industry to find more proper projects and external lectures. Thirdly, to incorporate emerging technologies into design-driven courses. Fourth, to develop more scientific assessment approach for student and outcome assessment.

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Determining the Skills Gap for New Hires in Management: Student Perceptions vs Employer Expectations

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Abstract

This study is an exploratory attempt to evaluate the skills gap in the discipline of business management, based upon the perceptions of students as compared to the expectations of employers. While it has been assumed that the skills gap may be a shortcoming of higher education's inability to understand employer needs (Everson 2014), it is expected that the gap is more a result of misaligned student interpretations of employer needs and an academic environment that increasingly views the student as the customer. If faculty consider the employer as a primary customer, then perhaps academic programs can be redesigned to provide better opportunities to new graduates.

Keywords: skills gap, student learning, soft skills.

1. INTRODUCTION

Numerous studies over several decades have demonstrated a skills gap between employer needs and the skill sets of university graduates (Cappelli 1995; Conrad & Newberry 2012; Everson 2014; Murti 2014). This skills gap has been observed across nations (Jackson 2009) and across disciplines (Jeswani 2016; Messum, Wilkes, Jackson & Peters 2016; Salleh, Yousoff, Harun, & Memon 2015). Typically, there is an ongoing distinction between expectations of ―soft" skills and ―hard" skills possessed by graduates. Typically, ―soft" skills are considered as those human relation and interaction skills which are not job specific. They are noticeable but difficult to measure. ―Hard" skills tend to be those skills which are more job or industry specific and more measurable.

It is possible this proposed skills gap is being exasperated by the shift from traditional higher education learning methods to more online learning. It is known that online learning opportunities have grown exponentially over the years as computer and internet technology makes such courses more easily accessible (Allen & Seaman 2010). The availability of technology to reach students anywhere, anytime, coupled with the convenience for the student and additional cash flow for the university has inspired growth in online learning. The question remains as to whether students are able to learn or practice human interaction type soft skills while participating in an online learning environment. Another trend that may be affecting the skill sets of new graduates is the trend among universities to view the student as a customer. Rising tuition rates make it more difficult to attract students, pushing universities to offer or promise more for potential students. As a result, students are treated more like an end consumer, with satisfying their needs and concerns a primary focus of the institution (The Chronicle of Higher Education,

2012). Likewise, students are showing a trend toward the assumption of exchange theory, where they have paid their tuition and in exchange they expect passing, or even superior, grades as a result (Schings, 2017).

2. EMPLOYABILITY AND THE SKILLS GAP

Employers seek applicants with capabilities, skills, abilities, and personality attributes appropriate for their work environment (Jeswani 2016). Most student who attend an institute of higher learning do so with the assumption that attaining a degree with improve their employability and their earning power. This concept of employability is often defined as a preparation for graduates to successfully get jobs and to develop in their chosen career (Askov and Gordon, 1999; Fugate *et al*., 2004). The Australian Department of Education, Science and Training (DEST) (2002) defines employability as having the skills required to both gain employment and to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise. These skills are not job-specific, but are applicable across all levels and in all industries (Jeswani 2016; Sherer & Eadie, 1987).Employability skills are those basic skills necessary for getting, keeping, and doing well on a job (Robinson, 2000). Such skills are assumed to be teachable (Lorraine and Sewell, 2007) and transferable (Yorke, 2006).Yorke and Knight (2003) define employability as "A set of achievements—skills, understandings and personal attributes—that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy". The University of Exeter defined employability as, "The establishment of clear mechanisms by which students can develop their abilities to use and deploy a wide range of skills and opportunities to enhance their own academic learning and enable them to become more employable" (Lee, 2000).

The background theory often related to employability skills development is the human capital theory, which states that 'employability' is not only about shaping talent, techniques, and experience for an individual to get a job, but more towards the ability to do the work (Schultz, 1963). The difference between the skills needed on the job and those possessed by job applicants is referred to as the Employability Skills Gap (Jeswani 2016). Particularly for hard skills, hiring applicants with job-specific skills is often difficult. As a result, many employers assume the responsibility of training new workers. However, this also requires an expectation of trainability. Trainability means applicants have well-developed generic skills such as creative thinking, problem-solving and analytical ability (Jeswani 2016). Thus, employers need new hires who can learn and who can easily work with others.

Employability from the university perspective is about producing graduates who are capable of getting employed. Therefore employability is a result of learning how to learn and is a process rather than a product (Jeswani 2016; Lee, 2002). Employability relates to the ability of the graduate to get a job and to remain a life-long learner (Hillage & Pollard, 1998; Jeswani 2016; Harvey, 2001).

3. PREPARING NEW GRADUATES

Recent university graduates have been described as having a more "an unrealistic view of the world of

work, an exaggerated notion of one's importance and a strong sense of entitlement" (Braid, 2007, p. 15).A study by Graduate Careers Australia (GCA, 2008) indicated that employers reported that graduates as having over inflated expectations of salaries and speed at which their career would advance (Jackson 2009).Schultz (2008) argues that firms tend to see most new graduates as self-centered, unable to integrate into an existing team, and expecting to be placed in a senior position without demonstrating qualities for leadership.

When employers were asked how well universities in the US are preparing graduates for the work world, results were mixed with about half positive and half negative responses (Hart Research Associates 2013). Firms have been arguing that graduates are not equipped with the right set of soft skills that would enable them to integrate themselves and contribute effectively at the workplace (Constable and Touloumakos, 2009).

A study by Messum, Wilkes, Jackson and Peters (2016) examined the employability skills of new graduates in Health Services Management in Australia. They found the ten most important employability skills to be (in rank order):

1. Verbal communication skills
2. Integrity and ethical conduct
3. Time management
4. Teamwork
5. Priority setting
6. Ability to work independently
7. Organizational skills
8. Written communication skills
9. Being flexible and open minded
10. Networking

A similar research brief reported by Hart Research Associates (2013) on behalf of American Association of Colleges and Universities indicates that employers want graduates who possess the following skills (in no specific order):

- Critical thinking
- Complex problem solving
- Written and oral communication
- Applied knowledge or real world settings

What may be difficult for university officials and program developers to work with is that most employers focus on soft skills as the primary attributes sought in a new graduate. However, soft skills are difficult to teach and even more difficult to evaluate in the classroom (Murti 2014).It is often assumed by university faculty that soft skills are acquired by students while they are otherwise involved with the academic process (Murti 2014). So while universities are more focused on content knowledge, employers are seeking a different measure for employability (Hart Research Associates 2013).

4. DETERMINING PERCEPTIONS OF MANAGERS VS. PERCEPTIONS OF STUDENTS

If it is true that universities are increasingly viewing the student as a customer, then it would reason that academic programs would cater more to student desires regarding program content. In addition, if student perceptions of employability differ from management perception of employability, it would reason that the skills gap would be increasing.

This is an exploratory study to determine the employability if a skills gap exists in the discipline of business management for a specific university and its surrounding community. If the process is successful, it is hoped that we can expand the process as a means of better understanding the needs of regional employers, and thus developing academic programs that better prepare our graduates to suit employer needs.

To test the hypothesis and assess our ability to survey employer expectations, several local managers were questioned about the skills and abilities they most sought from candidates in an entry level management position. Their responses were in close alignment to the findings of Hart and Associates (2013) and Messum, Wilkes, Jackson and Peters (2016). Based on these three total sources, a basic questionnaire was developed to include both soft skills, hard skills, and management knowledge. The hard skills and management content information were taken from both topics and expectations typically included in business management programs as well as suggestions from our participating managers. Respondents were asked to rate each item based upon1) Not Important, to 5) Very Important. Students in a capstone course in business management were selected as the new graduate representatives. Survey items are listed in Table 1.

Table 1

—Soft" Skills	**Employer Mean**	**Employer Std Dev**	**Student Mean**	**Student Std Dev**
People Skills/Social Skills	5.00	0.00	4.63	0.60
Critical thinking/problem solving	4.75	0.43	4.57	0.66
Leadership	4.75	0.43	4.44	0.75
Attention to detail	4.25	0.66	4.44	0.61
Honesty and Integrity	5.00	0.00	4.75	0.53
Teamwork skills	4.50	0.50	4.49	0.61
Work Ethic	5.00	0.00	4.78	0.49
Grit	4.13	0.78	3.95	0.72
Curiosity	3.38	0.70	3.56	0.92
Manners	4.38	0.70	4.43	0.79
Dress & Appearance	4.00	0.71	4.30	0.79
"Hard" Skills	**Employer Mean**	**Employer Std Dev**	**Student Mean**	**Student Std Dev**

Writing proficiency	3.75	0.66	4.10	0.81
Oral Communication Skills	4.13	0.78	4.71	0.45
Data analysis	3.25	0.66	4.06	0.79
Use of programs like Excel, MSWord	4.00	0.71	4.24	0.75
Mathematics	3.43	0.73	3.95	0.92
Coding/computer programming	1.88	1.27	3.03	0.93
Analyzing financial data	3.13	1.45	4.08	0.91
Foreign language proficiency	1.63	0.99	2.84	1.04
Management Knowledge	**Employer Mean**	**Employer Std Dev**	**Student Mean**	**Student Std Dev**
Management History	3.00	1.00	3.33	0.91
Strategy	4.00	0.71	4.05	0.82
Planning	4.00	0.71	4.30	0.79
Scanning and analyzing the environment	4.00	0.87	4.11	0.76
Goal setting	4.63	0.70	4.44	0.71
Implementation/Execution of plan	4.75	0.43	4.59	0.61
Human Resource management	3.00	0.87	3.87	0.83
Conflict management	3.75	0.66	4.05	0.81
Motivation	4.63	0.48	4.51	0.69
Group decision making	3.63	0.70	4.32	0.75
Total Quality management	3.63	0.70	4.32	0.75
Control processes	3.75	0.66	4.10	0.83

Response items, Means, and Standard Deviations

5. SURVEY ADMINISTRATION AND RESULTS

This survey was conducted in a community of approximately 75 thousand residents, including a university of approximately 7 thousand students. Twelve employers were selected for the survey because there are known to regularly hire new graduates for entry level management positions. Of those selected, 8 responded to the survey for a response rate of 67%. Students enrolled in the capstone course within the college of business were surveyed to determine graduate perceptions of skills required for an entry level position in management. Of the 76 students in the graduating class, 62 participated in the survey, for a response rate of 81%.

Responses were collected and Analysis of Variance (ANOVA) was used to determine the variance between employer perception and student perception of employability skills for new applicants in a management position. Results indicate that at the 0.10 level, the only items of significant variance are (Table 2):

Table 2

—Soft" Skills		Sum of Squares	df	Mean Square	F	Sig.
People Skills/Social Skills	Between Groups	.946	1	.946	2.888	*.094*
	Within Groups	22.603	69	.328		
	Total	23.549	70			
"Hard" Skills		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Oral Communication Skills	Between Groups	2.465	1	2.465	9.592	*.003*
	Within Groups	17.732	69	.257		
	Total	20.197	70			
Data analysis	Between Groups	4.698	1	4.698	7.495	*.008*
	Within Groups	43.246	69	.627		
	Total	47.944	70			
Coding/computer programming	Between Groups	9.498	1	9.498	9.809	*.003*
	Within Groups	66.812	69	.968		
	Total	76.310	70			
Analyzing financial data	Between Groups	6.465	1	6.465	6.421	*.014*
	Within Groups	69.478	69	1.007		
	Total	75.944	70			
Foreign language proficiency	Between Groups	10.501	1	10.501	9.498	*.003*
	Within Groups	76.288	69	1.106		
	Total	86.789	70			
Management Knowledge		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Human Resource management	Between Groups	5.410	1	5.410	7.621	*.007*
	Within Groups	48.984	69	.710		
	Total	54.394	70			
Group decision making	Between Groups	3.404	1	3.404	5.942	*.017*
	Within Groups	39.526	69	.573		
	Total	42.930	70			
Total quality management	Between Groups	3.404	1	3.404	6.611	*.012*
	Within Groups	35.526	69	.515		
	Total	38.930	70			

ANOVA Results

It is interesting to note the direction of relationships between the employability skills listed above. The only soft skill of significant variance was that of people skills/social skills, with employers rating the skill

higher than what is expected by students. Several hard skills indicated a significant variance of opinion, with students overvaluing each skill as compared to employers. Only three items regarding management knowledge had a significant variance, but again, students overvalued each skill as compared to employer opinions.

6. SUMMARY AND LIMITATIONS

In summary, students graduating in business seem to have a reasonable view of employability skills, as expected by employers. Students do seem to underestimate the importance of social skills, but both students and employers show a strong expectation for soft skills. In many cases students indicate a higher expectation for hard skills and management knowledge as compared to employer expectations. This may suggest that the concept of student as customer may not be completely prevalent in the classroom. It is very possible that student over expectations regarding the value of hard skills and management knowledge is a result of faculty support for the relevance of such topics.

Findings of this study support earlier research which suggests employers believe that universities should place less emphasis on foreign language proficiency, cultural diversity, and community engagement. Weligamage and Siengthai (2016) suggested that to better prepare graduates, universities should provide entrepreneurship development, organize career fairs, hold business lecture series and company visits, provide leadership and professional development programs and provide curriculum and practical training.

This study is only an exploratory search into the feasibility of gathering the opinions of employers and students about the employability skills of new graduates in entry level management positions. The sample size is small, the survey only measures one community and one university, and the survey only measures one business discipline. For research purposes, it is suggested that a greater number of sample areas be included as well as expanding across business disciplines. Another purpose of this exploratory survey was to determine the feasibility of measuring community opinions against student options about employability skills. Expanding this activity to include additional employers and additional disciplines may be an early step in redefining the concept of student as ―product," and our customers as those who accept our products after graduation. Hopefully this is an exploratory example of how faculty can question employers and redesign academic programs to better provide the employer with graduates who possess the correct employability skills.

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A look at the Postgraduation Stricto Sensu Scientific Production of Teachers in a Brazilian Federal Teaching Institution

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Abstract

This article aimed to investigate the areas of research interest developed in a Brazilian federal education institution, CEFET-MG. In order to do so, we analyzed the academic production carried out by teachers who work in the Postgraduation stricto sensu in this institution, verifying in which areas of knowledge their research has been carried out, based on the analysis of Lattes Curricula of its teachers between the years 2005 and 2016. It was chosen a qualitative, exploratory and descriptive research. Regarding to technical procedures, documentary research was adopted. The results showed that the teachers who had their Lattes Curricula analyzed come from different areas of knowledge and, therefore, their areas of activity and research are also diversified, mostly the researches developed in the Engineering and Exact Sciences, showing the strong technological character of CEFET-MG. This characteristic is also noticed in the distribution of the Research Groups by big Area of Knowledge and by the projects carried out by teachers and managed by Cefetminas Foundation.

Key words: Research; Scientific Production; Post-Graduation Stricto Sensu; CEFET-MG.

1. Introduction

According to the Aurelio (Ferreira, 1986:1320) dictionary, research means: "inquiry or thorough search that meets the reality; investigation, inquiry ". The act of researching is part of the daily life of all people,

whether to discover the lowest price of a product, the best hotel to spend the holidays or the address of a restaurant, people are always researching. However, in this study the focus of interest is the scientific research having as an aim the discovery of new knowledge in a certain area, carried out in educational institutions.

Therefore, scientific research is one of the pillars of university activity and requires a set of actions or procedures to be performed. It is a process of investigation that demands a methodological rigor for the solution of the problems. And in the words of Coutinho & Cunha (2004):
The research implies a disciplined process of actions with a view to the construction of a new knowledge or to the revision of some knowledge already constructed in some specific area. In this perspective, the research is a systematized collection of information regarding some particular event or phenomenon for the purpose of its exploration, its description and its explanation. It is the establishment of relationships between information transformed into data, so it might be explored, understood and incorporated into a theoretical system (Coutinho & Cunha, 2004: 39).

Moreover, Ohira (1998: 66) points out that the knowledge acquired by researches must be disseminated, "which will only be achieved if communication is reached, thus requiring properly conditions to the dissemination of intellectual production". Following this reasoning, Witter (1989) argues:
Scientific production is related to the performance of postgraduate courses, both for their scientific work and for their role in the training of teachers and researchers who will work in other entities, university or not. Its product is relevant, including as a vehicle for the change from dependency to scientific and technological independence and, consequently, economic and political independence (Witter, 1989: 29).

Therefore, the importance of Post-Graduate courses in doing research and publicizing their results in Brazil, the Coordination of Improvement of Higher Education Personnel (CAPES), a foundation of the Ministry of Education (MEC), is the body responsible for the expansion and consolidation of Post-Graduation stricto sensu in all Brazilian states. Then, only the master's degree programs (professional and academic) and doctorates evaluated with a grade of three or more are recommended, as well as the renewal and recognition of on-going courses, by CAPES through the National Education Council (CNE / MEC). It is important to note that, according to CAPES, only the courses recognized by this Council are authorized to issue diplomas in master and / or doctoral degrees with national validity (CAPES, 2008).

According to information available on the Sucupira platform, a CAPES tool for the collection of information and procedures on Post-Graduation, there are currently in Brazil 4,256 Postgraduate Programs, belonging to 49 areas of evaluation, divided as follows: Academic, 78 doctorate, 745 professional master's and 2,115 academic master's and doctoral degrees. Most of these programs are located in educational institutions in the Southeast (44.97%), followed by the South Region (21.22%), the Northeast region accounts for (20.23%), % of programs and lastly the North region with 5.45%.

The sucupira platform also provides the data quantitative of postgraduate courses belonging to the same 49 evaluation areas. There are a total of 6,370 courses divided as follows: 3,433 academic masters, 2,192 doctorates and 745 professional masters. When verifying the geographical distribution of these courses, it is realized that they follow the same proportion of the Programs: firstly the southeast region (47.47% of the courses are in universities of that region), followed by the south region (21.27%), In the northeast region, there is 18.58% of the courses, followed by the center-west region with 7.8% and, lastly, the northern region with 4.88%.

Among the institutions of education in the Southeast, the Federal Center for Technological Education of Minas Gerais (CEFET-MG) has been a focus of investigation in this study, due to its 108-years of tradition in professional technical education, offering a vertical education: starting with the technical education integrated to the secondary level, passing through undergraduate, postgraduation lato sensu, postgraduation stricto sensu and even the doctorate.

At CEFET-MG, it is highlighted the concern with scientific research as a contribution to the advancement of science and the discovery of new knowledge by encouraging research, through the activities of scientific initiation in projects developed by secondary students (BIC Junior Program) and the Institutional Program of Scientific Initiation Grants (PIBIC) for undergraduate students. Add to this the expansion of its postgraduation stricto sensu courses, which is clearly mentioned in the Report of Institutional Self-Evaluation, Research and Postgraduation - Base Year 2015, carried out by the Research and Post-Graduate School Board of that Federal Center:

> The development of such activities in CEFET-MG, as in the rest of the world, is closely linked to the performance and evolution of its research groups and Programs and Postgraduation Courses stricto sensu, composing and thus a binomial whose developments have contributed strongly to the achievement of the goals and aims established in the Institutional Development Plan (PDI) and also to improve the quality of Higher Education and Professional Technical Education offered at the institution (CEFET-MG, 2016: 5).

According to the report of Institutional Self-Evaluation Research and Post-Graduation - Base Year 2015:

> In its history, CEFET-MG has been consolidating itself as an institution of recognized excellence, a center for the technological training of professionals who work especially in the productive sector, applied research and training of technological teaching. The Institution's role goes beyond professional training and carries out a critical and constructive dialogue with society to generate knowledge and new technologies. Thus, Research and Postgraduate Studies are developed at CEFET-MG through projects that result in the strengthening and improvement of the institution's general Technological Education Program (CEFET-MG, 2016: 5).

Before of this reality, it was chosen to develop a study that investigated the areas of interest of research done at a Brazilian federal education institution, at CEFET-MG. For that, an analysis was made of the

academic production done by the teachers of this institution who work in the Post-Graduate stricto sensu courses, verifying in which areas of knowledge their researches have been carried out, from the analysis of Lattes Curricula of their professor-researchers between the years of 2005 and 2016.

2. Theoretical Bases

The Scientific research

It is not only in the research pillar of universities that research-related activities take place. These are also always being carried out in teaching activities, because it is through the research that is taught and learned. Also the extension pillar of universities has a strong interface with research, due to its social function of bringing knowledge built in university to society, ie the results of research have to be used by society. Therefore, academic practices interconnect through the three university pillars as explained by the National Plan for University Extension of the MEC (2007). The university extension is constituted of a set of activity that are:

> Academic practices that interconnect the university and the community in their teaching and research activities, providing the training of the citizen professional through the constant search for the balance between social demands and the innovations that emerge from the academic work (MEC, 2007: online).

Following that understanding, the analysis of Severino (1996) is extremely pertinent:

> In the University, teaching, research and extension effectively articulate, but from research, that is, one only learns, one only teaches, one researches; Services are only provided to the community if such services were born from the research. Teacher needs the practice of research, to teach effectively; the student needs it, to learn effectively and meaningfully; the community needs the research, to be able to have knowledge products; and the University needs research to be a mediator of education (Severino, 1996: 63).

This dialogue between university activities to the principle of inseparability, as provided for in article 207 of the Federal Constitution of 1988, and that is how the university stands on its three pillars. Therefore, it is reinforced here, that research runs through all the pillars. However, it is important to note that each pillar is related to a type of research (Figure 1). Basic research is scientific research that aims to generate new knowledge and thus contribute to the advancement of science. Applied research, on the other hand, uses scientific research for practical applications aimed at solving specific problems involving local truths and interests (Córdova & Peixoto, 2009).

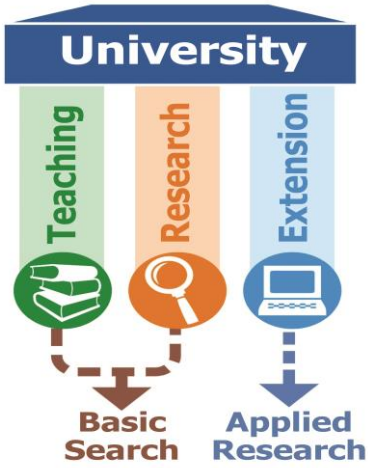


Figure 1. The pillars of the University and its researches.
Source: Prepared by the authors

In order to carrying out the research, it is fundamental that research groups, created by the National Council for Scientific and Technological Development (CNPq) in 1992, have the function of stimulating the construction of knowledge through studies and debates on an area of knowledge and /or dialogue between different areas. It was from these debates on that the concerns and ideas of research appeared, and these groups are responsible for most of the investigations carried out today and also for the training of a huge group of researchers (Marafon, 2006).

The research groups have representatives, students and teachers, from all levels of education, from undergraduate to doctorate. The research carried out within these groups has awakened in students the investigative sense and provided them the appropriation of knowledge. The results of researches conducted at universities ought to be known by academic area and society. This is usually done through the scientific articles, the course completion works (TCC) which are carried out at the undergraduate level, the monographs (Post-Graduation Programs lato sensu), master's dissertations and doctoral theses (Post-Graduation stricto sensu), which are the materialization of research results.

Thus, for a study to become a scientific publication, an academic rigor is necessary in its elaboration, as Erdmann (2011) explains, it is necessary to write in appropriate language, pleasant, precise and clear, to bring possibilities of success of accepting the article for publishing. The Figure 2 shows the materialization of the research results, in which the link with the research groups might be noticed.

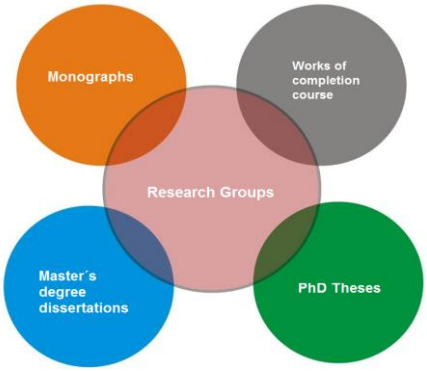


Figure 2. Search for Undergraduate and Postgraduate.
Source: Prepared by the authors

The incentive to research also happens through the training of researchers, through the granting of scholarships at all levels of training, such as:

1. Scholarships for Scientific Initiation of fomentation agencies (financial and non-bank institutions) of the States, such as the foundations of support for state research, in the case of Minas Gerais, FAPEMIG.
2. Institutional Program of Scientific Initiation Scholarships (PIBIC) of CNPq.
3. Young Talents Program for Science CAPES.
4. Financing of Studies and Projects (FINEP).
5. Resources from the own institution.
6. Research grants from private and public companies.

Support Foundations in the context of universities

Support foundations of the Federal Institutions of Higher Education (IFES) are non-profit, private law organizations. Some also have the title of Civil Society Organization of Public Interest (OSCIP) and are recognized as a foundation of fund by the Ministries of Education and Science and Technology and are governed by the Brazilian Civil Code. They fund extension and research activities and enable integration actions with public agencies, development agencies or private companies. According to (Rocha, 2016):

> In general, the academic community has perceived funding foundations as effective tools for managing human and material resources for university projects and programs without the traditional bureaucracy of the public sector. Undoubtely, this is an important role of the funding foundation that usually supports the work of teachers and academics through project management (Rocha, 2016: online).

Thus, the support foundations in the context of the IFES have a fundamental role, mainly because it can meet the needs of the institution supported, having agility, flexibility , administrative and financial autonomy, which in many cases is a lack in the universities. Therefore, "the field of teaching and research

is one of the most likely and fertile to the foundational performance" (Paes, 2010: 260).

The Figure 3 shows that support foundations, universities and development agencies and / or companies (public or private) are interlinked for research and development. Each of these three institutions has its rules, functions and responsibilities: in universities, research projects are developed by teachers and students; the development agencies and / or the companies financially support the projects and the funding foundations run the financial and administrative management of the projects as well as their accountability. Thus, all of them are contributing to the scientific and technological development of the country.

It is key to be emphasized the partnership between these three institutions is firmed through contracts or agreements, "with a waiver of bidding to manage institutional projects, yet subject to the limits of the legislation as a way to avoid the distortion of this partnership of great importance for public universities" (Pinto, 2013:09).

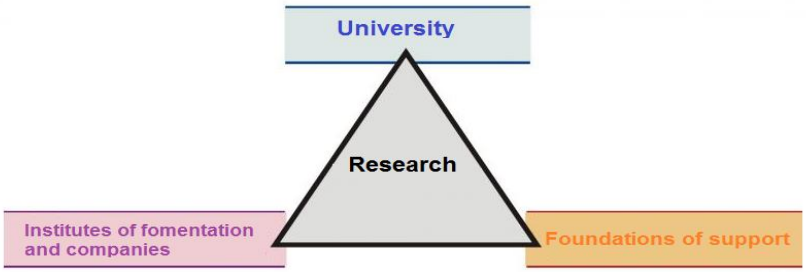


Figure 3. Institutions that support research in universities
Source: Prepared by the authors

In this research, the foundation that supports the institution of teachers who had their productions analyzed was the Foundation for Support to Education and Technological Development of Minas Gerais - Cefetminas Foundation (FCM), which is a private law organization, non-profitable, federal OSCIP and recognized as a foundation of support by the Ministries of Education and Science and Technology. The FCM has been operating for 22 years and has supported extension and research activities, as well as enabling integration actions with public and development agencies or private companies.

The activities of Postgraduation stricto sensu at CEFET-MG began in the late 1980s with the creation of the Advisory Office for Research, Graduate and Extension (AEPEX). The course started in 1987/1988 with an experimental group resulting from an agreement between CEFET-MG and the University of Loughborough in England. In addition, in 1991 it was offered the first regular group of Master studies in Technology. And, because it integrated two major areas, Education and Technology, the conception of research within this Master was very broad. With regard to training for research, Sales & Santos (1997) point out that the Master in Technology involved:

Education for Technology and Technology for Education or Technology in the service of human

formation, progress and well-being of the humans, in other words, training of the master's degree in the light of the purpose of the areas of Technological Education and Integrated Manufacturing by Computers as technical areas to meet the practical demands placed by the scientific-technological evolution of Education and Technology (Sales & Santos, 1997: 99).

The institution continued its trajectory and, in 2005, the Postgraduation Stricto Sensu began at CEFET-MG, with the approval/recommendation by CAPES of two new master's courses: Technological Education, and Mathematical and Computational Modeling. At that time, AEPEX was extinguished and the establishment created the Direction of Research and Postgraduation. Since then, new Masters and PhD courses have been created in the institution, as shown in Chart 1.

Chart 1. Trajectory of Postgraduation stricto sensu courses in CEFET-MG.

Course starting and situation	Programs/ Courses	Nr. of Professors		Concentration Areas	Concluded Dissertations
		Permanent	Contributors		
1991 – 2005	Master in Technology	-	-	1) Technological Education. 2) Integrated Manufacturing by Computer	198
2005 –on going	Master in Technological Education	17	0	1)Technological Education	280
2005 –on going	Master in Maths and Computational Modeling (PPGMMC)	22	3	1)Maths and Computational Modeling	220
2007 –on going	Master in Civil Engineering	12	2	1)Civil Construction 2) Structures	58
2008 –on going	Master in Engineering of Energy	17	1	1)Engineering of Energy	51
2009 –on going	Master in Electric Engineering	21	0	1)Electric Systems 2)Modeling and Systems Control	45
2009 – on	Master in	18	2	1)Technology	111

going	Language Studies (POSLING)			and Discursive Processes Processos	
2010 –on going	Master in Engineering of Materials	17	0	1)Science and Material Development	72
2013 –on going	Doctorate in Maths and Computational Modeling	The same professors for master in PPGMMC		1)Maths and Computational Modeling	1
2015 - on going	Master in Administration	12	3	1)Process and decision-making systems	0
2015 –on going	Doctorate in Language Studies	The same professor for master in POSLING		1)Technology and Discursive Processes	0
2016 –on going	Master in Multicentric in Chemistry	7	0	Chemistry	0

Source: Prepared by the Authors.

It is important to highlight the MSc in Multicentric Chemistry does not yet have a dissertation concluded, since the course began to be offered in the year of this research, 2016. However, it is necessary to clarify that the data were collected until October 2016. It is also worth noting that during the conduct of this research, CAPES approved the doctorate in civil engineering at CEFET-MG, and the expectation is that the first selection document for this doctoral degree will be published in early 2017, and the area of concentration is the sustainable construction with two lines of research: Sustainable building materials and Construction components and building processes.

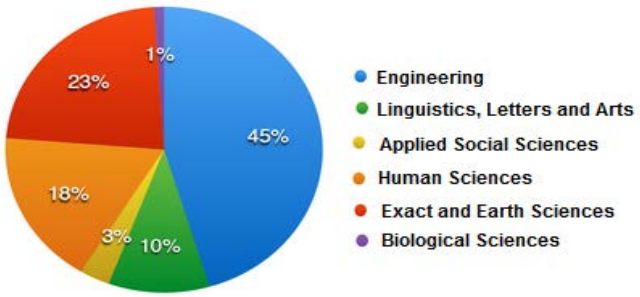
In order to complete Chart 1 data were collected from the information on CEFET-MG website, and also contacted the coordinators of all the courses by telephone to check the information, since the body of teachers acting in the postgraduate courses depends on the accreditation and the re-accreditation of teachers, and depending on the academic production of each teacher he or she does not remain in the teaching staff.

Following the data presented in Chart 1, it might be seen that in the period from 1991 to 2016, 1,035 master's dissertations and a doctoral thesis were defended, that is, 1,036 scientific studies carried out from many researches, are scientific discoveries that contributed to the strengthening of their areas, but also brought benefits to society in general. Another point verified was that, during the data collection period, none of the courses had the presence of visiting professors, only the permanent ones and contributors.

Since CEFET-MG offers a master's degree in Electrical Engineering in association with the Federal University of São João del Rei (UFSJ), the body of teachers in this course is organized as follows: 17 professors are from CEFET-MG and 9 belong to UFSJ. The same happens to the master's degree in Engineering of Energy that is held in association with the UFSJ, therefore, it is composed of 11 are professors of CEFET-MG and 8 belong to the board of professors of UFSJ, adding to this board of professors one who belongs to the Federal University of Viçosa.

All of these teachers participate in research activities, which take place within the research groups, organized around one or more lines of research in a field of knowledge. The groups are registered in the Directory of Research Groups of CNPq and certified by the educational institution.
The first research groups of CEFET-MG began their activities in the 90's and nine research groups were formed, which in 2015 had 95 research groups registered in the Directory of Research Groups in Brazil, managed by CNPq. "This increase indicates the correct direction that was taken to consolidate the policy of encouraging the formation of research groups and valuing the researcher in the Institution" (CEFET-MG, 2016). Graph 1 shows the Distribution of Research Groups by Large Area of Knowledge. It is noticed that the Large Area of Knowledge in Engineering is predominant, with 45% of the total, followed by the Great Area of Knowledge Exact Sciences and the Earth (23%). This result was already to be expected, since CEFET-MG has a strong technological character.

Graph 1. Distribution of Research Groups by Big Area of Knowledge.



Source: Research and graduate direction of CEFET-MG
(http://www.posgraduacao.cefetmg.br/dppg/index.php/pt/grupos-de-pesquisa)

3 Methodology

In this study, we opted for qualitative scientific research. As for the type of research, it was exploratory and descriptive. Regarding the technical procedures, documentary research was adopted, which according to Vergara (2009) is a study done in documents found in public or private agencies, which in this case was the database of the Lattes Platform of CNPq, As well as data from the archive of FCM projects. This research was divided into two stages:

1st stage: In the second semester of 2016, a curricula consultation was made to the Lattes Platform of the CEFET-MG professors who work in the Postgraduation stricto sensu. We analyzed 154 curricula. For each of the curricula analyzed, the following variables were raised:

a) Profile of teachers.
b) Area of knowledge in which the doctorate was held.
c) Areas and major areas of knowledge in which doctoral research was developed.
d) Scientific production of teachers.

2nd stage: In the second semester of 2016, a consultation was done on the data of the projects managed by FCM on the projects developed by CEFET-MG teachers. The following variables were investigated: development agencies and companies (public and private) financing the projects and the areas of knowledge in which the projects were developed.

4. Results and data analysis

Presentation and result analysis of the research stages:

1st stage

a) Profile of teachers: Of the 154 professors who work in the Postgraduation Programs stricto sensu of CEFET-MG, the majority (137) did their doctorates in Brazil and 17 abroad. This might be explained by several reasons, such as: the improvement of the quality of universities in Brazil that have academic programs as good as those of universities abroad; The teacher does not need to obtain funding for staying abroad; The professor is confident on the recognition of his/her doctorate by CAPES (which is not always the case when the doctorate is done abroad). Already 57 of these professors did postdoctoral studies, 70% were attended in Brazil and 30% abroad.

In relation to the gender distribution, the majority are male (105) representing 68.2% of the total number of teachers, while female teachers represent 31.8%, and in the Civil Engineering course a tie was found in this relation . In the other seven programs, the number of teachers was higher than that of teachers. This result may be related to the strong technological character of CEFET-MG, and confirm the Brazilian reality in which, until now, the exact areas are preferred by men, while women prefer the human or health areas, as shown by the Census of Higher Education 2012, published by the National Institute of Studies and Educational Research Anísio Teixeira (Inep): one-third of the men who graduated opted for courses related to engineering.

b) Area of knowledge in which the doctorate was held: When investigating this item, it was noticed that all of the Postgraduation Programs stricto sensu of CEFET-MG, there are teachers who work in different areas of knowledge. It was verified by the area in which the professors defended their doctoral or postdoctoral research. In Table 1 we can observe this diversity of areas by Program, highlighting the Postgraduate Program in Civil Engineering that has teachers from 11 different areas. In the first column of this table the total number of teachers of each program is in parentheses and in the second column, the number of teachers referring to each maximum degree is in parentheses. In those who do not have a number, they consider themselves a teacher.

Table 1. Knowledge area in which the teachers who work in the Postgraduation programs of CEFET-MG held their doctorates.

Programs	Maximum Titles
Administration (15)	Administration (8); Production Engineering (2); Civil Engineering; Electrical Engineering; Physics; Science and Tecnology Policy Studies; Sciences of management.
Civil Engineering (14)	Civil Engineering (4); Structural Engineering (4); Architecture and Urbanism; Earth Sciences; Aeronautical and Mechanical Engineering; Mechanical Engineering; Material Engineering; Chemistry; Sanitation, Environment and Water Resouces.
Energy Engineering (18)	Mechanical Engineering (14); Civil Engineering; Electric Engineering; Chemistry Engineering; Energy Engineering.
Material Engineering (17)	Metalurgical and Mining Engineering (10); Mechanical Engineering (4); Material Engineering (2); Transport Infra-Structure; Chemistry.
Electric Engineering (21)	Electric Engineering (20); Computational Modeling.
Language Studies (20)	Pos-Doctorate in Linguistics, Letters (9); Pos-Doctorate in Human Scienc (1); Pos-Doctorate in Social Sciences (1); Doctorate in Linguistics (3); Doctorate in Literary Studies (3); Doctorate in Letters (4); Doctorate in Education (1).
Technological Education (17)	Pos- Doctorate in Human Sciences(7); Doctorate in Philosophy (1); Doctorate in Mathematics and Sciences Teaching (1); Doctorate in Urban Education (1); Doctorate in Management and Public Policies (1); Doctorate in Information Science (1); Doctorate in Education (6)
Mathematical and Computational Modeling (25)	Pos-Doctorate in Physics (3); Pos-Doctorate in Engineering (2); Pos-Doctorate in Exact and Earth Sciences (2); Doctorate in Computing and Systems Engineering (2); Doctorate in Physics (2); Doctorate in Computing Science (2); Doctorate in Electric Engineering (1)
Chemistry (7)	Chemistry (4); Theoretical Chemistry (2); Chemistry Sciences.

Source: Research Data.

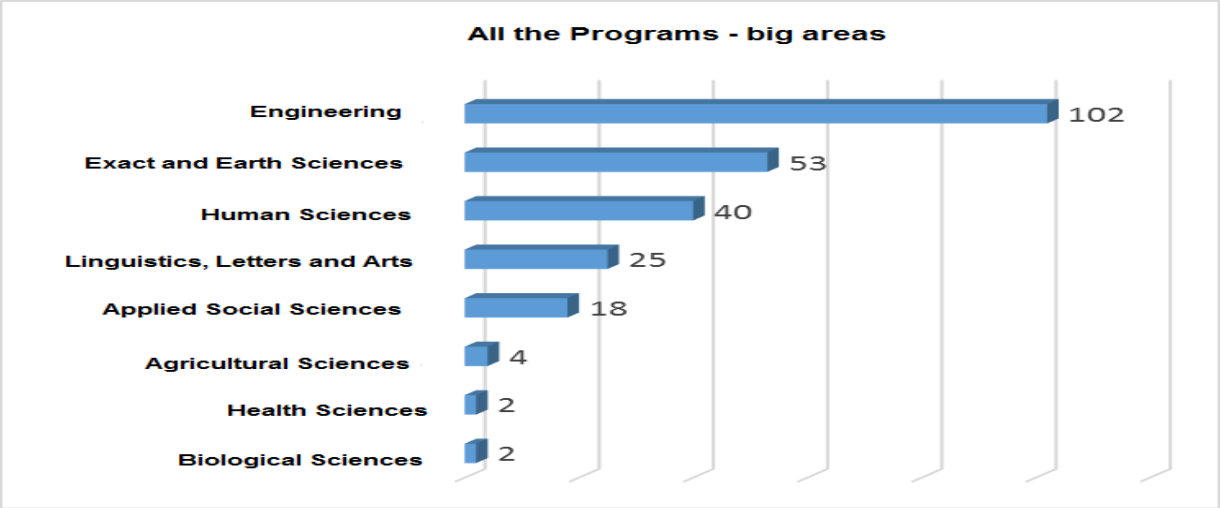
Thus, the results obtained evidenced the interaction between the knowledge of different areas of knowledge in the postgraduate programs of CEFET-MG, which contributes to the enrichment of the paths of a research and promotes the global integration of sciences and the scientific advance As Piaget (1981) points out in defending the idea of breaking the boundaries between disciplines.

c) Areas and big areas of knowledge in which the doctoral research was developed: It is important to note that the teacher, when selecting in his curriculum Lattes, his area of activity is indicating in which area his research is developed. However, it should be considered that a teacher can select one or more areas and big areas of action. Therefore, when analyzing the 154 Lattes Curricula of teachers, we identified 246

Major Areas of Practice, as can be seen in Figure 2.

The data in chart 2 indicate that although CEFET-MG has teachers working in different areas of knowledge, most of them work in the big area of Engineering, followed by Exact Sciences and Earth, which reinforces the conclusion obtained in figure 1which is the strongest technological character of CEFET-MG.

Graph 2. The Major Teacher Performance Areas in all the Postragduation stricto sensu Programs of CEFET-MG.

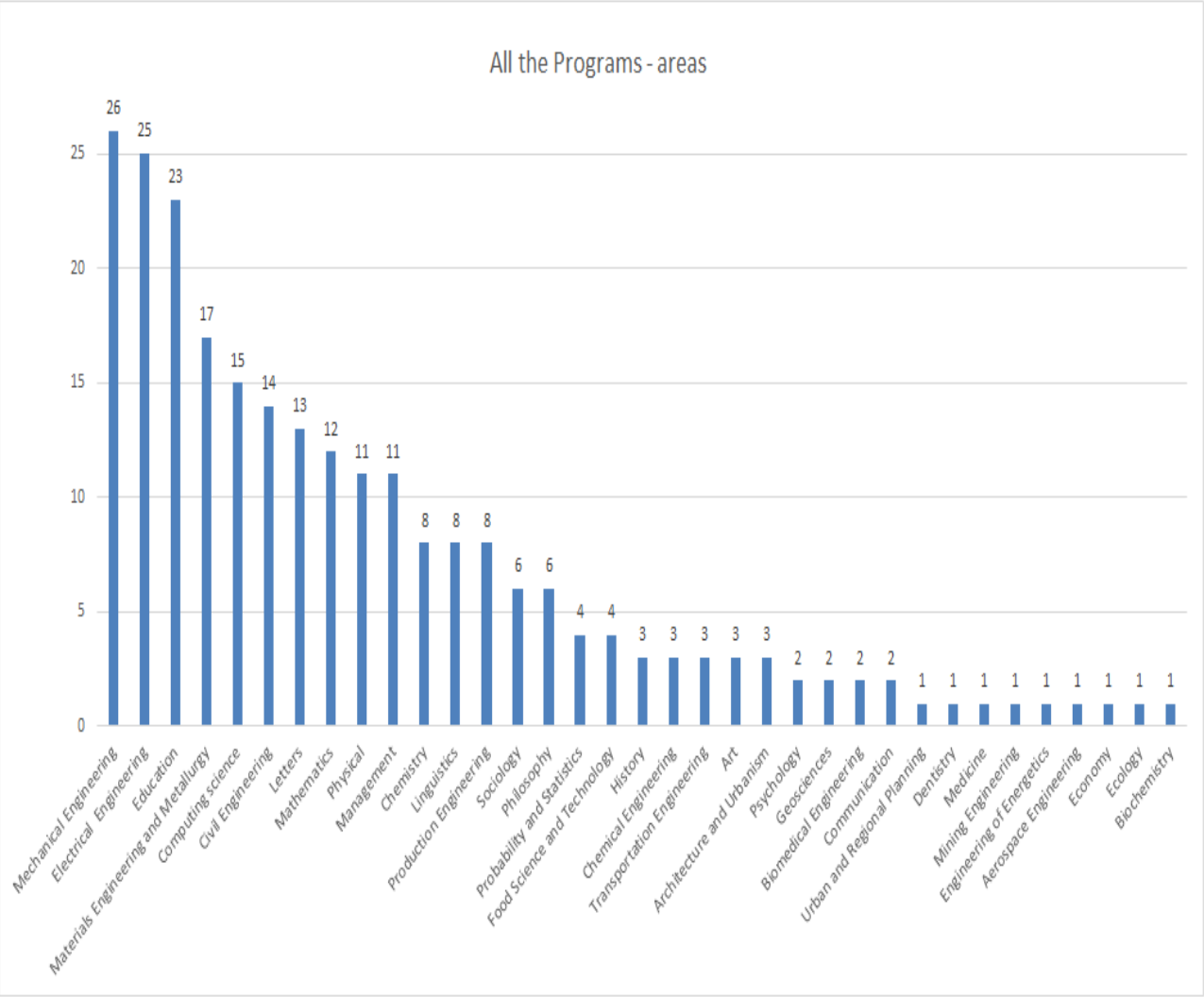


Source: Research Data

In Figure 4 the charts with the information on this item by program are presented. When looking at this figure, we can see the diversity of areas of knowledge per program, which was also proven in the item on the areas of knowledge in which the doctorate of each teacher was developed. It is worth highlighting here the Mathematical and Computational Modeling Program, with six different areas of activity. Once again the Great Area of Engineering and Exact Sciences and Earth are the majority.

Similar conclusions were obtained when analyzing the actions of the teachers by area of knowledge, Graph 3: the great diversity of areas (35) in which the professors develop their researches and, once again the highlight for the technological areas (54% of activity areas). However, it is necessary to consider that a teacher can select, in his Lattes curriculum, more than one area of activity.

Graph 3 - The areas of teachers' performance in all the Postgraduation stricto sensu Programs of CEFET-MG.



Source: Research Data.

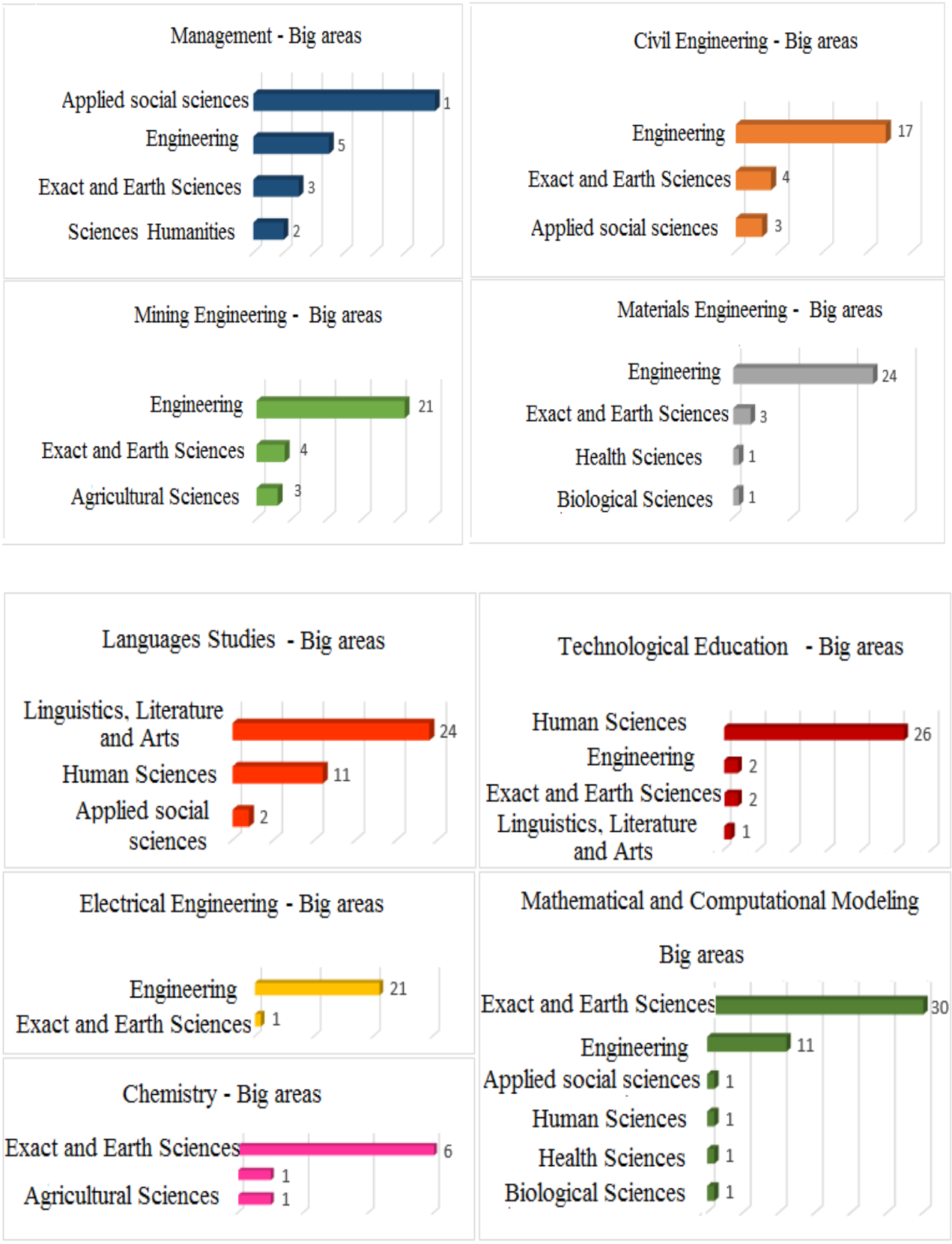


Figure 4. Graphs that represent the Postgraduation Stricto Senseu Programs of CEFET-MG and the Areas and the Great Areas of teachers' performance.

Source: Research Data

About scientific production of teachers: It is through the publication of the teachers' studies, whether in the form of four categories of publication: periodicals, book chapters, complete books or published articles in annals of events, that the findings of their researches are transmitted to the Scientific community and society as a whole. It is the socialization of knowledge. And as Erdmann emphasizes (2001) it is important to recognize the contribution of a journal to the advancement of an area, promoting scientific development. At this stage the bibliographical productions that the professors declared in their Lattes Curricula were raised, but only the complete articles published in periodicals, the books, the chapters of books and the works published in annals of events were only interested in research.

Before presenting the results, it is necessary to point out that each postgraduation program has its specificity and characteristics, which influences the place where its publications are most important. Thus, between 2005 and 2016, professors of the CEFET-MG Post-Graduation courses published 6344 scientific studies, Table 2. It is noticed that most of this publication was done in papers published in annals of events (63.14%), followed by full articles published in journals (28.78%). The category in which the CEFET-MG teachers published the least, was in complete books.

It is also noticeable that only the professors of the courses of Chemistry and Technological Education published their searches more in complete articles than in another category. In the other courses, the largest number of publications was made in annals of events. Another finding is that the programs that have published most of their researches are: Mathematical and Computational Modeling and Electrical Engineering. Emphasizing the Chemistry course had its first class in the year of this research, in 2016, which justifies a smaller number of publications of its teachers.

Table 2. Quantities of scientific publications produced by the professors of the Postgraduation Programs of CEFET-MG from 2005 to 2016.

Programs	Publication Categories				Total of publications by programs
	Complete articles published in periodicals	Works published in Event Annals	Books	Book Chapters	
Administration	246	306	6	23	581
Civil Engineering	149	270	1	9	429
Energy Engineering	147	435	3	19	604
Material Engineering	151	503	2	6	662
Electric Engineering	245	831	2	10	1.088
Language Studies	212	482	47	138	879
Technological Education	192	182	48	145	567
Mathematical and Computational Modeling	355	930	6	46	1.337
Chemistry	129	67	0	1	197

Total	1.826	4.006	115	397	6.344

Source: Research Data

Comparing the data of Chat 1 (number of teachers per program) with the data of Table 2, it is possible to verify the relation of published research by teachers. The programs that present the major relationships are: Mathematical and Computational Modeling with 53.48 publications per teacher and Electrical Engineering with a ratio of 51.8. These results reveal the profile of the research carried out at CEFET-MG, where publications in the Major areas of Engineering and Exact and Earth Science dominate.

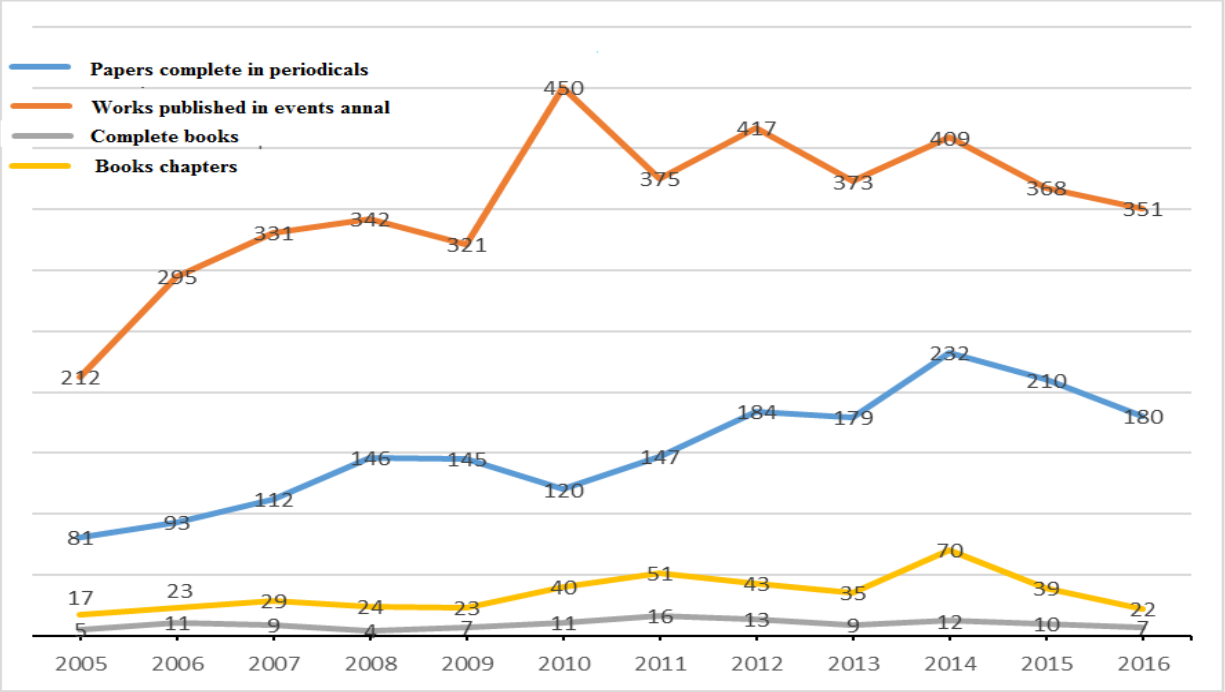
The Graph 4 shows the evolution of the publications of the teachers by category of publication over 12 years, period of investigation of this research. It might be seen that the publications of the full articles in annals of events presented a gradual increase between the years of 2005 and 2008 and after a decline in 2009 there was a great jump in the number of these publications in 2010, which was the highest point. However, from that point on, it showed oscillations in its curve, and in the last year of analysis it ended with a number of smaller publications of the last five years.

The curve representing the number of papers published in periodicals, shows a growth between the years 2005 to 2009, between 2009 and 2010 it presents a decrease in the number of publications and, from then on it begins to grow and in 2014 has its greater peak and from year to year the number of publications falls. Publications in book chapters and in complete books present curves with few fluctuations of increase or decrease, indicating a flow in the number of publications.

One aspect that needs reflection is: in all four categories the year 2016 had the lowest number of publications in relation to most of the analyzed years. Although the reasons for this fact were not investigated in this study, one observation is important: it was found that in many curricula analyzed, in-press articles were declared that have not yet been published. It is believed that in 2017 they will be published with the year 2016 and thus the reality presented in figure 4 may improve.

Other reasons may also be related to this fact: Curricula Lattes not updated and even with problems in filling it; Teachers with high production who are retiring; Newly accredited professors in the Graduate programs; Recently created programs (two in 2015 and one in 2016); Difficulty in getting a publication, the number of articles submitted have grown more than the number of new journals; and lack of stimulus given to researchers. But one detail caught the attention: in the curricula Lattes of the teachers were found many articles accepted for publication.

Graph 4. Evolution of teachers' publications by publishing category.



Source: Research Data

2nd Stage

During the study period (2005-2016) FCM managed 212 projects coordinated by CEFET-MG teachers, and the funding institutions were: FAPEMIG (with 177 projects); FINEP (with seven projects); FAT VITAE (with four projects), and 24 projects supported by companies: Cemig, Petrobrás, Acellor Mittal Brasil, Orteng, Belgo Bekaert Arames, MMX Mineração e Metálicos, Porto Real, Senergy, RNP and Metal Cycle. The importance of the development agencies, specifically FAPEMIG and FINEP, as well as the support for the research and production of knowledge of CEFET-MG, is perceived here. These projects were developed in the different areas of knowledge (Table 3).

Table 3. Distribution of projects managed by FCM and coordinated by CEFET-MG teachers by area of knowledge.

Major Areas of Knowledge	**Quantity**
Engineering	129
Human Sciences	27
Exact and Earth Sciences and Mathematics	29
Linguistics, Letters and Arts	15
Applied Social Sciences	7
Biological Sciences	5
Total	212

Source: Research Data

These data reaffirm the realities presented in Graphs 1, 2 and 3: most of the projects developed by CEFET-MG professors are related to the technological area (74.53%), adding the Big Knowledge Areas: Engineering and Exact Sciences and Earth.

5. Final considerations

The results found in this research showed that the teachers who had their Lattes Curricula analyzed come from different areas of knowledge and, therefore, their areas of acting and research are also diversified. However, predominantly the researchers developed in the Engineering and Exact Sciences, which proves the strong technological character of the CEFET-MG.
Reinforcing this technological character, the data also showed that most of the projects carried out with funding from the development agencies and managed by the support foundation come from the Engineering and Exact Sciences.

Another conclusion that deserves to be highlighted is where the results of the research carried out at CEFET-MG are published. It can be inferred that most of this publication was made in works published in annals of events and by the complete articles published in periodicals, the category in which CEFET-MG professors least published was in books. In relation to published researches by teachers, the programs that present the greatest relationships were: Mathematical and Computational Modeling and Electrical Engineering. Once again, these results reveal the profile of the research carried out at CEFET-MG, where publications in the Large Fields of Engineering and Exact Science and Earth dominate.

Although there are 95 CEFET-MG research groups registered in the Directory of Research Groups managed by CNPq, which is a stimulus to the development of research produced in the academic field, the year 2016 presented the lowest number of academic publications of its professors. This fact is worrying, since in Brazil the researches are linked to Postgraduation Stricto Sensu programs, and one of the ways of disseminating the knowledge resulting from the researches carried out in the scope of the masters is through the scientific publication.

Therefore, in order to improve this reality, it is necessary to increase the number of professors with a doctorate degree, to strengthen the partnership between the university and the development agencies, to increase research grants, to value research activities such as: orientation; Participation in research groups; Participation in commission board and in scientific events and to review scientific works, in didactic tasks. Recalling that academic publishing is the result of research, that requires time, funding and that each area of knowledge has its own characteristics and rhythms.

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–Children's First Experiences in School" A Reflection for Parents and Teachers

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Abstract

Children are products of their environment and their parents/caregivers (the persons or people who raised them} are their first teachers. When children are enrolled in school, they bring with them what they have learned from their home environment. This could be positive or negative and it may fit into their new learning environment or it may not. It becomes the task of the teachers and staff to help these children adapt to their school environment by applying certain methodologies.

Rules must be developed and implemented. From an early childhood perspective, it is recommended that not more than five basic rules be implemented in order that students may remember them. Having this list of rules posted in the classroom may serve as an excellent reminder for children and at times the rules may be fully brought to the attention to children who cause the most distractions in the classroom. Developing these rules with the children's input will able them to remember and follow the rules. In addition, the cooperation between teachers and students helps in establishing a community environment whereby the children feel a part of the school and classroom while helping the teacher to remind children to follow the rules that they have to developed. It has been demonstrated that once students have participated in developing the rules that are posted in the classroom, they will remind other children when they are exhibiting inappropriate behavior and are not following the rules. This is a great help to teachers because they will then continue their teaching without interruption to correct errant students. The children are then able to become a group of community learners that feel supported by the teacher and each other. Of course, in a home environment, parents can establish rules with their children and these can also be posted on the refrigerator for easy reminders and viewing.

Some teachers tend to forget that the children in their classrooms may not come from the same environment as the teacher. It becomes critical therefore that teachers accept all children for their individuality and that the teachers be reminded that in single household children from the same biological parents and with the same childrearing practices, offer some similarities among the siblings, but also differences as well. Some children before arriving at school, may have had many tasks at home to be completed. These tasks may range from taking care of siblings, fixing breakfast and lunch, and getting themselves ready for school. Teachers in the classrooms need to be aware that some children are undergoing these kinds of adult tasks and challenges before the school day even begins. This forces a teacher to stay on task with the students in order to accommodate these kinds of challenges that particular affects the urban learner. Applying Vygotsky's Social Constructivist Theory may answer these questions and challenges. Vygotsky's, theory postulates that the teacher's primary role is to guide and help children

construct or build their behavior and use it in socially appropriate and productive ways. Vygotsky‘s use of scaffolding would then play a critical role by implying that the teacher must use informal methods such as conversations, questions, modeling, guiding, and supporting children to help learn concepts related to knowledge and skills that they might not otherwise learn by themselves (Morrison, 2008).

Scenarios

One scenario demonstrates how teachers and staff at a high school applied the Social Constructivist Theory and scaffolding with a Jamal who was encouraged to become a dynamic, hard-working, focused young person. This kind of support was extremely instrumental in helping Jamal move forward proactively in life and is a perfect example of how teachers and school staff can effect positive change for those children in need. This is a real case scenario: Jamal was a high school student whose mother passed away at the age of 12 years-old. He was raised by his step-father, because of his job requirements as a sailor, he was never around to provide consistent parental guidance. Jamal was basically left to raise himself. He worked a part-time job at a department store, while also participating in school activities including playing on the Varsity Football Team. All of this while maintaining a 3.0 GPA. Being aware of his background, the principal, teachers, and some parents in the school supported Jamal and offered guidance when needed, including providing resources for him to attend college, sometimes providing clothes that were needed for prom and receptions and making sure that his high school experience continued to be positive. As a result, Jamal graduated from college and is now matriculating toward a master‘s degree. Jamal is black and the principal and staff were white, and it is a clear indication where a school staff refused to prejudge a student and offered support to allow him to reach his optimal potential.

This scenario demonstrates how teachers can stay on task with children and help them to meet challenges by collaborating with parents and families. Although it may appear that some parents are not involved with the school or their child from the teacher‘s perspective, it is paramount that teachers be aware of their biases toward some parents and these biases may keep them from implementing best practices (Jalongo & Isenberg, 2008). Some teachers have the motto” parents who care” and ―parents who don‘t care” and often the ―don‘t care‘ groups would be those whose race, class, culture or language differs from the teachers. (Jalongo, 2008) The best goal is to create a plan of communication and positive interaction with all parents (Hartle, 2007).

A second scenario of teacher bias was with Kyle (a Black male in third grade) who was in the ninetieth (90^{th}) percentile on a standardized test. When the teacher received the results she not only asked Kyle if he was of Spanish descendant but asked him if he had taken the test at a prior time. This being a clear example of teacher bias and a preconceived notation that Kyle being a Black male would not be capable of scoring so high on a standardized test. The behavior of this kind of teacher is unacceptable and must be eliminated in schools. Teachers are expected to treat all children fairly and equally and not be allowed to prejudge a child because of his skin color or rac A Nurturing Environment

A Nurturing Environment

Children are sensitive individuals and they are very aware of who accepts them and those who are

indifferent to them. Teachers can make a world of difference by making each child feel special and wanted by showing empathy to their children. Allowing children to make- up missed work when circumstances occur can be very helpful to children. Greeting children cordially on a daily basis, talking to children and finding out how they are feeling and if everything is fine with them, telling children to always do their best work, and demonstrating that the teacher has confidence in children's' excelling at school, are ways to demonstrate that teachers are being understanding and supportive. The simple daily conversations can be helpful to children. It gives students a sense of belonging and a feeling that the teacher does care about their welfare. For some children, the teacher may be their basic support mechanism and in this case the teacher will provide the children with the necessary skills to reach their optimal potential.

Bonding with the teacher and building trust with the urban learner can be very significant in the learner accomplishing and completing assignments. Once the teacher has bonded with his/her children, the teacher will know what children really have a lot on their plate and those who are lazy, and who may just want or need special attention. As students bond with their teacher and build trust, this kind of relationship will build confidence and self-esteem with the urban learner. Of course, these characteristics are very important for children to build and develop so they will meet their optimal potential. Scaffolding can be very helpful with these students and minor mistakes continuously repeated can be caught and corrected. In this way, the teachers can continue to assist the students and help to build every child's academic talents.

Teachers must recognize learning differences and remember Howard Gardner's Theory of Multiple Intelligences (MI). This theory discusses how there are eight different intelligences---intrapersonal, interpersonal, musical, logical/mathematical, linguistic, bodily/kinesthetic, visual/spatial, and naturalist. For Gardner, each form of intelligences involves unique cognitive skills that can be demonstrated through solving problems and creating products that are culturally valued. (Jalongo &Isenberg, 2008). Gardner suggests that while certain intelligences dominants, all of the intelligences work together to help individuals solve problems and accomplish tasks. Teachers would need to recognize this theory and apply various teaching applications so that students would be able to learn through the application of their different intelligences.

Appreciating and Respecting Cultural Differences in the Classroom

An example for supporting children is teaching the students to know about differences and similarities within the classroom and school. An example, one English Language Learner (ELL) was speaking to her four-year-old classroom peers. Once she completed speaking, one little girl said, ―What did you say?" Well, the ELL stopped talking out loud in the class. She felt offended when the students could not understand her. That was a teachable moment. The teacher could have explained that the student was from a different country (named the country) and named the language that the student speaks and now the student is learning English and will soon be able to speak two languages.

That explanation from the teacher would demonstrate sensitivity to the child, exposing the other child to

another country and language. In addition, this incident made the English Language Learner feel good about herself and also showed that it was fine to be different. Even if there were no cultural differences within the classroom, the children could be exposed to other cultures by literature, media, field trips and having special guests come into the classroom who may be able to share their various cultures with the students.

It is extremely annoying and unfair when children are from a different cultural group and they are referred to as ~~t~~hose children". No matter where students are from they all need love, respect, hope and the reassurance they can learn and that their school environment is a caring place where teaching and learning takes place and they are a valued member of this learning environment. They must feel that the learning environment has been put in place for their enrichment and their social development and is a place where they look forward to being part of a learning community. Even adults, when they enjoy something, they want to do it and do it well.

To be effective, teachers should actively research the cultures of each child within the classroom. One of the best ways to become familiar with a child's culture is to invite parents into the classroom to talk with the other students about customs, bringing in artifacts, pictures, books, and maps. Sharing how holidays are celebrated and other things that would give the student's classmates a respect and appreciation for another culture. When teachers are aware and familiar with a student's culture, it makes the student feel comfortable and welcomed in the environment. Most cultures celebrate a holiday in December, this would be a great educational experience for the children to celebrate and to be exposed to different holidays.

When cultures are celebrated it is important to start with the different cultures within the classroom. These kinds of diverse lessons give students a cultural perspective and will assist in eliminating any biases that the child may have been exposed to or may not be exposed to. As a result, the child has formulated a perspective about differences in cultures. This is also a perfect opportunity to demonstrate in lessons how people are alike and different. Teachers may want to prepare graphs on differences such as eye colors, hair colors, height, and teachers demonstrate things that we like that are the same such as foods, hobbies, favorite television programs or places to visit. Upon completion of a unit, the classroom can always have meaningful pictures (real photographs), language experience charts, globe and maps, family pictures for each child, multicultural picture books and other kinds of artifacts. The different skin tones of crayons, markers, paints, and papers are ideal for students to select and make pictures of themselves and family members. These cultural activities should be completed throughout the year, not just during Black History Month or Hispanic Month and should be integrated throughout the curriculum. Once the children have been exposed to their own culture in the classroom then the teacher may begin to introduce other cultures to the children.

So often with culture we celebrate a specific month or day and never discuss culture again until the designated day or month comes again. Culture should be recognized on a daily basis and should be part of the learning experience of all students (Sparks 1989). Teachers should teach students how to appreciate different cultures that will influence a student's learning experience and also how the student feels about themselves.

The Child s Sanctuary-School

A child‘s school should be a safe and fun environment for students. Certainly, special treats such as a popcorn party, field trips that are developmentally appropriate for the child, infusing technology and creativity throughout the environment, and allowing children to think outside the box would be a developmentally appropriate environment.

Teachers should not make a child feel badly if their response to a question is incorrect. Instead, if a child gives the wrong answer, a teacher can say that is one way to answer the question, but the teacher can continue asking other students until the appropriate answer is giving. If students are constantly told they are wrong or to repeat an answer, they are going to shut down and not respond anymore. The student will feel embarrassed and will feel that they will be wrong again and so it is no longer any reason to respond. Sometimes teachers forget about children‘s feelings. What could be very meaningful to a child may be quite insignificant to an adult or better still the student may be hurt over something the teacher or parent may not even consider.

Children will act the way they are treated. If students are treated as being smart and told that they are smart, they will act accordingly. That whole self-fulfilling prophecy is one to be dispelled. That is the preconceive notion that some students are not that smart so we will not teach them like we would teach other children that teachers consider smart. Sometimes that notion is developed because of environment, race, or children may be low performing.

Some strategies to eliminate this Prophecy would be to assist children in reaching their optimal potential academically and to understood, appreciated and respected every child‘s culture. Having parents or other family representatives to share and expose their culture in the classroom will reinforce the respect of the culture, in addition to showing students that their families are a part of the educational experiences. Children are more motivated to learn when they are comfortable and they feel that the learning environment respects who they are.

Teacher Engagement is essential in developing a child to their optimal potential. Teacher engagement falls into four distinct types, two of which are affective and focuses on human relationships in the school, and two of which are instrumental and focuses on the goals of teaching and learning (Firestone & Rosenblum, 198; Bryk, Lee, & Holland, 1993). Each form of engagement is vital and must be present for teaching to remain effective for all students (Williams,2003). Williams (2003) describes four types of engagement:

1. Engagement with the school as a social unit. This type of teacher views children as friends and family. This kind of engagement, the teacher attends after school events and cares about the adults in the school and integrates personal life and work life.

2. Engagement with children as unique, whole individuals rather than as ―empty vessels to be filled”. Leads classes so that children are acknowledged and responds to children‘s thoughts and knowledge. Many types of informal and formal coaching, sponsoring, mentoring, and counseling activities are additional examples of engagement with children. These teachers involve themselves in the children‘s personal and school lives, and in general makes themselves available to children who need support or assistance.

3. Engagement with academic achievement. Curriculum writing and sharing with other teachers, makes good and creative use of class time, expresses high expectations for academic performance, provides useful feedback to students, and actively considers children‘s assessments are all ways teachers can engage in their children‘s achievement.
4. Engagement with a body of knowledge needed to carry out effective teaching. Keep current in their content fields and incorporate new subject related ideas into their classrooms. Expresses one‘s personal passion for a subject, seek ways to connect the subject to children‘s lives, being involved in professional organizations, and pursuing advanced degrees in one‘s field can be examples of this form of engagement.
Respecting the urban learner is the best way to integrate school and culture into the classroom. Children will be motivated to learn and families will know that they are a part of the learning experience. This will be the beginning of the bonding and trusting relationship with school and home. From this experience, teachers can continue to engage families in the learning process that will be occurring on a daily basis in the child‘s classroom.

Training in Multicultural Education/Diversity

Many times teachers and teacher assistants will have to be trained to integrate multicultural education within the classroom setting. It is important that the teaching staff know who they are and know that they possess a positive perspective on culture. Culture within the classroom can only be integrated and be positive if the teacher is positive and appreciates culture. Teachers must be willing to have training in multicultural education and be ready to admit their biases. Once teachers can be honest with their own feelings regarding culture, they will be in a position to learn about, respect, and appreciate other cultures.
Multicultural training will help teachers to begin to expose all children and families to the exposure of appreciation and respect for culture, in addition to demonstrating the importance of multicultural education. This cultural process will help rid the belief of the the self fulfilling prophecy. This prophecy is the preconceived notation. that some students will not learn and that it is not necessary to challenge these particular children.
It is important to know that many times it is the teacher who makes a difference in a student‘s learning experiences. It is only fair that teachers are given the appropriate skills that they need to promote continuous growth in the learning environment. Academically, building on a child‘s strengths is the beginning of this process. When children are respected and they know that they are in a caring and loving environment, they will be ready to learn and do their best. Teaching does involve knowing the child and being familiar with the student‘s strengths and weaknesses. This beginning is the foundation of learning and gives the child a positive sense of self. As learning begins, children feel they are appreciated and acknowledged for who they are and what they bring to the learning environment is valued.
It can be very significant that some assignments that teachers give children can be about the process not the product. In cases where every assignment is given a letter grade some students who are not working on grade level continue a downhill battle. However, if some assignments can be about the process, it can give all students an opportunity to excel. When children receive the bonding, nurturing and verbal praise from teachers, it can motivate the child to work harder and excel with all assignments and overcome

challenges that may seem difficult for the student.

Helping Families

When parents are viewed as being deficit, the school should provide information on how to become better parents (Linn, 1990). This view of parent involvement is often directed toward minority and low-income parents (Jennings, 1990). This approach often makes parents feel they are the cause of their children‘s failure in school. Teachers are presented as more skilled in parenting than parents (Banks & Banks 1997). Parents and teachers may even become rivals for the child‘s affection (Lightfoot, 1978).
In some situations, families have challenges in their lives such as martial problems, financial problems or health concerns that would affect the productivity of the child in the learning environment. It is necessary that the school assist the families in order for the child to continue to learn without distractions. Some other things that the school might include for families could be field trip cost, provide lunches for children, provide school supplies, provide proper clothing, food and shelter. The school should have a fund for these necessities and the school should partner with agencies who can help and assist families who may be having these challenges. This is a challenge that all school systems have not taken into account, however, it is necessary for the education system to develop a mechanism that will enable all students to have their basic necessities met and to be able to attend to school without carrying this kind of ―luggage" with them on a day to day basis. This mechanism would allow students to be ready to learn and to excel in school.

It is important to remember, to recognize, and to acknowledge that the parent is the first teacher of the child. Parents need to be welcomed and embraced. It can make a teacher‘s job less difficult when a parent is involved in the learning process of their child. Although every parent will not attend PTA meetings or Back to School Night, but teachers should reach out to parents and discuss how they can be helpful in the learning process of their child. A personal phone call or an email can be helpful. Remember that every home may not have a computer, so it is important that we find out if the child has tools to work with when we communicate with the parents. Once parents feel that the teacher really values their child and parents wants the involved in the teaching and learning process, it can be a rewarding parental/family experience. Having a checklist that all parents fill out can help parents feel connected. This checklist should have something that all parents can be a part of, even if they cannot come into the school. Parents have to bond and trust the teacher before they can be supportive. Sometimes parents do not feel welcomed or they feel intimidated by the school so they stay away.

Making parents feel a part of the school and contacting them can be a first step in building a necessary rapport. Sometimes, it is the grandparent or another family member who may be the person who represents the child and supports school activities. That family member representing the child should be welcomed just like a parent without any prejudging.

Summary Analysis

Children are products of their environment. When the learner comes to school, they bring their environment with them. It is important that educators help the learner adjust to the school environment and make the learner feel a part of the school. Allowing the children to develop the classroom rules, accommodating, and involving parents /family in the school environment is the beginning of a collaborative teaching and learning experience. Nurturing, bonding, and scaffolding with the urban learner is pivotal for the learner to excel to their fullest potential. In addition, appreciating and respecting cultural diversity is critical in helping the children reach their optimal potential.

Remembering the nurturing experience of Jamal who was in high school and how the teacher and school staff became his support mechanism is critical in helping students be successful. The school staff and other parents understood that he had limited family participation and assisted him and motivated him to do well and to reach his optimal potential. This gives one an idea of how critical the teacher and school are in the development, motivation, and the ultimate success of students.

The teacher and parents will need to remember the following:

- Children are products of their environment.
- Students should be allowed to develop the rules for the classroom (no more than five rules).
- Every student in the classroom is unique.
- Some children may complete many tasks and challenges before they arrive to school.
- Utilizing the Vygotsky‘s Social Constructivist Approach Theory and scaffolding can be instrumental in developing a supportive, enriching environment.
- Jamal‘s scenario demonstrates the outcomes of teacher, and school staff and other parents‘ motivation and encouragement.
- Creating a plan for parent/ family collaboration.
- Bonding and communicating with children on a daily basis is very necessary in developing and instilling a positive self-concept.
- The importance of Gardner‘s Multiple Intelligence Theory is crucial. The application of diverse teaching strategies would meet the learning styles of all children.
- Recognizing, appreciating, and respecting culture daily, not only for special cultural weeks or holidays.
- The four types of teacher engagement are critical in order to develop the school as the child‘s sanctuary.

With the school, teacher, child, and parent/family collaborating together, the student will have the critical support mechanisms in place to excel academically and reach their maximum development and academic potential. It is very significant for the school, teacher, child, and parent/family collaborating together. The child will have the critical support mechanisms in place to excel academically and reach their maximum developmental and academic potential. It is very significant for every child to have a family member support their academics and be involved in the school. School, family and child collaboration are key components for children to excel academically.

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Anti-monopoly Regulation on the Standard Essential Patent-On Huawei v. the US IDC

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Abstract

With the arrival of the Sci-Tech era and information era, the standards-essential patent becomes increasingly important and the educational circle is more and more concerned about the study on the anti-monopoly law of standard essential patent. Since many lawsuits on the standards-essential patent occur in recent years, the educational circle of China begins to think seriously over the new legal issue. From the perspective of the anti-monopoly law, this thesis gives an introduction to the concept of standards-essential patent and takes the specific case of Huawei suing the US IDC as an example to analyze how to make use of the anti-monopoly law in China to regulate the standard essential patent .

Keywords: Standard Essential Patent; Anti-monopoly; Regulation; Huawei v. The US IDC

1. Introduction

With the arrival of the knowledge economy era, there are more and more patents in the field of technical standards, which are called as the standard essential patent. The implementation of standards in order to make the products meet the technical standards of standardization organizations have to use standard essential patents in the system. Standards play a key role in many industries, including those critical for future growth. Intellectual property (IP) owners vie to have their technologies incorporated into standards, so as to collect royalty revenues. Therefore, once the formation of standard-essential patents, the patentee will use standard gain advantage in, through the control of patent license to competitors, or to control access to high patent licensing fees, and even more as the limit of the tools of market competition. Nowadays, there are a lot of intellectual property rights disputes among large multinational companies, and we should pay more attention on the negative effect resulted from the abuse of it. As we all know, if enterprise controls the standard essential patent and abuses it, it will implement monopoly behaviors, which will form monopoly status in related markets and cause the formation of international trade barriers moreover.

Standard-setting organizations (SSOs) perform three functions. The discovery function consists of learning about, and certifying the value of, various combinations of functionalities. The standardization function then steers market expectations toward a particular technology; the SSO usually selects one of several options. Patents that are ex ante dispensable to the extent that technology variants that do not rely on them were competing with the selected one may thereby become ex post, ―standard-essential patents.” Most SSOs perform a regulation function, requiring the owners of patents covered by the standard to

grant licenses on fair, reasonable, and nondiscriminatory (FRAND) terms. Needless to say, such loose price commitments have been conducive to litigation. Both the antitrust practice and the legal literature (e.g., Swanson and Baumol 2005; Schmalensee 2009; Lemley and Shapiro 2013) emphasize that ―fair and reasonable" must reflect the outcome of ex ante technology competition, not of the manufactured ex post monopoly situation.3 But it is difficult, if not impossible, for a court to determine ex post how valuable a given patent would have been in the ex ante world in which the standard was formed.

In order to regulate the abuse of standard essential patent, we should make full use of Anti-monopoly Law, which takes maintaining the market competition order as its primary task, puts more obligations to maintain market competition on standard essential patent, recognizes and regulates the abuse of standard essential patent monopoly more strictly. The US IDC in the standard advantage made negotiations with Huawei company about essential patents licensing with the unfair treatment to Huawei, because it made full use of patent licensing negotiations to seek specific performance control, to maximize their own interests. From the perspective of the monopoly law, this thesis gives an introduction to the concept of standard essential patent and takes the specific case of Huawei suing the US IDC as an example to provide some reflections and suggestions for the regulation of the anti-monopoly law of standard essential patent in China.

2. Materials and Methods

2.1. The Basic Facts of Huawei v. the US IDC

2.1.1.The Introduction of Two Parties

Huawei Technologies Co, Ltd. the plaintiff of this case, which has its own business scope mainly including development, production and sales of data communications equipment, broadband multimedia equipment, wireless communications equipment, electronics, terminal equipment and related maintenance and technical advisory services, is one giant of the world's main communication terminal manufacturing. In terms of patent holdings, the plaintiff Huawei company owns a number of patent technology at home and abroad and has joined the global 123 major standard organizations.

Inter Digital Group, namely the IDC company, the defendant of this case is a giant of global communication standard patents. Interactive digital group has a lot of standard essential patents in the field of global wireless communication technology ,which are the key standards of application of 2G, 3G and 4G. The defendant interactive digital group makes lots of profit with its essential patents by authorizing patent rights to other companies such as Huawei, and it does not produce any substantive business products.

2.1.2.The main Facts of the Lawsuit

The plaintiff Huawei and the defendant the US Interactive Digital Group (hereinafter referred to as the IDC)are the members of the European Telecommunications Standards Organization. According to the ETSI policy provisions of related standard patents, before the holders‘ relevant patent technology are included in the ETSI standard, the holder must be committed to grant an irrevocable license of the patent technology with the principle of "fair, reasonable and non-discriminatory (FRAND requirement)" . In

September 2008 to August 2012, the defendant has sent patent license offer to the plaintiff four times in totally. In the offer, the defendant has granted the plaintiff Huawei company related standard essential patents in the field of 2G, 3G global communication, and the plaintiff Huawei must pay the necessary fees for these licenses. However, the offer of licensing fees is too harsh for Huawei, which is obviously much higher than rival companies such as Apple, Samsung and etc. moreover, the IDC asked for the plaintiff giving all of its patents to the defendant for free license. In the process of the talks, in order to force the plaintiff Huawei company to accept its offer authorized conditions, the defendant IDC applied for "337 investigation "United States international trade commission on July 26, 2011. At the same time, the IDC companies as the plaintiff also sued a lawsuit against Huawei as the defendant to the US Federal Court, which charged that Huawei company has violated the IDC‘s seven standard essential patents, and asked the court to award a "ban" on Huawei company to relieve defendant's losses for Huawei‘s infringement of its standard patents . Finally. the United States Federal Court only recognized one standard essential patent as a infringement and rejected the defendant's ban on Huawei for requesting.

2.1.3.The Litigation Process and Result of the Lawsuit

On December 6, 2011, after a bona fide negotiations to the US IDC, the plaintiff Huawei company sued a case to the Shenzhen Intermediate People's Court, which accused the defendant the IDC company abusing its dominant market position in the field of communication, in violation of the principle of fair, reasonable and non-discrimination as FRAND requirement and the relevant provisions of the Anti-monopoly Law in China and its behavior had formed a monopoly statue. The plaintiff Huawei requested the Shenzhen Intermediate People's Court to order the defendant IDC to stop its monopoly and claimed 20 million RMB as the licensing fee loss in accordance with the principle of fair, reasonable and non-discrimination. Finally, the Shenzhen Intermediate People's Court made a conclusion to support the plaintiff‘s requirements. It concluded that the defendant's act has constituted substantial monopoly in the field of communication, in violation of the anti-monopoly law in China, and the IDC paid 20 million RMB to compensate the plaintiff. After the first-instance judgment of Shenzhen Intermediate People's Court, both the plaintiff and the defendant appealed to the higher court. On October 29, 2013, Guangdong Higher People's Court make final judgment on the case, where the judge dismissed the appeal and upheld the verdict.

2.2. The main Legal Theory Related to Huawei v. the US IDC

2.2.1.The Key Legal Disputes of the Case

From the point of the global market, legal disputes of standard essential patents mainly include two aspects: the first problem is that the patentee who owns the standard essential patent may misuse his dominant market position to form monopoly; the second one is about the application of the FRAND requirement principle. The main legal dispute involved in the case of Huawei v. the US IDC is whether the IDC abused his dominant market position according to Anti-monopoly Law in China. How the patentee of standard essential patents abuse his dominant market position is mainly refers to the righter

make full use of standard dominance to engage in the high pricing, advertising, etc which violate the fair, reasonable and non-discriminatory principle (FRAND requirement). Due to exclusivity of the standard, the standard essential patentees are generally considered to have dominant market position, unless the licensee have strength enough to fight against it. If the standard essential patentee is not in line accordance with the principle of "fair, reasonable and non-discriminatory licensing‘‘, it may be considered abusing its dominant market position. This main legal dispute of Huawei company v. United States IDC case is the analysis in the standard essential patents under special environment, to judge whether the obligee has abused his dominant market position .In Anti-monopoly Law, the problems related to standard essential patents mainly includes the definition of relevant market , market dominant position, and the definition of the abuse of dominant market position, which are the keys for us to analyze this case.

2.2.2.The Definition of the Relevant market

When we judge whether a enterprise occupies a dominant position in relevant areas, the first and the most basic question for us is to identify clearly what the relevant market is. According to the Anti-monopoly Law in our country, the second paragraph of article 12 of the Anti-monopoly Law has some relevant provisions, it refers to "the operator has specific commodities or services in a certain competition period , the product range and regional scope." Therfor, it is obvious that the Anti-monopoly Law in China has divided relevant market into the scope of the relevant geographic area and the related products. To determine the relevant merchandise range is more difficult than to determine the geographic market area, which refers to the market on the basis of such factors as the nature of the goods ,the prices and the replacement of this kind of goods .Relevant geographic market, from the perspective of space definition, refers to areas of the main bodies of the related market supply or buy goods and the condition of competition in this area is basically consistent.

For the determination of relevant market, the degree of alternative of relevant goods as well as the relevant geographic market is a very important consideration element. When defining the relevant market, there are two main types of alternative analysis methods in academia, the first method is mainly based on the demand side (mainly consumers) as the starting point to alternatively analyze the demand, which is the main method. The second method is to supply alternative analysis when it is necessary (mainly from the perspective of the business operator analysis method), but no matter adopt what kind of method of relevant market shall be determined. moreover the masses of consumers' demand for goods need to be put in significant position. In the Anti-monopoly Law cases, how to scientifically define the relevant market is the foundation of subsequent antitrust problems. Without early the work, later analysis will also be a hindrance, this is also the premise of our analysis on Huawei v. the US IDC.

2.2.3.The Definition of the Dominant market Position

The provisions of article 17 of the Anti-monopoly Law in our country is about the definition of dominant market position, where the point is that: "the operator in the relevant market having the ability to control the commodity price, quantity or other trading conditions, or can block or affect other business operators

getting into the relevant market. " For the traditional anti-monopoly law, to decide a dominant market position is to evaluate market power, which is the evaluation of market forces depending largely on the size of the market share. The so-called market share refers to the offender's sales proportion in the relevant market of all the competitors. In the United States, the operate who has a market share of more than 1/2 can be presumed with relevant market dominant position; In the EU, if the company can independently take behavior in the business to do everything and doesn‘t have to consider other competitor, then this behavior will be considered as a dominant market position within the relevant market. In Asia, the significant reference is the Japanese law. In Japan. in the definition of dominant market position, in addition to market share, two factors about trade barriers and price control will also be considered. For China's Anti-monopoly law, the presumption is mainly in accordance with the market share to define a dominant market position, especially in article 19 of the Anti-monopoly Law, which provides three standards for the presumption such as, one half for one operator, two-thirds for two operators, three-quarters for three. But one of the operator's market share is less than one over ten, the presumption of it should not been considered as a dominant market position.

2.2.4.The Definition of the Abuse of market Dominant Position

Montesquieu in "the spirit of law" have a words of wisdom: "all who have the right but abuse the rights, this eons is an experience in constant time . " The operator of the dominant market position is not illegal, which is the embodiment of the operators strength and is also the result of the operator‘s hard work .But everything has a limit, the exercise of the right is also do the same thing. As we all know, because there is no absolute freedom in the world, rights must be limited. The patentee can not just follow his own inclinations to use his own standard essential patents. If he abuses his right, he will be punished by China's Anti-monopoly Law. The abuse of dominant market position is to point that:" enterprises who have dominant market position to make use of this status to make substantial restrictions on competition in the field of certain transactions, violate the public interest, which obviously damage the interests of consumers and is obviously prohibited by the anti-monopoly law. " For the provisions of article 17 of the anti-monopoly law in China, it has provided seven kinds of abuse, including:" to unfair charging or buy goods with higher or lower price ; to sell goods below cost price without justifiable reasons; to refuse the deal behavior without good reason ; to limit trading behavior without justified reason ; to sale with additional unreasonable conditions of behavior without justifiable reasons; to discriminate the transaction price without justifiable reasons and other abuses of antitrust authorities recognized. "In the environment of the standard essential patents, patent holder usually take obligation with the requirements of the standard principle" fair, reasonable and non-discriminatory (FRAND requirement". To violate the principle of FRAND requirement is usually regarded as the main basis of abuse of dominant market position. This case involves abuse in the request for the high price and discriminatory pricing, tying the abuse of unreasonable.

3. Result and Discussion

3.1. The Relevant market of Huawei v. the US IDC

In this case, the relevant commodity market which the plaintiff Huawei has claimed is every essential patent market under 3G wireless communication technology standard which the defendant the United States IDC companies have. The relevant geographic market includes American market and Chinese market. While the IDC company claimed that 2G, 3G and 4G should be regarded as the same commodity markets and the global market should be regarded as relevant geographic market. The court finally supported the plaintiff's Huawei company‘s claim. For the following reasons: due to the particularity of standard essential patents, if the plaintiff Huawei want to foothold in the field of global communication, it must be able to produce communication products in line with international standards . In order to achieve this goal, standards essential patent owned by the defendant the US IDC is the only and essential patent technology which the plaintiff must implement. Therefore, the defendant IDC company in the United States has the incomparable advantage in the alternativity of goods. However, the plaintiff Huawei company can not find other techniques to circumvent the defendant‘s advantage in the relevant market. In the field of 3G communication, there's no substitute for each standard, and each standard constitutes an independent relevant market.

Therefore, we can make a conclusion that: in the condition of standard essential patents, every standard essential patent that the patent holder has constitutes an independent relevant market, rather than different types of standard technology patents constitute a common market. If the court accepted the defendant America IDC company‘s claim that all the standard essential patents in the field of communications are considered as a complete market, the market share percent of the defendant IDC companies in the entire market is not enough to constitute a monopoly statue. moreover, the defendant can make full use of its essentially monopoly strength without any restriction. It will be harmful to the interests of consumers and this target is contrary with the value of anti-monopoly law at the end. Secondly, on the basic of the dimension of the relevant geographic market analysis, intellectual property is a kind of regional power. In different places, there are different types of content of the intellectual property rights, and there are also different legal regulations on intellectual property rights . It is necessary for us to consider the definition of the relevant market under the relevant regulations of the local intellectual property law. Both Huawei company and the US IDC company in this case are the members of the European telecommunications standards institute. The defendant IDC companies in the United States respectively put forward its application with respect to its standard essential patents to the United States court and China court. The intellectual property rights in the United States and China should be regulated on the local intellectual property laws, rules and regulations respectively. If the global market is considered as a relevant geographic market, the regulatory body is ambiguous. As a result, the IDC company has 3 g standard essential patents related to regional markets in China and the United States, which must be within the scope of their respective geographical exercise of essential patent rights.

In the relevant documents enacted by the anti-monopoly commission have mentioned that the relevant market is made up of close substitute markets issued by demands. It has been mentioned above no matter what kind of method is adopted to define the relevant market, the need of the consumers is an important factor that should be fully considered. Therefore, the dispute of this case has arisen, ―who the real needs of the case is.” There is a wrong opinion that no matter how we want to give full consideration to the

needs of consumers, the demand of this case is telecommunication terminal consumers. If we agree with the above opinion, the US IDC company is not dominant in the relevant market. In fact, the view is obviously wrong. Because the core problem of this case is that the defendant had standard essential patent licensing, however, telecommunication terminal consumers in fact don't need to get the defendant's standard essential patent licensing so that they are not the real consumers of this case. As a result, according to the specific analysis of specific case ,not all consumers are the really demanders of such cases. But the interests of the consumers should be taken into account ultimately no matter what happen .In this case, Huawei company is the real demander of the US IDC‘s patent licensees,so that the need replacements of Huawei should be considered when we define what the relevant market is .

3.2. The Dominant Market Position of Huawei v. the US IDC

In this case, although the defendant IDC thinks that in the field of global communication, there are a lot of companies similar to it, such as Qualcomm, Motorola and etc, which are large multinational companies own many standard essential patents, so that the share of defendant in the market field of all essential patents is far less than 50%, but it obviously belongs to obfuscate. The defendant US IDC company has many essential patents in 3g wireless technology standards.There's no substitute for each standard in the field of 3G communication, because each standard constitutes an independent relevant market and occupies an absolute dominant position in the relevant market. In this case, it is difficult for the other business operators with competitive relationship to enter the relevant market. Actually, the defendant has fully market shares in each of its standard essential patents, which is far beyond the market share construed dominant market position in accordance with the related regulations in our country anti-monopoly law. The defendant has a strength in the field of 2g, 3g, because almost all involved related products manufacturers need to use the its standard essential patents. It is difficult for other competitors to have the strength to compete with the US IDC. It has been a long time for this situation will not change. The defendant IDC companies in the United States will continue to occupy a dominant market position in the field of cellular. So the defendant‘s claim that its number proportion of its own essential patents to all necessary patent communication in the communication field be calculated as its market share is unreasonable. We actually should use the market share to each standard presumption of dominant market position, so the court found the defendant has a dominant market position. Also the accused the United States by the profit pattern of IDC is necessary patent license fee, not like other companies also substantial related products for production operation mode. Therefore, the plaintiff Huawei is actually unable to effectively restrict to the defendant, cannot like other production products between technology companies through cross licensing patents to get both sides need.

To sum up, in this case, comparing to the situation of both sides, we can see clearly that the defendant is in a strong position and the plaintiff is obviously in a weak position in the negotiations. The plaintiff has no capacity to compete with the accused, because the accused can make use of its advantages by controlling any permits prices. Therefore, the defendant in this case should be considered with relevant market dominant position. When the defendant IDC companies in the United States with its advantage position force the plaintiff Huawei to accept unfair terms of the license, it is suspected of using its

monopoly and abusing its dominant market position. The significance of Huawei v. United States IDC made the standard essential patents environment more clear and relevant market dominance can greatly simplify in the analysis process. It is namely that the licensee has the power to fight, not cases, standard necessary to the patentee is thought to have a dominant market position.

3.3. The Abuse of Market Dominant Position of Huawei v. the US IDC

3.3.1The Request for High Price or Discriminatory Pricing

In this case, fee of standards essential patent licensing that the defendant the US IDC company awarded to the plaintiff Huawei is much higher than that it awarded to Samsung, Apple and other companies. Huawei‘s cell phone sale is far less than that of industry giants such as Apple, Samsung in the mobile phone market, but the approval rate of the former is more 19 times than of Apple‘s , more than 2 times of Samsung‘s rate. In addition, according to other data, it shows that patent licensing fees that the defendant awarded to the plaintiff accounted for the proportion of total sales of Huawei company is also significantly more than other major competitors. What‘s more, the defendant doesn‘t have any substantive production, which make the plaintiff company can not t reach a cross-licensing agreement with that defendant the US IDC. However, the accused IDC companies in the United States would forced the plaintiff Huawei company to give the defendant free license of in the global range, which is clearly a "loss" of the business account for the plaintiff. If it comes true, the defendant the IDC can gain not only the high licensing fees, but also can "squeeze" the extra benefits from the plaintiff Huawei. It is obvious that this is a imbalance benefit of trade, which belongs to the existence of excessive pricing and discriminatory pricing behavior, violation of "fair, reasonable and non-discriminatory" principles of FRAND requirement.

In the process of negotiation between the plaintiff and the defendant, the plaintiff has been in a good state, which expected to make proper solved negotiation at a reasonable price for the defendant's standard essential patents. On the contrast, when they both are in the process of negotiating, the defendant the plaintiff claimed a ban in the field of essential patents against Huawei in the United States, which required the plaintiff Huawei immediately to stop the infringing act and the plaintiff should be forbidden to use the necessary patent, which in essence belongs to force the plaintiff to accept the behavior of the high licensing fees. To sum up, the defendant awarded an unfairly high sales of standard essential patents to the plaintiff , which is suspected of abusing discriminatory pricing in the request for the high price and abusing of dominant market position behavior. The IDC violated the standard of FRAND requirement. Finally, as a patentee, the IDC must abide the promise of necessary and should be subject to regulation of our country's Anti-monopoly Law.

3.3.2 The Abuse of Unreasonable Tying

In the standards, essential patent can not be replaced, but the not necessary patent can be replaced. In this case, when the defendant the IDC is in negotiations with the plaintiff Huawei company, the IDC tied the necessary patents and unnecessary patents bound for selling to the plaintiff. The defendant think this sale

behavior conformed to the practices of industry and it can promote the effective competition of the market, and it does not constitute a tying sale. The court held that before the standard member joined to the organizations, what kinds of patents are necessary and which is unnecessary can be judged clearly. Therefore, standard essential patents of the defendant the IDC is clear, the plaintiff Huawei company didn‘t need to buy other non-essential patent. The defendant can only license the patent to the plaintiff on the inclusion of necessary standards. For non-essential patents, it can only get a deal by negotiating , it can not be forced to sell to the plaintiff as a necessary premise of patent license . In this case, the defendant IDC companies in the United States putted their non-essential patents as the premise of the granted patents necessary, so that heir non-essential patents were bundling, which made the plaintiff Huawei company forced to must buy the defendant non-essential patents at the same time of purchasing standard essential patents, which has a negative influence in the market competition, because it is clearly beyond the reasonable scope, belongs to the unreasonable conduct for sale. As a result, the court concluded the defendant should not make use of its essential patent advantage to tying its non-essential to seek to maximize the interests of the patent. Because the patent should not be held for beyond a reasonable value of the standard itself. In a word, the defendant the IDC‘s sale behavior of its standard essential constituted the abuse of dominant market position.

4. Conclusion

Standard essential patents is the combination of patents and standards. Due to the contradiction of the public benefit of technical standards with the private benefit of patents right, the combination of product patents and standards caused many problems to be solved. Standard essential patent chargers tend to charge unreasonable licensing fees or command unfair bargaining position rely on their patent including in the standard. The development of FRAND principle proved to be an effective means to achieve a great balance between patentee and the public interest. However, due to the lack of an accurate understanding of the FRAND principle and the inaccuracy of how to calculate patent licensing rates, there are many disputes in practice.

Patent right abuse is the main performance of intellectual property abuse. When patent right is combined with the technical standard, the problem of right abuse becomes more complex and serious to deal with. The reason lies on the private interest of the patent conflicts with the public character of the technical standard. From the case of Huawei v. The US IDC, we can see that the problems related to standard essential patents mainly includes the definition of relevant market , market dominant position, and the definition of the abuse of dominant market position, which are the keys for us to analyze this case. In order to regulate the abuse of standard essential patent, we should make full use of Anti-monopoly Law, which takes maintaining the market competition order as its primary task, puts more obligations to maintain market competition on standard essential patent, recognizes and regulates the abuse of standard essential patent monopoly more strictly.

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The Factors Affect Company Performance in Renewable Energy Industry

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Abstract

Concerns about global warming and climate change are generating interest in renewable energy measures with the purpose to minimize environmental impact. Promoting renewable energy production becomes indispensable since its represent a tiny fraction of energy consumed. The purpose of this study is to identify the performance determinants are divided in country-specific advantages and firm-specific advantages. Companies were selected from Bloomberg and filtered due to its information availability from COMPUSTAT to construct a Panel Data structure.

The results proved that both country level (shares of renewable and energy consumption) and firm level (market capitalization, employee growth rate and capital intensity) determinants were significant in the renewable energy industry. Through the analysis, it's possible to realize that return on assets it's a performance measure with long term results, but unlike it, gross profit margin is variable that demonstrate short term results. We conclude that renewable energy industry has a great potential due to its results performed.

Keywords: renewable energy industry; company performance; country-specific advantage; firm-specific advantage

1. Introduction

Aslani and Mohaghar (2013) identified a significant growth in energy demand and consumption due to economic and social development. Based on (Australian Government (Australian Renewable Energy Agency)) , renewable energy (RE) can be acquired from natural resources that can be refilled, in other words, it's essentially inexhaustible. It can be generated from natural resources such as bio-energy, geothermal energy, hydropower, ocean energy, solar energy and wind energy. Nowadays, the development of renewable energy resources has become the theme of much discourse which encompasses about energy security, climate change, and depletion of fossil fuel resources increases. Indeed, energy policy is receiving increased international attention not only from a range of researchers, but also policy makers, consumers, and so on.

The purpose of this study is to explore an application of renewable energy. Available researches into this

phenomenon are limited with respect to how firm-specific advantages (FSA) can determine the performance of renewable energy companies. However, it‘s also critical to understand that government plays an important role in the economic structure. The development of power, transportation, and other utilities has been implemented by the government in some economies. Moreover, the government has offered financial incentives and subsidies. Therefore, this study is undertaken in order to understand how the country-specific advantage (CSA) and firm-specific advantage (FSA) influence the corporate performance of renewable energy.

2. Literature Review

The studies performed on the relationship between performance and several variables that will be presented first at country-specific advantage and firm-specific advantage. At best, studies were linked as much as possible on their commonalities, and not as much in a chronological order.

2.1 Country-specific advantage (CSA) and Firm-specific advantage (FSA)

The main goal of business strategy is to create and sustain competitive advantage in form of lower costs or differentiated products (Porter, 1998). It‘s an advantage that an enterprise has over their rivals with the purpose to create value for enterprise itself and especially its shareholders. Managers have a goal to create and interact strategic possibilities for the purpose to build advantages upon competitors.

In order to deepen our understanding of competitive advantage, I will separate and analyze in two different advantages which are: Firm-specific advantage and Country-specific advantage. Rugman and Collinson (2012) defined firm-specific advantage (FSA) as an enterprise that manifest its abundant resources such as higher productivity of tangible and intangible assets to build specifics strengths and benefits. Also, Rugman and Collinson (2012) defined country-specific advantage (CSA) or location-specific advantages as a country that manifest its attractiveness of different locations such as policies, labor force, competitive environment, and so on to build specifics strengths and benefits.

According to Vera and Langlois (2007), countries promote policies to control and avoid further results for the global warming induced by the increasing greenhouse gas emissions. Many studies have similar opinions about the role of government in promote investments such as Klaassen et al. (2005) and Owen (2006), they cited the influence of policy interventions to reduce costs of new technologies with the objective to expand market shares since these innovations are often more expensive than existing ones. Endrikat, Guenther, and Hoppe (2014) referred to the potential impact of country-level factors such as different regulatory systems (price supports, tax credits and mandates) or different cultural values. A proper regulatory support is needed to make renewable energy sufficient, feasible and reliable to achieve the sustainability targets in a country (Vera & Langlois, 2007). According to Johnstone et al. (2008), there are six distinct policy types which are R&D, investment incentives, tax incentives, tariff incentives, voluntary programs, obligations and tradable certificates.

To outperform and overcome competitors, Strandskov (2010) mentioned that enterprises must possess exclusive resources and capabilities in form of assets and skills which have been developed for a period of time. A lot of capabilities to generate strategic opportunities for the company would be mentioned as

examples of prosperous negotiations or relationships with stakeholders. Renewable research and development expenditures is a significant factor to induce companies‘ innovation and is related to profit through the opportunities (Johnstone et al., 2008). According to Vera and Langlois (2007), the process to implement renewable energy procedures vary from company to company and a successful accomplishment depends on firms‘ priorities, the existing expertise of energy data, capable human and financial resources for decision making and so on. However a particular FSA may be highlighted for its importance and significance in creating and be deployed into dynamic capabilities, which is entrepreneurship (Marinova, Child, & Marinov, 2011). In Rugman and Collinson (2012) FSA/CSA matrix, firms might experience situations through its strategies and the intensity they are exposed to external factor or developed capabilities. In his study he mentioned that companies in quadrant 3 are considered as international business, which is very similar than renewable energy organizations, where both FSA and CSA are extremely essential factors to achieve its goals and gain competitive advantage over competitors. Also, Rugman and Collinson (2012) highlighted that firms applies cost leadership and differentiation strategies and might face challenges in reconciling both advantages. The FSAs of the companies are enhanced and facilitated through CSAs.

2.2 Porter’s Diamond Framework

Over the years, achieve high level of performance has become the main target for most of nations in their struggle. But what are the intrinsic causes that makes a nation and industries more competitive than its competitors on a global scale? For Wee, Yang, Chou, and Padilan (2012), Porter's diamond of national advantage tries to clarify and analyze the superioty of nations and industries due to determined factors, where it explains the reason why a nation succeeds in specifics industries but not in others.

According to Porter (1990), there are 4 major determinants such as factor conditions, demand conditions, related and supporting industries, structure and rivalry that allows an organization to gain and sustain potentially competitive advantages. Also, he included the roles played by 2 different factors like –chance” and –government” which have significant influence on these 4 major determinants. Porter‘s diamond of national advantage represents a dynamic system in which all factors interact with each other, becoming very complicated to replicate the same frame of the industry in different countries (Porter, 1990).

2.3 Corporate Performance

For a long time, companies analyzed and measured its performance based on income statements. However, this method (considered by many) are no longer suitable for organization practices due to increasingly globalized and highly competitive economy like responsiveness, customization, flexibility, and so on (Chow & Stede, 2006). Nowadays, organizations seek different methods with the purpose to widen their scope, improving strategy implementation and obtaining success since the global economy has radically changed. In addition to, Chow and Stede (2006) emphasized even financial measures are measured more accurately, it‘s considered to be most sensitive to uncontrollable multiple factors. Also for Halkos and Tzeremes (2012), the use of financial measures in a company provides an analytical perspective for industry evaluation in order to conduct and support its operations. Another benefit

provided by this tool is the possibility to forecast future performance, recognizing characteristics and determinants of good or bad performing which may imply in success or bankruptcy prediction (Delen, Kuzey, & Uyar, 2013).

Several researches used different financial ratios, different samples, different situations and different analysis tools to evaluate the performance of renewable energy companies. For example, Patari, Arminen, Tuppura, and Jantunen (2014) analyzed 210 firms from global energy industry and through his findings, he observed a positive impact between corporate financial performance and sustainable development. In Ekatah, Samy, Bampton, and Halabi (2011) research, it was used case-study approach of a multinational energy company to examine the link between factors and financial performance (profitability). Researches also used financial performance to appraise relation between factors in emerging markets, such as China. Base on Zhang, Li, Zhou, and Zhou (2013) study, it was employed data from renewable energy firms in China to estimate the influence of government subsidies on renewable energy manufacturing firms financial performance.

As mentioned before, financial ratios can be used for several intentions, since it‘s possible not only estimate the current situation but also can be used to predict future situations and based on the outcomes, making decisions to achieve companies‘ goals. Locatelli and Mancini (2010) and Weaver (2012) applied financial performance such as profitability analyzing renewable energy firms with the purpose to measure and plan investments in long-term scenarios (construction of power plants), and company decision-making to obtain first mover advantage (development of a project), respectively.

3. Methodology

3.1 Research Hypothesis

Several research papers have proposed there are several dimensions of performance measurement and some of scholars have tried to detect the efficiency of the implement by means of adopting others and broad extensions dimensions in their studies. These different points of views affect the relationship between dependent and independent variables, therefore the development of hypothesis. As mentioned before, there are two determinants of firm performance which are firm level determinant and country level determinant referred by Hansen & Wenerfelt (1989). Based on prior knowledge and observation, it‘s useful to develop some predictions regarding the potential outcomes that are supported from previous studies. Then, after the obtained results based on expectations, it will be possible to review if the outcomes are aligned or not with previous studies findings. The hypotheses of this study are as follows:

1) Country-specific advantages

Therefore, multiple perspectives expect that the country level is an important element of the structure impacting firm performance. Stated formally:

Hypothesis 1: CSA factors impacts corporate performance.

a) Tax incentives

Tax incentives became an important factor in developing and transition countries and its effects have encouraged further researches. From 1999 to 2007, Wu, We, Zhou, and Wu (2011) researched 245 firms

in a highly interventionist government environment and found that connected organizations with government is an efficient way to surpass market disadvantages and acquire some benefits from it, since tax incentives from governments has several benefits to firms with the purpose to obtain bank loans, obtain resources and so on.

However, in Teraoui, Kaddour, Chichti, and Rejeb (2011) research demonstrated that even tax incentives are considered a source of motivation for development but in the long term. In short term, it affects negatively the performance due to the intensity of international competition faced by local firms. They noticed that government involvement is needed for companies' survival to improve competitiveness and stimulate investment, given the importance that tax incentive encourages investors and it allows improvement of economic and financial performance. The research that used a sample of 60 firms taking into account the period from 2001 to 2003 considered the current system of tax incentives as inefficient from several weakness, but with great potential in long term since it is a crucial factor to increase profitability and expand markets.

Based on previous findings and theory about tax incentives, we expect that tax incentives are an important element of the structure impacting firm performance. Formally, we predict that:

Hypothesis 1a: Tax incentives impacts positively corporate performance.

b) Shares of renewable

According to Benli (2013), there are countries with potential and abundant renewable sources that can be developed to decrease the dependence on fossil fuels, whether imported or not. The transition to implement shares of renewable is required not only to reduce gas emissions and to avoid high cost of imported energy resources, but also promote the development of the shared of renewable influencing positively organization's performance (Boon & Dieperink, 2014). A stable policy framework would minimize doubts and allow investments of renewable energy technology for investors that are investing in long term projects.

Also, it's essential to influence perception and support by revealing the potential in deploying the renewable energy in companies' procedures. This leads us to expect that the shares of renewable are an important element of the structure impacting firm performance. Stated as a formal hypothesis:

Hypothesis 1b: Shares of renewable impacts positively corporate performance.

c) Energy consumption

Ye, Liu, and Kong (2013) observed that organizations' effort to reduce energy consumption has a great influence on firms' market value and investors' behaviors. Also, according to Ahmed, Montagno, and Naffziger (2003), management worried about environment performance will focus their efforts to achieve positive impact. In other words, reducing energy consumption will impact positively on firm's performance. Based on extant theory and evidence, as well as our expectation that the energy consumption may have a stronger role with firm performance, we predict that:

Hypothesis 1c: Energy consumption impacts positively corporate performance.

d) Infrastructure (Roadways)

Based on Chandra and Thompson (2000) research using historical data from 1969 to 1993 as evidence, they found that investing in highway construction can reduce transportation costs and it has positive influence on firm‘s performance. With a different point of view, Moreno, Lopez-Bazo, and Artis (2002) used data of 12 companies from 1980 to 1991 and assumed that infrastructure doesn‘t have significant influence on performance in the long-run, contrary to what happens with the employment, which has a positive effect.

Based on previous findings and theory about infrastructure, we expect that infrastructure is an important element of the structure impacting firm performance. Formally, we predict that:

Hypothesis 1d: Infrastructure impacts positively corporate performance.

2) Firm-specific advantages

Therefore, multiple perspectives expect that the firm level is an important element of the structure impacting firm performance. Stated formally:

Hypothesis 2: FSA factors impacts corporate performance.

a) Market capitalization

According to Endrikat et al. (2014), investing in renewable energy industry requires more resources and larger firms tend to have more resources. Economies of scale, controls over stakeholders are some of the many reasons that market capitalization is positively associated with performance.

This leads us to expect that the market capitalization is an important element of the structure impacting market capitalization. Stated as a formal hypothesis:

Hypothesis 2a: Market capitalization impacts positively corporate performance.

b) Research & Development

Performance of a company is also likely to be determined by a firm‘s research and development activities, providing innovative approach especially in the renewable energy industry. According to Endrikat et al. (2014), research and development efforts are needed to implement renewable energy policies and develop sustainable technologies. The study which analyzed 149 studies concluded that research and development it‘s a long-term form of investment that improve knowledge and process innovation affecting companies‘ performance.

Based on extant theory and evidence, as well as our expectation that the research and development may have a stronger role with firm performance, we predict that:

Hypothesis 2b: Research and development impacts positively corporate performance.

c) Capital intensity

Companies with high capital intensity are usually reluctant to change its business model. And based on Endrikat et al. (2014) analyzed 149 cases, capital intensity is associated with firm‘s cost structure and its impact negatively companies performance, because high capital intensity companies are less flexible in its process, having problems to suit in different environment and are unwilling to change its strategies.

Based on previous findings and theory about capital intensity, we expect that capital intensity is an important element of the structure impacting firm performance. Formally, we predict that:

Hypothesis 2c: Capital intensity impacts negatively corporate performance

d) Employee growth rate

Based on Dogl and Holtbrugge (2010) research, renewable energy industry it is considered a high technology industry and having competent employees is very important. The more competent employees available for local or foreign firms, more benefits companies will receive from employees' skills and qualifications. Also, through practices and policies, firms control employees' growth rate with the purpose to reduce costs and increase their commitment (Arthur, 1994).

This leads us to expect that the employee growth rate is an important element of the structure impacting firm performance. Stated as a formal hypothesis:

Hypothesis 2d: Employee growth rate impacts positively corporate performance

3.2 Definition of the Variables

Based on hypothesis establishment, we explained by supporting ideas from previous researches about the relationship between dependent variables represented by return on assets, gross profit margin and interest coverage; and independent variables represented by tax incentives, infrastructure, shares of renewable, research and development, market capitalization, energy consumption, employee growth rate and capital intensity.

The summary of the definition of the variables, and how its each variable is represented were described in the Table 1 as following:

3.3 Source of Data and Sample Size

To acquire a sufficiently large sample for statistical testing objective, we collected data from all countries to ensure that firms in the sample would have sufficient scale to use formal performance measurement systems. The companies in the study, chosen from Bloomberg (major global provider of financial data, real time and historic price data, and so on), were selected according to scope of study, sectors related to renewable energy sources and obtained a total sample of 845 firms.

Our sample was drawn from the COMPUSTAT, a database of financial, statistical and market information on global companies from Standard & Poor's. In constructing the sample, first it was included in the scope of research the located firms on COMPUSTAT by their ~~"n~~ame" or ~~"ti~~cker" and exclude the ones it couldn't be located. Due to the exclusion of not located firms, the initial sample was reduced to 430 firms from 34 different countries. Then, in compliance with country specific advantage and firm specific advantage variables, the sample was restricted with at most 5 firms per country to provide the statistical power needed to detect the factors that affect corporate performance. The selection was based on its firm size and since it has homogeneous and heterogeneous samples, it was possible to select firms from each country and cover at least 70% or more of the total sample.

Table1. Definition of the variables

	Variable	Definition
Dependent Variable	ROA	$\text{Return on assets} = \frac{\text{Net income}}{\text{Total assets}}$
	GPM	$\text{Gross Profit Margin (\%)} = \frac{\text{Revenues} - \text{Cost of Goods Sold}}{\text{Revenues}} \text{ x } 100$
	INTCOV	$\text{Interest Coverage} = \frac{\text{Earnings before interest and taxes (EBIT)}}{\text{Interest expense}}$
Independent Variable	TAX	Countries with tax incentives = 1, countries without tax incentives = 0
	RENEWABLE	Shares of renewable energy in primary energy consumption in percentage (%).
	ENERGYMTOE	Total energy consumption in million tonnes of oil equivalent (MTOE).
	INFRASTRUCTURE	Total length of the road network in kilometers (km) per country
	MKTCAPIT	Market capitalization = Common shares outstanding (in millions) x Price-close monthly (in dollars)
	RD	All costs incurred in millions (M) related to the development of new products or services
	CAPITAL INTENS	$\text{Capital Intensity} = \frac{\text{Total Assets}}{\text{Sales}}$
	EMPLOYEES	$\text{Employee growth rate} = \frac{\text{Empl}_t - \text{Empl}_{t-1}}{\text{Empl}_{t-1}}$

Source: This study

3.4 Econometric Procedures

This study employed the panel data methodology due to its several benefits mentioned by Baltagi (2008)

such as controlling for individual heterogeneity, more informative, less collinearity between variables, increasing the degrees of freedom, and exploration of the dynamics of adjustment. And compared to normal time series methodologies, panel data methodology produces more efficient and more reliable parameters estimates.

The regression model is specified as follows:

$$ROA = a1 + \alpha 1TAX + \alpha 2INFRASTRUCTURE + \alpha 3RENEWABLE + \alpha 4RD + \alpha 5MKTCAPIT + \alpha 6ENERGYMTOE + \alpha 7EMPLOYEES + \alpha 8CAPITALNTENS$$

$$GPM = a1 + \alpha 1TAX + \alpha 2INFRASTRUCTURE + \alpha 3RENEWABLE + \alpha 4RD + \alpha 5MKTCAPIT + \alpha 6ENERGYMTOE + \alpha 7EMPLOYEES + \alpha 8CAPITALNTENS$$

$$INTCOV = a1 + \alpha 1TAX + \alpha 2INFRASTRUCTURE + \alpha 3RENEWABLE + \alpha 4RD + \alpha 5MKTCAPIT + \alpha 6ENERGYMTOE + \alpha 7EMPLOYEES + \alpha 8CAPITALNTENS$$

4. Research Findings

4.1 Descriptive Statistics Analysis

In this study, we selected a total of 93 renewable energy companies from 34 countries, which approximately 52% of the companies were considered small, and the remaining companies accounted for about 48% of the companies (large).

According to the Table 2, it shows the values of the minimum, maximum, mean and standard deviation of the used data in this study. Gross profit margin has a high mean value (40.10) than other two dependent variables. It has a maximum value of 104.53 and a standard deviation of 29.38. At same time, return on assets has a low mean value (-0.45), and a maximum and standard deviation are 147.82 and 24.28, respectively, compared to other dependent variables. The maximum and minimum values for each performance measures indicate that the performance varies substantially among renewable energy companies that are listed in the Bloomberg. Also, some independent variables such as infrastructure, energy consumption and research and development have a higher mean value, 1775237, 405.82, and 46.23, respectively with compared to the mean value of financial performance.

Table 2. Descriptive analysis

	Mean	Median	Maximum	Minimum	Std. Dev.
Return on assets	-0.45	1.61	147.82	-375.93	24.28
Gross profit margin	40.10	36.94	104.53	-166.43	29.38
Interest coverage	31.25	1.77	4978.72	-895.14	380.43
Renewable	12.15	8.24	56.77	0.00	11.62
Captial Intensity	9.08	3.22	227.57	0.39	24.03
Infrastructure	1775237	823217	6586610	2090	2028042
Energy Consumption	405.82	165.82	2712.77	16.52	672.59
Employee growth rate	17.84	5.94	360.87	-99.43	53.64
Research and development	46.23	5.45	709.00	0.00	103.30

Source: This study

4.2 Correlation analysis

Continuing with the analysis of our data, Table 3 reports correlations between variables. Correlation analysis is used to explore the possible interactions between two or variables more than two. Some results showed some high correlations but in an acceptable level of correlation and is not expected to influence the results of the regression analysis.

Table 3. Correlations between variables

	Return on assets	Gross profit margin	Interest coverage	Tax	Renew.	RD	Mktcap	Infras.	Energy	Employee	Capint.
Return on assets	1										
Gross profit margin	0.26	1									
Interest coverage	0.35	0.07	1								
Tax	0.05	0.14	-0.06	1							
Renew.	0.01	-0.11	-0.01	0.06	1						
RD	0.05	-0.13	0.08	-0.13	0.09	1					
Mktcap	0.35	-0.09	0.16	-0.10	0.49	0.42	1				
Infras.	0.09	0.02	-0.11	0.30	0.24	-0.18	0.22	1			
Energy	-0.01	-0.05	-0.14	0.09	0.07	-0.11	0.30	0.63	1		
Employee	0.22	-0.03	0.02	-0.04	-0.18	-0.18	-0.09	0.21	0.13	1	
Capint.	0.08	0.39	0.03	0.11	-0.24	-0.11	-0.20	0.10	-0.10	0.17	1

Source: This study

According to Greene (2000), further investigation is needed for VIFs higher than 4, and VIFs exceeding 10 are signs of serious multi-collinearity requiring adjustment. As shown in Table 4, Table 5 and Table 6, the multi-collinearity test demonstrates that no significant collinearity exists in our 3 regression models.

Table 4. Multi-collinearity test (Return on Asset-ROA)

Variable	VIF
Tax incentives	1.176
Shares of renewable	1.569
Energy consumption	2.056
Infrastructure	2.235
Market capitalization	1.919
Research and development	1.405
Capital intensity	1.211
Employee growth rate	1.137

Table 5. Multi-collinearity test (Gross profit margin - GPM)

Variable	VIF
Tax incentives	1.176
Shares of renewable	1.569
Energy consumption	2.056
Infastructure	2.235
Market capitalization	1.919
Research and development	1.405
Capital intensity	1.211
Employee growth rate	1.137

Table 6. Multi-collinearity test (Interest coverage - INTCOV)

Variable	VIF
Tax incentives	1.172
Shares of renewable	1.593
Energy consumption	2.011
Infastructure	2.245
Market capitalization	1.954
Research and development	1.399
Capital intensity	1.18
Employee growth rate	1.155

4.3 Results analysis

The regression results for the dependent variables return on assets, gross profit margin and interest coverage by panel estimation procedure are shown in Table 7, Table8 and Table9, and the explanatory variables used to estimate the influence in the performance of RE firms through independent variables. A total of 93 companies were considered in a time period of 6 years going from 2008 to 2013. The sample demonstrates significant outcomes for measuring companies‘ performance, and the power of the model (R-Square) varies between 10.08% and 31.66%.

Table 7. Estimation of the panel data model (Dependent variable: Return on assets)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Tax incentives	3.35428	3.28653	1.02061	0.3103	
Shares of renewable	-0.31478	0.13472	-2.33662	0.0218	**
Energy consumption	-0.00550	0.00241	-2.27908	0.0251	**
Infrastructure	0.00000	0.00000	0.52225	0.6028	
Market capitalization	16.0012	2.93792	5.44643	0.0000	***
Research & development	-0.01329	0.00955	-1.39072	0.1679	
Capital intensity	0.04461	0.08795	0.50720	0.6133	
Employee growth rate	0.05319	0.02160	2.46238	0.0158	**
C	-5.41965	3.32412	-1.63040	0.1066	
R-squared	0.31387	Mean dependent		-0.6591	
Adjusted R-squared	0.25078	S.D. dependent var		11.7398	
S.E. of regression	10.1617	Akaike info		7.56419	
Sum squared resid	8983.61	Schwarz criterion		7.80459	
Log likelihood	-354.081	Hannan-Quinn		7.66136	
F-statistic	4.97483	Durbin-Watson stat		0.47593	
Prob(F-statistic)	0.00004				

Significance level: *** <0.01, ** <0.05 and * <0.1

Source: This study

Based on the findings in Table 7, the coefficient of shares of renewable and energy consumption are negative and significant for return on assets, respectively, -0.31478 under a 95% confidence level and -0.00550 also under a 95% confidence level. On the contrary, the coefficient of market capitalization and employee growth rate is positive and significant for return on assets, respectively, 16.0012 under a 99% confidence level and 0.05319 under a 95% confidence level. The explanatory power observed in return on assets of this regression was reported with 0.31387 R-square level.

Empirical outcomes provide different results for hypothesis 1b that propose a positive relationship to the performance. The empirical results support hypothesis 1c that lower energy consumption in a country, the more they grow in terms of performance as mentioned in Ye et al. (2013) research, on the contrary in Nasreen and Anwar (2014) study, that cited the positive influence of energy in companies process.

The results suggest that market capitalization are more likely to influence return on assets which provide support for our hypothesis 2a, and the results hold for Endrikat et al. (2014). In accordance with Miller and Noulas (1996) findings, empirical results support hypothesis 2d that high employees growth rate will perform better in terms of performance.

Also contrary to the empirical evidence in the literature, our empirical outcomes provide no support for the relationship between shares of renewable, which according to previous researches, would lead to a better performance indicator for the enterprises. Based on our findings demonstrated in the estimation of panel data model, we provide no support for hypothesis 1a, hypothesis 1d, hypothesis 2b and hypothesis 2c.

Table 8. Estimation of the panel data model (Dependent variable: Gross profit margin)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Tax incentives	6.07569	6.49916	0.93484	0.3525	
Shares of renewable	-0.16670	0.26640	-0.62574	0.5331	
Energy consumption	-0.00129	0.00477	-0.27124	0.7869	
Infrastructure	0.00000	0.00000	-0.27745	0.7821	
Market capitalization	5.06863	5.80978	0.87243	0.3854	
Research & development	-0.02370	0.01889	-1.25425	0.2131	
Capital intensity	0.64726	0.17392	3.72170	0.0004	***
Employee growth rate	-0.03972	0.04271	-0.92991	0.3550	
C	29.8592	6.57349	4.54236	0.0000	
R-squared	0.19461	Mean dependent		35.3901	
Adjusted R-squared	0.12055	S.D. dependent var		21.4280	
S.E. of regression	20.0949	Akaike info		8.92787	
Sum squared resid	35131.0	Schwarz criterion		9.16828	
Log likelihood	-419.538	Hannan-Quinn		9.02505	
F-statistic	2.62779	Durbin-Watson stat		0.43339	
Prob(F-statistic)	0.01258				

Significance level: *** <0.01, ** <0.05 and * <0.1

Source: This study

Based on the findings in Table 8, the coefficient of capital intensity are positive and the only coefficient significant for gross profit margin, respectively, 0.64726 under a 99% confidence level. The explanatory power observed in gross profit margin of this regression was reported with 0.19461 R-square level. Empirical outcomes provide different results for hypothesis 2c that propose a negative relationship to the performance. Our findings are incompatible with those of recent empirical studies by Endrikat et al. (2014) that highlighted that high capital intensity companies are less flexible in its process, having problems to suit in different situations and are unwilling to change its strategies.

Based on our findings demonstrated in the estimation of panel data model, we provide no support for hypothesis 1a, hypothesis 1b, hypothesis 1c, hypothesis 1d, hypothesis 2a, hypothesis 2b and hypothesis 2d.

Table 9. Estimation of the panel data model (Dependent variable: Interest coverage)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Tax incentives	0.96979	35.2358	0.02752	0.9781	
Shares of renewable	-1.45720	1.48112	-0.98385	0.3281	
Energy consumption	-0.04054	0.02694	-1.50517	0.1362	
Infrastructure	0.00000	0.00001	-0.24698	0.8055	
Market capitalization	75.9848	32.3803	2.34663	0.0214	**
Research & development	-0.06296	0.10253	-0.61407	0.5409	
Capital intensity	0.22567	0.96097	0.23483	0.8149	
Employee growth rate	0.09385	0.23529	0.39889	0.6910	
C	-8.41424	35.7158	-0.23559	0.8143	
R-squared	0.09003	Mean dependent		-13.709	
Adjusted R-squared	0.00016	S.D. dependent var		108.560	
S.E. of regression	108.551	Akaike info		12.3070	
Sum squared resid	954446.3	Schwarz criterion		12.5569	
Log likelihood	-544.813	Hannan-Quinn		12.4078	
F-statistic	1.00176	Durbin-Watson stat		0.39019	
Prob(F-statistic)	0.44132				

Significance level: *** <0.01, ** <0.05 and * <0.1

Source: This study

Based on the findings in Table 9, the coefficient of market capitalization are positive and the only coefficient significant for interest coverage, respectively, 75.9848 under a 95% confidence level. The explanatory power observed in interest coverage of this regression was reported with 0.09003 R-square level. The results suggest that market capitalization are more likely to influence return on assets which provide support for our hypothesis 2a, and the results hold for (Endrikat et al. (2014)).

Based on our findings demonstrated in the estimation of panel data model, we provide no support for hypothesis 1a, hypothesis 1b, hypothesis 1c, hypothesis 1d, hypothesis 2b, hypothesis 2c and hypothesis 2d.

5. Conclusion

Through our result findings, we found the relationship between dependent and independent variables, if exists or not, and we can conclude the following observations:

1) Shares of renewable have negative impact on return on assets, it means that lower the share of renewable energy higher the opportunities to expand its business and develop or invest in renewable technologies. Consequently, it will bring more revenues impacting in its net income;

2) Market capitalization is positive effect to the return on assets and interest coverage; it means that larger firms have more exposure and more resources to make investments. It implies that a company might have the capability to honor its debt easily and also generate revenue using its assets such as its renewable

energy technologies. The results will impact positively in its performance;

3) Energy consumption it‘s a variable that impact negatively on return on assets. Return on assets is a performance measurement that is very sensitive variable to the costs implied for the energy consumption. It‘s a short term alternative to reduce costs and especially the damage to environment, increasing net income and stakeholders reliance on companies procedures;

4) Employee growth rate it‘s a variable that impact directly on return on assets. The reason why this variable has this effect can be explained due to its impact for business long term objectives. Definitely, employees are considered companies‘ greatest asset that provide competitive advantage. In the long term, employees will bring favorable results to the shareholders since it‘s an investment and it will provide excellent outcomes that match firm‘s mission. ;

5)Capital intensity has positive impact on gross profit margin, it means that the money invested by shareholders are producing revenue and firms with high capital intensity won‘t have volatility in income statements affecting in its net income since it‘s not usual to change its strategies such as business models.

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Using Lecture Capture to Improve Online and In-Class Student Performance in Principles of Economics

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Abstract

The primary purpose of deploying a lecture capture method of course delivery is to enhance student performance in online classes. In this study, recordings of classroom lectures are available to students in online sections of the course, as well as those taking the class in face-to-face class sections. We examine the effects of viewing these recorded lectures on student performance in principles of economics courses (macro and micro) over the course of five years. The setting is a small regional university that serves an extensive rural area. The dataset consists of close to 700 students, 55% of which enrolled in online course sections. Course grades, as the dependent variable, are regressed on measures of personal characteristics and academic maturity, as well as use of the recorded lectures. Results indicate that online students who watch the recorded lectures earn course grades that are significantly higher than counterparts who do not. There is also evidence that students in the face-to-face course sections also benefit significantly from watching recorded lectures.

Eastern New Mexico University (ENMU) is a four-year, comprehensive, regional school that serves an extensive and sparsely populated area. The College of Business (COB) has long been proactive in the development of enhanced opportunities for distance students to be able to complete degrees at ENMU. Lecture capture, through Mediasite,[1] is the most recent course delivery technology used on this campus to support distance education.

This study assesses the use of lecture capture in twocourses, Principles of Macroeconomics (macro) and Principles of Microeconomics (micro), offered during fall and spring semesters from August 2011 through May 2016. A unique feature in the COB is that course delivery is ―blended" or ―cross-listed" as separate sections of online-only students and face-to-face students all access the same course materials and complete the same requirements.

An early study by Flores and Savage (2007) reported on student use of ―real-time lectures recorded on video and streamed over the internet," (p. 57), within a single face-to-face classroom. Students could access the recorded lectures at any time during the semester. The technology at that time constrained the instructor to the podium during class and the authors used ―choice experience data to estimate economics students' willingness to pay for streaming video and instructor movement away from the podium." Within this choice experiment framework, the authors did find a positive correlation between student performance in the course, measured by the course grade, and watching the videos.

[1] Mediasite is a lecture capture system offered by Sonicfoundry (www.sonicfoundry.com).

Studies that are more recent have focused on isolating the effects of lecture capture by making it available only to students enrolled in online sections of the course and restricting access to face-to-face students.

Euzent, et al, (2011) "examined student performance, student satisfaction and student evaluation of instruction in two large (N>300) introductory Economics course sections" where one section was offered in the classroom and the other through lecture capture only. "The instructional methods, assignments, exams, and instructor were the same for each section over two consecutive semesters," and the first author taught all four sections of the course (p. 295). The authors did not record lectures in the face-to-face sections. Instead, the lecture capture "courses were taught in a 280-seat multi-media classroom. ..." and online "students were given the option to attend the live origination section on a first-come, first-served basis, but only about10% of students regularly attended" (p. 299). The authors found, "no significant differences in student performance across the two delivery formats, though there was a higher withdrawal rate in the LC [lecture capture] sections (5.1% TO 1.9%). Student survey results reported, "Eighty percent indicated that the LC course was as good as or better than a traditional large lecture course taught face-to-face, and 73% reported that they would choose to take another LC course" (p. 295).

Figlio, Rush and Yin (2013) were able to test the effects of online vs. in-class instruction on student learning within an experimental framework. "Students were randomly assigned to either an online or a live section of a course taught by one instructor and for which the ancillaries for the class, such as the web page, problem sets, and TA support, as well as the exams, were identical between the sections. The only difference between these sections is the method of delivery of the lectures: some students viewed the lectures live, as would be the case in traditional classes, while other students viewed the lectures on the Internet" (pp. 7765-766). In fact, the authors describe extensive measures taken to prevent students who registered in the live section from accessing the recorded lectures through their LMS accounts (p. 767). The study found, "modest evidence that live-only instruction dominates Internet instruction. These results are particularly strong for Hispanic students, male students, and lower-achieving students" (p. 763).

In their 2016 article, Bosshardt and Chiang focus on "the selection process and educational outcome differences between students enrolled in a lecture capture and traditional face-to-face course in economic principles...." and find "that students' attitudes toward online learning are the chief determinant of their choice of class over student demographics, opportunity cost measures, or past online experiences. Additionally, our findings suggest that lecture capture students perform as well as those who take a face-to-face course when not accounting for self-selection. When selection is taken into account, lecture capture is not significantly worse than face-to-face" (p.1021). These authors also offered students enrolled in the online section, "the opportunity to attend the taping of the class" though very few elected to do so. In addition, "Students enrolled in the face-to-face section were not given access to any recorded lectures from the other section, with no exceptions per college policy which charges students in the lecture capture section a $180 technology fee" (p. 1030).

In the courses studied here, instructors use PowerPoint slides to supplement their lectures.Mediasite records the slides and any other materials demonstrated to the class on a computer screen, including drawings and notes written on the slides by the instructor during class. Students who are not in the

classroom may login to the course shell through Blackboard (the electronic Learning Management System or LMS) and watch the course live, with a few seconds delay through video steaming. After the class is over, all students in the class can assess the Mediasite recordings of the lecturesat any time during the rest of the semester.

When students watch the Mediasite recordings, they see two screens, one showing the professor and the other the lecture slides or other course materials. There are several options for viewing the lectures that include pausing the recording, reviewing only specified parts of the lecture and enlarging or downsizing each of the screens independently. Students seldom report technical problems accessing the recordings and ENMU offers extended hours for assistance through a dial-in ITS Helpdesk.

Through lecture capture, class attendance can be required and there are no longer any excuses for missing class. Either students attend the lecture in person, or they watch the lecture online at their convenience. The Mediasite system provides instructors withreports detailing which students watched which lectures, how many times and for how many minutes.

This project also investigates differences in student performance as a function of online or in-class enrollment. On this campus, it would not be possible to randomize student enrollment by face-to-face or online section since the majority of students enrolled in online sections are distance students who cannot attend classes on campus. Some students on campus do select to enroll in the online section, usually due to scheduling conflicts with other courses or with work schedules. By blending the online and face-to-face sections as well as combining the two sections within one Blackboard shell, all students in the course have unrestricted access throughout the semester to recordings of the class lectures.

The primary research question for this study asks if student performance in principles of economics courses improves through viewing Mediasite recordings of the lectures, regardless of enrollment in face-to-face or online sections. The dataset includes all students enrolled Principles of Macroeconomics(macro) and Principles of Microeconomics (micro) during the fall and spring semesters of five academic years, 2011 to 2015. Table 1 gives the distribution of these students between macro and micro in face-to-face and online sections. Enrollments are larger in macro because this is a requirement for business majors as well as a popular course that fulfills a social science general elective requirement for all ENMU degrees. The micro sections tend to attract business majors only.

Table 1 –Students Enrolled in ENMU Principles of Economics Courses Fall 2011 through Spring 2016

Section	Macro	Micro	Percentages
Face-to-Face	208	105	*45%*
Online	234	149	*55%*
Percentages	*65%*	*35%*	*100%*

The dataset includes variables measuring student performance in the courses, academic maturity and individual characteristics and listed in Table 2.

Table 2—Variables Included in the Dataset	
Variable Name	***Description***
Course Grade	Letter grades assigned are A through F; A = 4, B = 3, C = 2, D = 1, F = 0. Grade distribution for the dataset is A = 30%, B = 32%, C = 20%, D = 68% and F = 8%
Year	Academic years 2011 through 2015; 2011 = 1, 2012 = 2, 2013 = 3, 2014 = 4, 2015 =5
Course	Macroeconomics = 0, Microeconomics = 1
Face-to-Face or Online	Face-to-face = 0, Online =1
ACT	Total ACT score; students who had SAT scores only were assigned the ACT equivalent using the College Board 2015 SAT-ACT Concordance Table; students with no ACT scores were assigned the mean score of 21
Imputed ACT	0 if ACT score imputed, 1 otherwise; 38% of ACT scores are imputed
Previous GPA	Cumulative grade point average in previous semester; students with no previous GPA assigned a zero
Imputed GPA	0 if previous GDP imputed, 1 otherwise; 12% of previous GPAs are imputed
Previous Hours Earned	Total number of credit hours earned at the end of the previous semester
Current Hours	Total credit hours taken during the semester observed
Gender	0 = male; 1 = female; 50.3% male and 49.7% female
Race dummy variables	Non-Hispanic White (White) = 1, Hispanic = 2, Non-Hispanic African American (Black) = 3, Asian/Pacific Islander (Asian) = 4, Native American/Alaskan Native (Native) = 5, Non-Resident Aliens (International) = 6
Mediasite	Percent of the number of available lectures viewed multiplied by the average percent of the total minutes watched for each lecture

We note that ENMU is a Hispanic-Serving institution and the distribution of students by race shown in Figure 1 is representative of the general population in New Mexico.

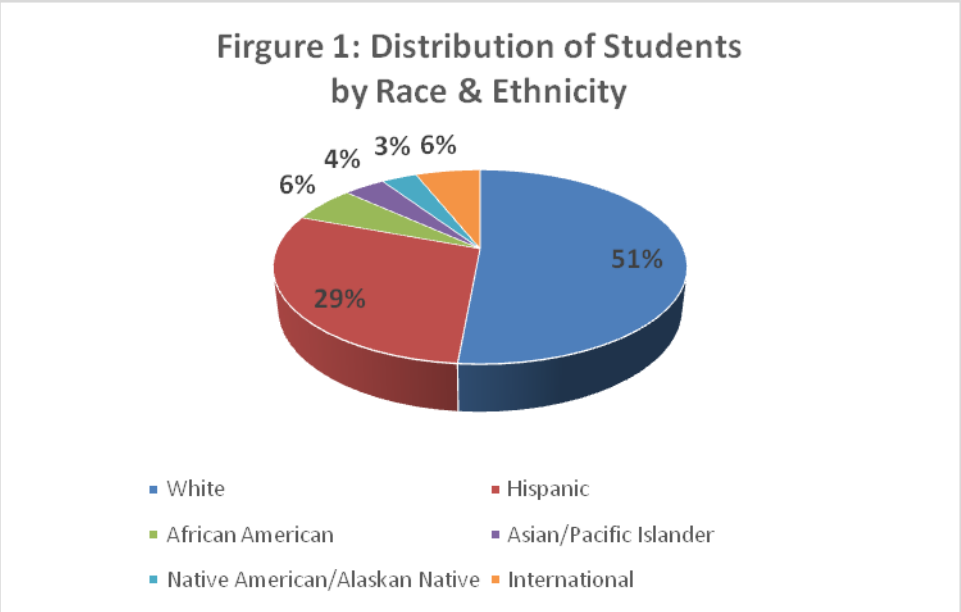

Table 3 gives selected descriptive statistics for the quantitative variables included in the dataset.

Table 3—Selected Descriptive Statistics for Quantitative Variables

	Mean	Median	Standard Deviation	Minimum Value	Maximum Value
Course Grade	2.65	3.00	1.23	0	4
ACT scores	20.8	21.0	2.8	12	31
Previous GPA	2.75	3.05	1.11	0	4
Previous Hours Earned	66	64	44	0	218
Current Hours	13	15	4	3	24
Mediasite	26.4%	14.0%	28.9%	0	100%

Three OLS regressions test the effects of utilization of Mediasite recordings on student performance. In each of these, the course grade is the dependent variable. The other variables described in Table 2 are independent variables regressed on the course grade. In the first regression, all students in the dataset were included. The second regression focused only on students enrolled in the online course sections, while the third looked only at students enrolled in the face-to-face sections. Tables 4, 5 and 6 present the regression result. Highlighted in each table are the coefficient estimates that are statistically significant at the .05 level.

Table 4-- Regression Results of Course Grade for All Students

Multiple R	0.6013
R Square	0.3616
Adjusted R Square	0.3465
Standard Error	0.9971
Observations	696

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	1.899775381	0.395082768	4.808550351	1.87359E-06
Year	-0.045624642	0.028274379	-1.613639046	0.107070352
Course	-0.031363392	0.079863201	-0.392713941	0.694654025
Face-to-Face or Online	-0.537397744	0.094387837	-5.693506279	1.85301E-08
ACT	0.039397839	0.014541672	2.709305894	0.00691246
Imputed ACT	-0.08115973	0.101221536	-0.801802984	0.422947443
Previous GPA	0.97296883	0.084741197	11.48165078	5.19406E-28
Imputed GPA	-3.290753354	0.302859393	-10.86561432	1.82071E-25
Previous Hours	0.003388895	0.001125749	3.010347083	0.002706261
Current Hours	0.014546227	0.011483205	1.2667393	0.205682865
Gender	-0.119267816	0.076839383	-1.552170412	0.121087405
Hispanic	-0.145144163	0.091108215	-1.593096337	0.111603959
Black	0.016486564	0.16675406	0.098867543	0.92127262
Asian	0.160451945	0.203829271	0.787187945	0.43144653
Native	-0.636904878	0.219034042	-2.907789456	0.00375872
International	0.574589854	0.187642829	3.062146618	0.00228437
Mediasite	1.355791248	0.149842734	9.04809468	1.51383E-18

The first regression results from Table 4 indicate that students in the face-to-face sections of the course do have a statistically significant advantage over students in online sections. Students who enroll in face-to-face sections of the macro and micro courses can expect to earn half grade higher than students in the online sections do. Watching the Mediasite lectures, however contributes even more substantially to student performance for all enrollments. The coefficient estimate indicates that studentscan expect to increase their course grade by almost one and a half points, out of four points possible.

At ENMU, the macro and micro classes have no prerequisites and the data indicate that there is no statistically significant difference in grades earned by students in either course. The coefficient estimate on ACT scores is relatively small, but positive. There is no difference however between students who had ACT scores and those who did not, since the imputed ACT variable is not statistically significant.

The other measures of academic maturity, the cumulative GPA from the previous semester and the total

credit hours earned are also statistically significant and positive. In this dataset, no students without a GPA the previous semester had earned any credit hours. We assume these students are all first-time freshmen. The fact that the coefficient estimate for the imputed GPA of zero is negative and relatively large indicates that these sophomore-level classes in principles of economics are too difficult for students who have not yet successfully completed university coursework.

Coefficient estimates on other variables measuring student characteristics indicate no statistically significant effects on course grades due to the number of hours taken during the current semester, gender and Hispanic, African-American and Asian students compared to White students. Native American students tend to earn more than half a grade lower than White students, while International students tend to earn more than half a grade higher.

Table 5-- Regression Results of Course Grade for Online Students

Multiple R	0.6057
R Square	0.3669
Adjusted R Square	0.3410
Standard Error	1.0436
Observations	383

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	1.348476717	0.538013114	2.506401203	0.012628526
Year	-0.081759157	0.040112136	-2.038264828	0.042239908
Course	-0.028937482	0.111692642	-0.259081361	0.795717722
ACT	0.043295844	0.021487777	2.014905662	0.044643355
Imputed ACT	0.080472067	0.128208459	0.627665812	0.530613221
Previous GPA	0.816928968	0.110680953	7.380935412	1.06164E-12
Imputed GPA	-2.554841235	0.399874859	-6.389101929	5.06089E-10
Previous Hours	0.001167984	0.001491162	0.783271069	0.433973111
Current Hours	0.001248369	0.013811451	0.090386527	0.928029372
Gender	-0.107988368	0.109429139	-0.986833748	0.324374292
Hispanic	-0.242387389	0.122323771	-1.981523186	0.048278457
Black	0.182197826	0.227439429	0.801082851	0.423601999
Asian	0.273220103	0.35863694	0.761829226	0.446651224
Native	-0.587182424	0.484309167	-1.212412369	0.226134468
International	0.498435427	0.483913651	1.030009022	0.303684097
Mediasite	1.520591172	0.170630442	8.911605418	2.3867E-17

The regression results for students in the online sections (Table 5) are similar to those of the entire dataset. Higher ACT scores make a slight difference in course grades. Previous GPA and imputed GPA have

relatively higher impacts on course grades. The size of the statistically significant coefficient estimate for imputed GPA strongly indicates that first-time freshman taking these courses online will have greater difficulty earning good grades than students with more university course experience. The coefficient estimate on the year variable is statistically significant for online students and indicate that earning higher grades in macro and micro was slightly easier in earlier years.Watching the Mediasite lectures does have a positive and statistically significant effect on online students, who can expect to earn a grade and a half higher than students who do not spend the time reviewing the recorded lectures.

Table 6-- Regression Results of Course Grade for Face-to-Face Students

Multiple R	0.6258
R Square	0.3916
Adjusted R Square	0.3609
Standard Error	0.91848
Observations	313

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	2.637704933	0.648727018	4.065970524	6.13197E-05
Year	-0.03474373	0.039863203	-0.871573957	0.384144835
Course	-0.083022079	0.113993136	-0.728307705	0.466999079
ACT	0.023583051	0.019994517	1.179475881	0.239152669
Imputed ACT	-0.347032592	0.17848155	-1.944361151	0.052795863
Previous GPA	1.282850557	0.139074466	9.224199078	5.49349E-18
Imputed GPA	-4.6022106	0.491400146	-9.365505148	1.96339E-18
Previous Hours	0.006817966	0.001772066	3.847467646	0.000146107
Current Hours	0.016493847	0.023712881	0.695564873	0.487245253
Gender	-0.147976695	0.107184213	-1.380582939	0.168445328
Hispanic	-0.034366859	0.136092158	-0.252526373	0.80080891
Black	-0.121696967	0.244139054	-0.498473985	0.618518948
Asian	-0.065136345	0.245520804	-0.265298678	0.790963426
Native	-0.582926422	0.23493589	-2.481214858	0.013646903
International	0.358840781	0.22571884	1.589768854	0.112950791
Mediasite	0.714355097	0.373126609	1.914511269	0.040515501

The regression results for students in the face-to-face sections (shown in Table 6) are similar to the other two regressions in that the cumulative GPA from the previous semester, the imputed GPA and the Mediasite coefficient estimates are statistically significant. Face-to-face students who take macro or micro as first-time freshman will tend to struggle more in earning good course grades than those who have completed previous coursework at the university level. Moreover, watching the Mediasite lectures can help face-to-face students improve their course grades by more than half a grade.

Students in the Native American group are the only ones who appear to struggle more in earning higher grades, compared to White students in the face-to-face sections.

Across the board, watching the Mediasite lectures does contribute positively and significantly to grades earned in macro and micro classes. Online students might have a greater incentive to watch the lectures since the coefficient estimate indicates grades can improve 1.5 points because of this activity.

Yet, students in the face-to-face sections also reap benefits from watching the Mediasite recordings of the lectures as evidenced by the statistically significant coefficient estimate of .71. In essence, taking the time to use the recordings indicates a higher level of student engagement with the course content. Some face-to-face students might be watching the recorded lectures because they were not able to attend class. Reports on which students use the Mediasite lectures indicate that some face-to-face students, especially athletes or others with extensive off-campus travel schedules do watch the recorded lectures for the classes they missed. Many students watch recorded lectures more than once.

This study is limited in that attendance records for students in face-to-face classes are not available for many of the sections studied. In addition, whether students are attending class or watching the Mediasite recordings, it is not possible to measure how actively engaged they are with the material. Additional research is planned that will include control groups of students in who took macro and micro courses before lecture capture was available. Measures of selection effects will be included to ascertain if the students who put the effort into watching recorded lectures are students who generally tend to do well in their classes anyway.

In spite of these limitations, this study does offer evidence that lecture capture can be an effective means of enhancing student performance in both online and face-to-face sections of principles of economics courses.

The Use of Literacy Routines as a Bridge to STEM Lessons

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Abstract

Elementary teachers are familiar with using literature and questioning techniques in teaching literacy. The good news is they can apply the same skills to teach STEM lessons. STEM instruction, particularly engineering, in elementary schools is virtually non-existent. However, using design challenges based off of children's literature can open up a new avenue to teach higher-order thinking. The use of literature with STEM foci, and "queries," questions that get at in-depth answers, can bridge teachers' comfort levels with STEM lessons, building students' creativity, curiosity, and perseverance.

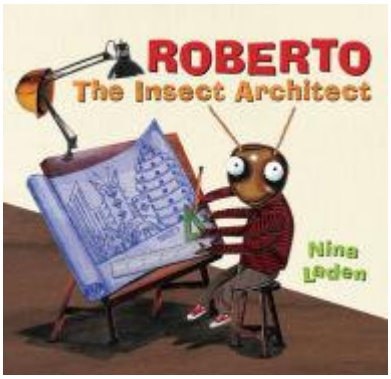
STEM Education and literacy are a perfect match: excellent children's books support literacy skills, and also introduce children to topics in science, technology, engineering and math. Even more importantly, STEM and literacy connect through inquiry and critical reading. Critical reading is not only about what the text says, but the interpretation of the text and the construction of meaning. This involves higher levels of thinking where students are actively engaged in the analysis of information. Inquiry too, requires students to be actively engaged in interpreting data and the construction of new knowledge. Thus, both require students to construct meaning from information. If these two connect so well, why are they not integrated together in elementary classrooms?

Using Children's Literature

The mention of STEM education implementation evokes different responses in elementary classroom teachers. Sometimes, it is excitement, but many times, it is fear. Finding a way to bridge STEM with a familiar instructional routine will make its implementation more satisfactory. Elementary teachers, especially teachers of grades kindergarten through three, are familiar with integrating children's literature selections or trade books in their lessons. The more comfortable teachers are with the process they use to teach a concept, the more successful the lesson will be. Since teachers use picture books frequently as a springboard to a lesson, it is logical to use them to introduce STEM concepts.

Jumpstarting STEM lessons with picture books is helpful for elementary teachers to have a level of familiarity as they teach new concepts. Elementary teachers have vast experiences in choosing picture books to supplement basal reader selections, and teaching a theme topic such as civil rights. This knowledge of picture books can apply to any topic, concept or content. An example of this would be, *Roberto, The Insect Architect*, by Nina Laden, highlighted in Figure 1.

Figure 1. Cover for *Roberto, The Insect Architect* by Nina Laden (2009).



This picture book is an obvious STEM link, as architects fall under the *Engineering* part of the STEM umbrella. Stories that have a nature storyline, like Janell Cannon's, *Stellaluna*, or a story where something floats, like Oscar's costume in Dav Pilkey's *Hallo-Weiner* can link with science lessons, and can be the impetus for design challenges. For mathematics, Cindy Neuschwander's book, *Sir Cumference and the First Round Table*, uses geometry to find the perfect shape for King Arthur's knights' meeting table. In *Dot* by Randi Zuckerberg, Dot uses her technology skills to find lots of information. Using these picture books and others (see Figure 2), to integrate and enhance learning of concepts is a familiar and effective way to teach. Making the connections between the concepts and the picture books requires students to use their own prior knowledge and higher order thinking skills.

Figure 2: Examples of Picture Books to Integrate with STEM

Picture Books	**Author**	**Topic/Concepts**
Roberto, The Insect Architect	Nina Laden	Engineering/Architecture
Stellaluna	Janell Cannon	Science/Nature
Halloweiner	Dav Pilkey	Science/Floating
Sir Cumference and the First Round Table	Cindy Neuschwander	Mathematics/Geometry
Dot	Randi Zuckerberg	Technology/Information
What Color is My World	Kareem Abdul-Jabbar	Engineering/Inventions
Marvelous Mattie	Emily Arnold McCully	Engineering/Inventions
Rosie Revere Engineer	Andrea Beaty	Engineer/Flight
Love Flute	Paul Goble	Science/Sound
The Boy Who Harnessed the Wind	William Kamkwamba and Bryan Mealer	Science/Energy
Roller Coaster	Marla Frazee	Science/Physics
Pigs Will Be Pigs	Amy Axelrod	Mathematics/Money
Inch Worm and Half	Elinor J. Pinczes	Mathematics/Measurement
Tar Beach	Faith Ringgold	Mathematics/Geometry
When Charlie McButton Lost Power	Suzanne Collins	Science/Electricity

STEM Education in Elementary School

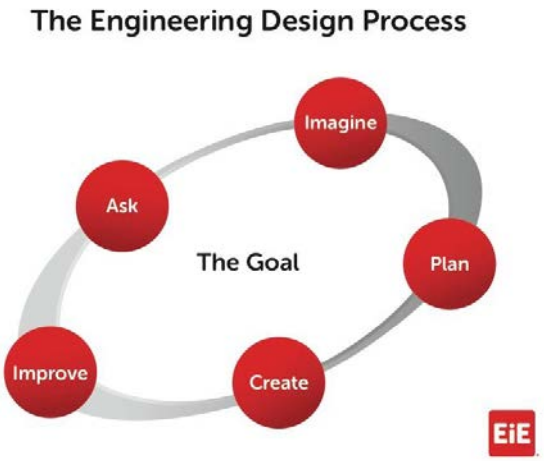
Many times, when teachers think of –STEM Education," they imagine robotic competitions or computer

labs. STEM is usually considered a high school initiative, or maybe a middle school program, and not for an elementary classroom. However, there are many reasons for the use of design challenges with elementary aged children, including the way they support literacy learning.

Through science and mathematics, we work to explain our world. Engineering drives advances and with the use of technology, we are able as people to revolutionize and improve every aspect of human life. Elementary school students can start to develop the habits of mind, curiosity, creativity, perseverance and resilience (Costa & Kallick, 2008) to meet the needs of their tomorrow‘s civilization.

A key element to STEM lessons is the Engineering Design Process (see figure 3).

Figure 3. The Engineering Design Process (Museum of Science, Boston, 2015)



The beauty of the engineering design process is twofold: First, it is really the process that working engineers use. Secondly, it does not start at any particular point, nor does it necessarily follow in lock step. For example, an engineer might start with a product that already exists, or one that needs improvement. So, it would start at the ―improve" stage. Or, after ―creating" a prototype, if it does not work like intended, the engineer steps back to the ―plan" step, or she may go back through the ―ask," ―imagine," and ―plan" steps to ―create" a new prototype. The importance of this process for elementary students is that it means failure is not the end. Failure is a key element of the process of making progress. This is a very healthy understanding of what to do when something does not work, whether it is designing a water purification instrument, or if it is solving a math problem. The parallels to reading comprehension should seem obvious. As readers, when we don‘t understand a passage we just read, we go back and reread, maybe slower, or out-loud until we get it and can go on. Not giving up is a foundation of a Growth Mindset (Dweck, 2007) where students believe that with continued effort, they will be able to achieve.

The Lesson Plan

STEM lessons can be a one-lesson activity with a theme, up to a unit of lessons that build bigger concepts

in science and/or mathematics. The format can be any combination of lessons between these extremes. The lesson in Figure 4 can be completed in one long session or broken into two sessions. It also can be appropriate for students ranging from first through third grade.

Figure 4: STEM Lesson Example

Goals:

- To apply attributes of triangles and squares to build a standing structure with marshmallows and toothpicks.
- To persevere in the face of difficulty.

Materials:

- 1 copy of the book, *Roberto, the Insect Architect,* by Nina Laden,
- 500-600 toothpicks,
- Yard stick or 2 rulers
- 1 bag of mini-marshmallows for part 1 (spread them out on newspaper, and let them sit out overnight to get a little stale- makes them easier to manage),
- for each pair of students:
    - 1 paper plate
    - a snack bag with 30 marshmallows for part 2 (again, use stale marshmallows),

Procedure:

1. Ask students what an architect is. Discuss how they plan buildings, using blue prints. Read the story, *Roberto, the Insect Architect*, to the students in a whole group. Stop at various points to check comprehension and/or highlight aspects that link with current reading lessons.
2. After the story, ask students what geometry is. (A study of shapes). Ask what shapes they know. Ask if students know what 2-D and 3-D mean (―flat" shapes versus ―fat" shapes). Tell students their task will be to create 3-D figures out of triangles and squares. Demonstrate how to use the marshmallows to connect the toothpicks. Students will build pyramids and prisms.
3. Pair students up, and assign them to sit together. Give each partner team a plate, a handful of loose marshmallows (not the snack bag) and 10-15 toothpicks. Give students 8-10 minutes to build as many 3-D figures as they can.
4. Have students stop so you can lead a discussion. Choose a cube that a team has built. Put it under the document camera or in your hand so students can see it. It will probably start leaning to one side. Ask students, ―What is happening?" Talk about the sturdiness of the figure. Choose a triangular prism, and ask students about the sturdiness of this figure. Continue with a square pyramid, and a triangular pyramid. Help students articulate a conjecture that is similar to: the more triangles in the figure, the sturdier it becomes. Write it on the board, or post it on a sheet of construction paper to be able to refer students back to it during their building time. (You can stop here if

you wish to do the lesson in two sessions)

5. Have students clean their tables, disassembling their structures, throwing marshmallows away, but keeping toothpicks and plates. Distribute the baggies of 30 marshmallows to each team, and more toothpicks if they need them.
6. Tell students that Roberto needs their help! Their challenge is to build the tallest building they can by using 30 marshmallows. Let students work with their partners. As you go around, ask questions such as:
    - What is your strategy?
    - (When towers are leaning) Where does the problem start?
    - How can you use the information in our conjecture to make it stronger?
    - Is there a way you can change your squares/rectangles into triangles?
7. After they have been working for 10-12 minutes decide if students could benefit from seeing other teams' structures. If all teams are making a successful building, then they do not need to do this. However, if some teams are struggling, and some teams are working successfully, do a Museum Walk in a modified version we nicknamed a "Walk-About." Have students stand up and clasp their hands behind their backs. Tell them to calmly walk "about" with their partners, to look at other people's towers. They are to look for ideas that will help them make their buildings better. They need to keep their hands behind their backs to remind them not to touch other people's work. When they have seen everyone's, they may return to their seats.
8. Lastly, give students about 10-15 more minutes to work. Call time. Gather students to do a formal Museum Walk. As a whole class, go to each building and have the builders explain what they did. Measure their height. When everyone's tower has been examined, congratulate students on sticking with the building, even when it was hard!

With a class of second graders who were within days of becoming third graders, a sign of success was children exclaiming, "I wish we could do it again!" during the final museum walk! Nevertheless, this lesson can serve as an example of the connection between strong literacy teaching strategies and a successful engineering design challenge.

The Use of Queries

In the quest to help children learn to understand text, Moats and Hennessy (2010) describe the use of "queries," a form of questioning distinct from traditional questions by the purpose. "They are designed to promote insight, questioning, clarification and inference-making- both gap-filling and bridging" (Kintsch, 2005). Designed to require longer, more thoughtful and more elaborate answers at critical points in the narrative, (Moats and Hennessy, 2010) queries are useful during STEM lessons to require deeper thinking, the application of prior knowledge, and to identify problems in plans that prohibit the goal from being achieved. (See Figure 5 for example queries for use for literature).

Figure 5. Queries to use with Literature

1. What was the reason for that?
2. Why do you think the character did that?
3. Is that part clear to you?
4. What problem is this character trying to solve?
5. What do we know about _____ at this point?
6. What do you wish would happen here?
7. Were you surprised here? Why or why not?
8. What might happen now?

(Moats and Hennessy, 2010, p.78)

In this lesson, the goal of the design challenge was for students to use knowledge about sturdy structures to build a toothpick and marshmallow building that could stand on its own. In the first part of the lesson, where students built –simple" polyhedra (consisting of one prism or pyramid made exclusively with triangles and/or squares), they learn through the construction and the class discussion that figures with mostly triangles (like a triangular pyramid) are studier than ones with mostly squares (like a cube). Using this understanding in building a standing structure will help them to be successful. Unfortunately, most children in their first attempt at solving a design challenge do not apply the prior knowledge just discussed.

Queries, with their open-ended structure and their focus on reflection were helpful in guiding students to modify their plans to include more triangles. As students got started, the queries we used included:

- What shapes are you planning to use?
- What kind of strategies are you going to use to make it sturdy?
- What shape are you using for the base?

As students were facing leaning towers or buildings that would not stand at all, our queries were:

- Where is it not being sturdy? Is there something you can do to strengthen that part?
- Do you want to talk about your building?
- Can you see the problem?
- How could you make triangles where you have squares?

Moats and Hennessy state that when using queries in the course of comprehending narrative text, the focus should be on the –connections between *who* is doing *what* and *why* they are doing it." (p. 78). We contend that queries in the course of a design challenge should focus children on the connections between what they are doing in light of previous findings. In this example, what do the children use to make a building stand, in light of the common understanding of constructing sturdy structures with triangles and squares?

Finally, queries to focus reflection are quite possibly the most important aspect of the design challenge. In literacy lessons, this would be equivalent to the summarizing (Cecil & Gipe, 2009) of what a student read. Reflection of a design challenge could include articulating, either orally or in writing, what steps they took to accomplish the goal, what worked and what went wrong. Ideally, a reflection should also include

next steps, or possible changes if they did it again. In this case, as we went around the room, Museum Walk style, we asked students to explain to the class what they did as we examined the buildings. Some prompting questions included:

- What did you do to make it stand up?
- Did you make any changes to your design after the walk about?
- Was this your first design? If not, what made you decide to start again?

Summary

STEM design challenges integrate foundational literacy skills at all stages of a project. Literacy teachers who make the connections between strong literacy teaching strategies and STEM lessons have the potential to build strong problem solvers, no matter the age, in reading, math, science and even engineering!

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COMMUNITY KNOWLEDGE, PERCEPTION AND ATTITUDE TOWARD BREAST CANCER IN SEKYERE EAST DISTRICT-GHANA

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ABSTRACT

The study was conducted to determine the knowledge level of women on breast cancer, respondents' perceptions about breast cancer and the attitude of the people toward breast cancer in the Sekyere East District-Ghana. The study adopted quantitative approach by collecting data through the use of questionnaire from 97 women, who were selected through stratified and simple random sampling techniques. The study established that the respondents demonstrated their knowledge level of breast cancer in their breast cancer practices and their source of information of breast cancer which most of the respondents stated that they got to know of breast cancer through the hospital. It was also established that most of the women in the study area practice Breast Self-Examination. The study also established that the women who did not practice BSE regularly, felt that they did not have breast problem, felt uncomfortable doing BSE. The study also found that respondents perceived Clinical Breast Examination as expensive and time wasting. The study recommended women should practice Breast Self-Examination (BSE).

Key Words:- Breast Cancer, health, self-examination, curable disease.

1.1 Introduction and Background of the Study

Breast cancer is one of the most widespread cancers among women and becoming a leading cause of death worldwide (Bray, 2004). Breast cancer is the most common form of cancer among females in developed and developing countries. According to the World Health Organization report, about 519,000 women die from breast cancer annually and an estimated one million women develop breast cancer each year (WHO, 2010). Globally, women knowledge, perception and attitude towards breast cancer influence their behavior towards seeking breast cancer screening (Bunker, Okonofua & Usif, 2006).

In the US, it is the most common, and the leading cause of cancer related deaths among women between 45 – 64 years of age (Benjamin, 2009). According to the American Cancer Society, Each year, more

than 200,000 women are diagnosed with breast cancer; furthermore Twelve percent of all women will contract the disease, and 3.5% of them will die from breast cancer (American Cancer Society, 2007). The knowledge level on breast cancer, perception and attitude towards breast cancer varies within the US. This disparity is especially apparent in Chicago, where the African-American/white breast cancer mortality ratio increased from 1.27 in 1990 to 1.68 in 2008 (Campbell, 2009).

Breast cancer incidence has increased and it is alarming for women affecting all ages in Africa (Ahmed & Mahmud, 2012). Breast cancer has affected interpersonal relationships such as marital or sexual relationship negatively in Africa over the years (Georgia, 2007). A study by Odusanya&Tayo, (2011) in some selected Africa countries on breast cancer show that lack of knowledge, misconception and disbelieve attitude towards breast cancer is a significant factor for delayed health seeking behavior. Many women in Africa do not know much about the symptoms of breast cancer (Coughlin &Ekwueme, 2009). As a result, women have misperception and bad attitude towards individual with breast cancer. This makes people not to response to symptoms of breast cancer early (Coughlin &Ekwueme, 2009). Knowledge, perception and attitude towards breast cancer are an important issue for early detection and improvement of health seeking behavior (Raffy, 2006). In Africa, several studies have shown that there is general little knowledge on breast cancer regarding the causes of breast cancer. Most women and individual in Africa have misperception and poor attitude towards breast cancer (Michael, Okobia, &Usifo, 2006).

Likewise, breast cancer is the most common form of cancer among Ghanaian women. According to the National Cancer Institute (NCI), breast cancer represents 18.9% of all cancer cases "35.1% in women and 2.2 % in men" (Robert, 2006). An understanding of a woman‘s risk knowledge, perception, and attitude towards breast cancer which is grounded in knowledge of her true risk, is a necessary basis for risk management and decision making in Ghana (Benjamin, 2003).The processes through which women develop knowledge, perception and attitude towards breast cancer risk in Ghana have been described as complex and multifaceted (Robert, 2006). Researches have shown that many women in Ghana have little knowledge regarding the causes of breast cancer. As a result, women have misperception and poor attitude towards breast cancer (Alam, 2006).

In Ghana breast cancer is usually detected at the terminal stages (around 60% of cases detected in the terminal stage), when treatment options are limited, and fatality rate is high (Lerman, Kash and Stefanek, 2009). Early detection leads to better outcome and prognosis of breast cancer (Lerman, 2011). Women knowledge, perception and attitude towards breast self-examination makes women more "breast aware", which in turn may lead to an earlier diagnosis of breast cancer (Campbell, 2002).Breast cancer in women is a major health burden in the Asokore in the Sekyere East District. It is one of the common causes of cancer death among women in Asokore in the Sekyere East District. The incidence, mortality and survival rate in the area is of great concern to stakeholder in the Asokore in the Sekyere East District. According to the district health director, women have little knowledge, misperception and poor attitude towards breast cancer (Osei, 2014). The 2014 year report on breast cancer showed that women have little knowledge on breast cancer. The report also showed that women have misperception and poor attitude toward breast cancer in the Asokore community (Osei, 2014).Preventive behaviour is essential for

reducing breast cancer mortality. Increase in knowledge, change in perception and attitude towards breast cancer is a necessary predisposing factor for behavioral change (Margaret & Chua, 2005). Knowledge, perception and attitude towards breast cancer also play an important role in improvement of health seeking behavior of women in Asokore community. Several studies also shows that knowledgeable women are more likely to adhere to recommended breast cancer screening. It is in this regards that this study seeks to examine the community knowledge, perception and attitude towards breast cancer in Asokore in the Sekyere East District.

1.2 Statement of Problem

Breast cancer is a frightening disease. It can be fatal, and while two thirds of the cases occur among mature women (Campbell, 2002). Knowledge, perception and attitude towards breast cancer is important in controlling breast cancer incidence and improving health seeking behaviour (Hevey, 2007). However, there is general low knowledge about breast cancer among women in Asokore. Increased knowledge can improve attitude, misconceptions reduce the fear of stigmatisation within the community but also increase the perception towards breast cancer screening within Asokore. Misconceptions about breast cancer and the fear of stigmatisation by the community are also reasons why women may conceal breast cancer symptoms at early stages and lead to late presentation and high mortality rates.

In Ghana, data on breast cancer is scanty. Women show generally low knowledge, misconception and poor attitude towards breast cancer. However the disease is a common cause of hospital admissions and mortality among Ghanaian women (Raffy, 2006). Reported clinical studies from many public hospitals and clinic in Ghana indicate that women have little knowledge, misperception and poor attitude towards breast cancer. This has made women to seek late breast cancer examination leading to increasing breast cancer cases in Ghana (Rahim, 2006). The major problem with breast cancer is that the overall death rate from breast cancer continues to increase (Campbell, 2002). In 2008, breast cancer comprised 16.3% of all cases of cancer and accounted for 7.8% of all deaths due to cancer. A study by Campbell (2002) showed that women‘s knowledge, perception and attitude toward breast cancer is essential in its treatment. Breast cancer is the second leading cause of death among women, exceeded only by lung cancer. Aside mortality rate of breast cancer, victims go through complicated health problems.

Many women in the Asokore in the Sekyere East District lack basic knowledge on breast cancer. Women may attribute several factors breast cancer and have varied perception on what causes breast cancer and how it can be cured. The traditional and Africa religious belief make community members of Asokore in the Sekyere East District to hold various perceptions and attitude towards breast cancers. The problem associated with the knowledge, perception and attitude towards breast cancer is that, it may influence their health seeking behaviour as well.

The knowledge, perception and attitude of people at Asokore in the Sekyere East District about breast cancer affect women health seeking behaviour regarding breast cancer which affects their health in general. This article therefore seeks to examine the perception people of Asokore in the Sekyere East District hold about breast cancer and how that affects women health.

1.3 Research Questions

1. What is the knowledge level of women on breast cancer at the Asokore?
2. What perceptions do the people of Asokore in the Sekyere East District hold about the causes of breast cancer?
3. What is the attitude of the people toward breast cancer?

1.4 Literature Review

Understanding how women attribute and perception breast cancer causation are important information for health promotion, including breast awareness and promotion of screening programmes, clinical care and policy development. Olumuyiwa & Olufemi (2011), conducted a cross sectional survey among nurses in general hospital in Lagos. 204 nurses were included in the study. Knowledge about symptoms methods of diagnosis, and Breast Self-Examination was above 60%. In response to question on 5 risk factors more than 50% identified positive family history and that bruising the breast is a potential risk factor for developing breast cancer. Mehregan (2013) conducted a cross-sectional study on female health care workers in Tehran, Iran to examine the knowledge of breast cancer, the attitude and practice towards BSE. In the study, they found that 75% of the women knew about the prevalence of breast cancer 27% knew that breast pain is not a symptom of breast cancer. Regarding attitude toward BSE, 63% believed that BSE is not difficult and 72% agreed that BSE is time consuming or troublesome. Only 6% of the women performed BSE monthly on a regular basis. 50% performed occasionally and 44% never practiced BSE.

A number of other factors have been explored for their possible association with risk perception, including demographic and psychological factors (Offit, 2009), coping and cognitive factors and heuristic factors (Lerman, Lustbader & Rimer, 2008). The impact on risk perception of anxiety proneness, ‗state' anxiety (ie anxiety at a particular moment, such as when attending for risk counselling), prior mental health, age, the number of affected relatives and the individual doctor who is communicating risk information have been evaluated, but no conclusive associations have been identified (Evans & Burnell, 2011).

A critical examined on the data reviewed on women perception about the causes of cancer showed that little information is available ton Ghana women perception on breast cancer. There is therefore literature on gap in term of cultural difference. This study will fill the gap and provide more information on the perception about the causes of breast cancer using women with the Sekyere District. An understanding of a woman's risk perception, which is grounded in knowledge of her true risk, is a necessary basis for risk management and decision making (Smith, Gadd &Lawler, 2011). The processes through which women develop a perception of risk have been described as complex and multifaceted, and there is little doubt that the lived experience of breast cancer can interfere with the development of accurate perception of risk and can cause ongoing cancer worry. Review of existing literature suggests that scanty information on rural women knowledge regarding breast cancer in Ghana. This article will therefore fill the literature gap in these areas.

1.4.1 Health Belief Model

In this article, the Health Belief Model was adapted. The Heath Belief Model (HBM) was designed by Hochbaum, Leventhal, Kegeles, and Rosenstock in the 1950s (Janz, Champion, & Strecher, 2002). Perceived susceptibility, perceived seriousness, perceived benefits, perceived barriers, and cues to action were the core components of the HBM (Janz et al., 2002). The self-efficacy component of the HBM was later added by Bandura in 1977. As the foundation of the HBM, value and expectancy are linked to health-related behaviors. The desire to avoid illness and the belief that a specific health action would prevent that illness can be interpreted and explained through various diseases including breast cancer. Further analysis can estimate perceived susceptibility, severity, and cues to action to reduce risk for breast cancer illness among women in this study area. Women are likely to take up necessary actions if the belief they are at risk or they actions will help them avoid breast cancer disease. Women‘s actions for prevention, screening, and health management will occur if they perceive they are susceptible to breast cancer, if potentially serious consequences of breast cancer are present, if a particular action is beneficial in decreasing susceptibility or severity of their current condition regarding breast cancer, and if the benefits for their actions when they are suffering from breast cancer outweigh the barriers (Janz et al., 2002).

1.5 Research Methods

In this article, a cross-sectional design was employed as the main framework for the collection of the data for the study. The design helped the researchers to examine the larger society knowledge perception and attitude toward breast cancer in the study area. The study was carried out at Asokore in the Sekyere East District in the Ashanti Region of Ghana. The people of Asokore are dominantly Akan with their occupation as farming and trading. The population of the area is estimated to be 23,890 inhabitants according to 2010 population and housing census (Ghana Statistical Service, 2010).The target population was women. The study concentrated only on women as it sought to examine the community knowledge, perception and attitude toward breast cancer. Since women suffer from breast cancer, they were the study unit of analysis.

The stratified and simple random sampling techniques were used to select the women for the study. The stratified sampling technique was used to group the women into group of similar characteristics. Once the target groups have been identified and grouped, the researcher then used simple random sampling to ensure some level of randomization in the selection of the respondents. This technique gave all the target population an equal chance of been included in the sample size. On the stratification, the women were put in group of similar feature. The study had two strata. One was the educated and the other was the uneducated women. The study involved a sample size of 97 women.

Questionnaire was the main instrument for data collection. The researcher used questionnaire in the collection of data for the study because the use of questionnaire permitted the respondents to reflect on the questions asked by the researcher and provide answers at their own convenient. The quantitative method of data analysis was employed.

The researcher observed a number of ethical issues so as to conduct the study on a more ethical manner.

Ethical issues such as informed consent, anonymity, confidentiality and privacy were observed in the conduct of the study.

1.6 Results and Discussion of Findings

1.6.1 Background Profile of Respondents

The articles respondents included respondents were within the age group of 15-50 years. Most of the respondents had at least primary and junior high education (basic education). A good number of them had secondary and tertiary education. Concerning the respondents‘ marital status, the study recorded more married women than the unmarried (single, divorce and widows).

The study found that majority of the women in the study area who were involved in the study were workers. Most of them had their own workers while some worked at the government sector. Few respondents (13.4%) were unemployed (either house wives or idle at home). The study recorded more Christian respondents than the other two major religious groups in Ghana.

1.6.2 Knowledge on Breast Cancer

Pertaining to the respondents‘ knowledge on breast cancer, the study found that high proportion of the respondents had heard of breast. The study found that most respondents had knowledge about breast cancer. The study results also showed that the respondents were not new to the issues of concern to the study. It was also revealed that respondents were conversant with breast and practices associated with breast.

The study‘s data showed that 41.1% (40) of the respondents had knowledge about breast cancer from the hospital, 22.7% (22) of them heard of breast cancer from friends, 30.9% (30) of them heard of breast cancer from the media and 5.2% (5) heard from breast cancer from their husband. From the study‘s results it was discovered that the major source of respondents‘ knowledge about breast cancer was from the hospital. Most of the respondents actually indicated that they heard of breast cancer during their visit to the health center. Aside the hospital, the media comes second, followed by friends and the respondents‘ partners. It was good to hear from some respondents that their husbands educate them on breast cancer.

The study found that majority of the respondents practices Breast Self-Examination (BSE). This actually confirmed that fact that most women in the study area were aware of breast cancer. The study results showed that the respondents did not only knowledge of had heard about breast cancer but were practices it to further confirm their knowledge and awareness of breast cancer through the practices BSE.

The study found that majority of the respondents practice BSE weekly or once in a month. Since most of the respondents practice BSE weekly or once in month, it means that respondents who actually practice BSE take it seriously and do so frequently, the fact that majority of the respondents practice BSE weekly or monthly showed that the respondents could detect early signs and symptoms of breast cancer if they were to develop breast cancer.

From the field survey, the study established that majority of the respondents started practicing BSE at early age. Out of the sampled population of 97 respondents, 39.2% (38) started practicing BSE at an early

age of 24 years or less. The study found that the respondents do not wait until adult age of older ages before practicing BSE. It was revealed that majority of the respondents could detect breast signs if any, at least within the age of 24 years and above.

For those respondents who do not practices BSE regularly, the study found that 2.2% (2) do not practice BSE regularly because they do not have any breast problem, 1.1% (1) of them stated that they do not practice BSE regularly because they do not think they should practice regularly, 7.2% (7) said they do not feel comfortable doing BSE practices regular, 4.1% (4) stated that they do not know how to do it, 7.2% (7) said they do not practice BSE regularly due to carelessness, 9.3% (9) of them stated that they do not practice BSE regularly because too frequent is bad, 8.2% (8) of them were of the view that they do not think it is necessary and 10.3% (10) of them said they were not sure of it benefits. The study found that the respondents had various reasons as to why they do not practice BSE regularly. Among the reasons, for respondents not practice BSE regularly were; they do not have breast problem, some respondents felt that they should not practice BSE regularly, others feel uncomfortable doing BSE, they do not know how to do that, carelessness, too frequent practice is bad, some felt that it was not necessary and other were unsure about its benefit of BSE.

The study showed that respondents had done breast examination by the doctor (clinic breast examination and 66% (64) had not done breast examination by doctor. Majority of the respondents had not done breast examination by the doctor (clinical breast examination)

Since majority of the respondents had not done breast examination by any doctor (clinical breast examination). The study revealed that clinical breast examination was on common to the respondents.

The study found that majority of the respondents had not done clinical breast examination because it concerned about extra money, concerned about extra time, fear of outcome, they felt they were too young to participate, that they had no sign symptom of breast cancer and that no one recommended CBE to them before. In fact, majority of the respondents argued that they have not done CBE because it cost time and money. Since majority of the respondents did not do CBE due to time and money, it implied that women spend more time having CBE which most of the respondents felt was cost to them. It also implied that doctors waste a lot of conducting clinical breast examination than when the women are doing BSE. Only 6% of the women performed BSE monthly on a regular basis. 50% performed occasionally and 44% never practiced BSE. The researcher also found that women more than 50 years of age, with higher education and professional status, positive personal history about breast problems and those who had more knowledge about BSE were more likely to practice BSE than other female health worker.

1.6.3 Perception regarding Breast Cancer

On the community perception regarding breast cancer, the study found that very few respondents felt that they were not at risk of breast cancer. The respondents have different perception as to whether they were at risk of breast cancer or not. While some respondents felt that they were at risk, others felt that they were not at risk and some did not even know whether they were at risk or not. The study found that majority of the respondents perceived that they do not have any risk factor of breast cancer. It was established that most women in the study area perceive they do not have any risk factors of breast cancer.

The study also found that most of the women in the study area felt that they will be affected with breast cancer as they do not have any risk factor of breast cancer.

The data showed that 25.8% (25) of the respondents felt that breast cancer is curable disease, 54.6% (53) of the respondents felt that breast cancer is not a curable disease and 19.6% of the respondents could not tell as to whether breast cancer was curable disease or not. The study found that majority of the respondents felt that breast cancer was a not a curable disease. This means that respondents have the perception that one a women contract breast cancer, it cannot be cured.

1.6.4 Attitude toward Breast Cancer

Investigating on the respondents' attitude toward breast cancer, the study further sought for the respondents' attitude toward breast cancer. This was to find out from respondents whether they have positive or negative attitude toward the breast cancers practices and whether their knowledge and perception bout breast cancer have any influence on their attitude toward breast cancer. The views of the respondents sought for a doctor within one month if they should develop breast lump. The study found that most women in the study react to breast cancer symptoms within one month period. Few respondents said they did seek for a doctor within one week. Very few women did not react quietly in response to breast cancer symptoms.

The study found that only 28.9% (28) of the respondents said they sought for a male doctor to examine their breast in case of breast cancer, 40.2% (39) of them said they did not see a male doctor to examine their breast in case of breast cancer and 30.9% (30) of the respondents said they cannot tell as to whether they will see a male doctor to examine their breast in case of breast cancer or not. Majority of the respondents indicated that they will not see a male doctor to examine their breast in case of breast cancer. The respondents stated that they did not want to make their intention knows. Since majority of the respondents argued that they will not see a male doctor in case of breast cancer, the study revealed that most women in the study area will not be comfortable to have breast cancer examination be done by male doctor. It also implied that respondents prefer female doctors for breast examination in cancer of cancer.

Concerning the age at which one is at high risk of breast cancer, the study that majority of the respondents believed that breast do not commonly occur among women of old age. Out of the total sampled population, only 35.1% (34) of them believed that breast cancer occur to women of old age, 46.4% (45) of the respondents believed that breast cancer occur to women of old age and 18.6% (18) of them stated that they cannot tell as to whether breast cancer occur to women of old age or not. The study found that women in the study area do not believe that breast cancer occurs or more commonly occur among women of old age.

1.6.6 Discussion of Findings

The study found that a high proportion of the women had knowledge on breast cancer. This implies that the idea about breast cancer is very common the populace. It was implied that the average women in the study area were aware of breast cancer. The high number of respondents having knowledge about breast cancer was good for the women and had implication for the study as most women were aware of the

issues of concern to the study. It also meant that respondents were conversant with breast and practices associated with breast. It means that the respondents could be in the best possible to take part in the study effectively. The study finding confirmed the study by Olumuyiwa&Olufemi (2011), conducted a cross sectional survey among nurses in general hospital in Lagos and found that most nurses and their closed associates were fully aware about breast cancer and that majority of their population of study had heard of breast cancer. The study finding however, disagreed with Okobia (2006) study results, in his cross-sectional study conducted among one thousand community-dwelling women from a semi-urban neighborhood in Nigeria.

In Okobia (2006) study to elicit knowledge, attitude and practices towards breast cancer, the Study result showed poor knowledge on breast cancer. Mean knowledge score was 42.3% and only 214 participants (21.4%) knew that breast cancer present commonly as a painless breast lump.In this study, it was established that women within the Asokore community in the Sekyere East District were fully aware of breast and had heard of breast cancer. This means that the study findings confirmed that study by Olumuyiwa and Olufemi (2011), but differed from Okobia (2006) study.

From the field findings, few respondents felt that they were not at risk of breast cancer. The respondents have different perception as to whether they were at risk of breast cancer or not. While some respondents felt that they were at risk, others felt that they were not at risk and some did not even know whether they were at risk or not. The study found that majority of the respondents perceived that they do not have any risk factor of breast cancer. This implied most women in the study area perceive they do not have any risk factors of breast cancer. This also means that most of the women in the study area felt that they will be affected with breast cancer as they do not have any risk factor of breast cancer. The study found that majority of the respondents felt that breast cancer was a not a curable disease. This means that respondents have the perception that one a women contract breast cancer, it cannot be cured. This study finding confirmed the views of Maria (2007), study on breast cancer knowledge believes and misconception among Latinas in Houston, Texas and found that more than one third of the participation had negative or fatalistic view of breast cancer. 29% believed that breast cancer was incurable disease and that the pain in the breast is the warning sign for breast cancer and 11.1% had never heard of breast cancer.

The study found majority of the respondents will seek for a doctor within one month if they should develop breast lump. This means that most women in the study will react to breast cancer symptoms within one month period. Few respondents said they will seek for a doctor within one week. This implied few women will react quietly in response to breast cancer symptoms. This study finding confirmed the views of Mehregan (2013) cross-sectional study on female health care workers in Tehran, Iran to examine the knowledge of breast cancer, the attitude and practice towards BSE. In the study, they found that75% of the women responses to breast cancer symptoms within the first month of the cancer.

Majority of the respondents indicated that they will not see a male doctor to examine their breast in case of breast cancer. Few respondents were silent as to whether they will seek for a male doctor in case of cancer. They did not want to make their intention knows. Since majority of the respondents argued that they will not see a male doctor in case of breast cancer, it implied that most women in the study area will

not be comfortable have breast cancer examination be done by male doctor. It also implied that respondents prefer female doctors for breast examination in cancer of cancer. The study found that women in the study area do not believe that breast cancer occurs or more commonly occur among women of old age. This means that women at all age in the study area know that breast cancer can occur to any women regardless of the women age. This also implied that the women will be more serious about issues regarding breast cancer since they believed that both old and young women are at risk of breast cancer. This confirmed the views of Murday (2008) and Oluwatosin&Olapo (2011), women at all age are at risk of breast cancer. Breast cancer occurs among all women.

1.7 Conclusions

The article concluded that its results adequately satisfied the objectives. The article concluded that women within Asokore community in the Sekyere East District were aware of breast cancer. On the knowledge of the women about breast cancer, the study concluded that women within the Asokore community in the Sekyere East District could give some signs of breast cancer. The study concluded that the respondents demonstrated their knowledge level of breast cancer in their breast cancer practices and their source of information of breast cancer which most of the respondents stated that they got to know of breast cancer through the hospital.

It was also concluded that most of the women in the study area practice Breast Self-Examination. The study concluded that respondents do not only practice BSE but did so frequently and at an early age of 24 years which further showed that the respondents were actually aware of breast cancer. The study also concluded that the few respondents who did not practice BSE regularly. Felt hat they did not have breast problem, felt uncomfortable doing BSE and other did not know how to do that, whilst some stated carelessness, too frequent practice is bad, they felt that it was not necessary and others were unsure about its benefit of BSE as the reasons why they did not practice BSE regularly.

The study concluded that most respondents perceived that they were not at risk of breast cancer. It was also concluded that most respondents had the perception that breast cancer was incurable disease. The study also concluded that respondents perceived Clinical Breast Examination as expensive and time wasting. The study also concluded that most women have negative attitude of male Doctor performing breast cancer examination on them.

1.8 Recommendations

The article therefore recommends that women should be educated at the hospitals on the need and importance for women to practice breast cancer practice regularly.

It is further recommended that women should be educated on the risk factors for breast cancer, since majority of respondents perceived that they were not at risk of breast cancer, it is recommended that women should actually find how from the health facilities whether they have any risk factor for breast cancer.

The article further recommended that women should not considered Clinical Breast Cancer Examinations

as time wasting and waste of money. They should be educated on the importance of Clinical Breast Cancer Examination to encourage more women to attend Clinical Breast Cancer Examination.

The article again recommended that women should not have problem being examined by male doctor in case of breast cancer. Male doctors should educate women on breast cancer examination and encourage women to feel free when being examined by male doctors.

Last but not the least, it is recommended that all women in the community should practice breast cancer self-examinations regularly.

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APPENDIX

Table 1 Knowledge On Breast Cancer

Responses	Frequency N=97_	Percent (100)
Number of respondents who had heard of breast cancer		
Yes	90	92.8
No	7	7.2
Respondents source of knowledge about breast cancer about breast cancer		
From hospital	40	41.2
From a friend	22	22.7
From media	30	30.9
From my husband	5	5.2
Number of women who practice BSE (Breast Self-Examination)		
Yes	68	70.1
No	29	29.9
Number of times respondents practice Breast self-Examination (BSE)		
Weekly	16	16.5
Once in a month	17	17.5
Once in three months	10	10.3
Once every six months	11	11.3
More than once in quarter of a year	7	7.2
Annually	7	7.2
Never in a year	29	29.9
Reasons respondents do not practice BSE regularly		
I don‘t have breast problem	2	2.2
I don‘t think I should	1	1.1
Number of respondents who have done breast examination by any Doctor		
Yes	33	34.0
No	64	66.0
Respondents reasons for not doing CBE		
Concern about extra money	9	9.3
Concern about extra time	46	47.4
Fear of outcome	13	13.4
Too young to participate	8	8.2

Responses	Frequency N=97_	Percent (100)
Number of respondents who had heard of breast cancer		
Yes	90	92.8
No	7	7.2
No sign symptom of breast cancer	10	10.3
No one recommended	11	11.3

Source: Researchers' Field Work, 2017

Table 2 Perception Regarding Breast Cancer

Responses	Frequency N=97	Percent (100)
Respondents' perceived risk for developing breast cancer		
Not at risk	8	8.2
Lower risk	21	21.6
Medium risk	27	27.8
Higher risk	24	24.7
Don't know	17	17.5
Number of respondents that perceive that they have any risk factors		
None	58	59.8
1 risk factors	30	30.9
2 risk factors	9	9.3
Number of respondents who think breast cancer is a curable disease		
Yes	25	25.8
No	53	54.6
I can't tell	19	19.6

Source: Researchers' Field Work, 2017

Table 3 Attitude Toward Breast Cancer

Responses	Frequency N=97	Percent(100)
How fast respondents who develop breast lump will seek for a doctor		
Within one week	9	9.3
Within one month	66	68.0
Within 1-3 months	22	22.7
Whether respondents will see a male doctor to examine their breast in case of cancer		
Yes	28	28.9

Responses	Frequency N=97	Percent(100)
How fast respondents who develop breast lump will seek for a doctor		
Within one week	9	9.3
Within one month	66	68.0
Within 1-3 months	22	22.7
No	39	40.2
I can‘t tell	30	30.9
Whether respondents believe that breast cancer occur more commonly in old women		
Yes	34	35.1
No	45	46.4
I can‘t tell	18	18.6

Source: Researchers' Field Work, 2017

DEVELOPMENT OF COMPETENCES IN THE USE OF THE ICT IN BASIC EDUCATION TEACHERS

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Abstract

The study of the training of Basic Education teachers and the development of their technological competencies in this era called "The knowledge society" is a prevailing necessity, so this research aimed to identify the training needs of teachers An institution of basic education, belonging to the private sector of the State of Yucatan in the use of Information and Communication Technologies (ICT). The methodology used was based on the mixed approach (quantitative and qualitative), this allowed to perceive in an integral way the real situation of the teachers in the use and training in the ICT area. In the first phase of the study, a needs assessment was carried out, which was used to design and develop a Blended Learning (B-learning) course in the Modular Object Oriented Dynamic Learning Environment (MOODLE). The second phase was worked out the structure and logistics for its implementation; And finally, the results were analyzed and the conclusions were established. And finally, the results were analyzed and the conclusions were established. Among the important findings it was found that theory and practice are elements that must be worked together, simultaneously, in a way that they assist one another in the training course in the use of ICT. This way, an atmosphere of security and confidence is generated between the teacher and the student during their learning process.

Keywords: Teacher training, basic education, technological competence, ICT.

1. Introduction

Nowadays, the technological advances have affected all the fields of the society and education has been no exception. This situation is reflected in the adoption of new paradigms in the form of teaching-learning, the redefinition of roles in education and in the design and development of didactic resources for use in the teaching-learning process in view of the need to Train teachers in the use of ICT. In this regard, Valdés, Angulo, et al. (2011) point out that the incorporation of ICT in educational programs has acquired special

relevance, under the assumption that these tools can promote a better educational quality and facilitate learning; In addition to helping to reduce the digital distance (p.212). In this sense, Ramírez (2006 quoting Valdés, Angulo, Urías, García and Mortis 2011), affirms that the process of incorporation of ICT by teachers in educational institutions has happened quickly resulting in new demands for teachers (Page 212). As part of these demands, the role that the teacher plays in education has been transformed from an agent that only transmits information to a guide that facilitates student learning. According to Rodríguez and Gutiérrez (2011) in the Comprehensive Reform of Basic Education (RIEB) of 2011 aims to the urgency of integrating ICT into teacher practice, in a way that not only benefits itself, but also relapses In the academic achievement of the students and, therefore, in the quality of the institution's processes (p.255).

In relation to this, it is necessary to transform teacher training in such a way that, as stated by Suárez, Almerich, Gargallo, and Aliaga (2010), in structuring these plans, two basic dimensions must be taken into account. In the first dimension, they must be organized in a series of stages in which the technological and pedagogical components are found, and in the second, that the organization of these training plans must be flexible and according to the needs presented by the teachers (p.24). It should be pointed out that there are several factors involved in the training of teachers, such as the consistency of courses, personal factors and context that influence the integration of ICT in their practice. In this regard, Suárez et al. (2010) assert that, as regards the incorporation of technological resources in their daily educational practice, teachers only contemplate it on certain occasions, it does not consider it in a regular or habitual way, focusing mainly on a personal plane (p. 24). This situation highlights the segmentation that teachers make when using technology; Which generates a decoupling of this with the academic aspects and the teaching-learning processes. Thus, the inclusion of ICT in the practice of teachers is affected by the lack of habituation and the belief that technology is a resource unrelated to their activities in the educational institution.

2. Development

The training of teachers in the use of ICT and the integration of them in their educational practice has become a priority on the part of the authorities of the different educational institutions due to the demands that society itself poses in recent times. As Domínguez and Canto (2012) point out contemporary teachers, work in a teaching-learning technological environment, where they have to fulfill basic roles (competencies) as a result of the influence that the context has on his professional task (p.95) In this sense, the teacher and the role that he plays acquire greater relevance to the new educational challenges, since the insertion of the technologies in the teaching-learning processes is required. The demands are therefore greater, it is no longer just focus on training in educational models or approaches, teaching and learning strategies, learning styles, educational skills and knowledge; But also in a training in which the incorporation of ICT is linked to all the previous requirements.

2.1 Training of Basic Education teachers in the use of ICT at national level

2.1.1 The Enciclomedia Project

The Enciclomedia project was implemented in the government of President Vicente Fox, whose objective

was to be a computer tool with digitized textbooks and useful information for primary level students (Balderas 2009: 79). As a pedagogical device in the classroom, it articulated multiple processes and components that were based on free digital textbooks enriched with multimedia resources, aimed at providing varied options for teaching work (Elizondo, Paredes and Prieto, 2006, p.214). One of its main critics has been this context, since it only constituted solely in the digital image transfer of the books to a computer program. In this respect, Navarro (2011) mentions that the first phase of the Enciclomedia Project lacked an analysis of alternatives, which considered the pedagogical aspects, those of equity, the operational complexity and the limited availability of public resources (p. 706)

The program started in its testing phase during the school year (2003-2004) in five schools of the Federal District and was installed in 21,434 classrooms of 5 and 6 grade of elementary school, located in 6,700 schools of the national territory, in addition in 548 Teacher centers, 32 regular schools and 74 indigenous schools. By the end of 2005 it was planned to equip approximately 95,000 classrooms of 5 ° and 6 °. (Elizondo, Paredes and Prieto, 2006, p.215). In this regard, it is convenient to mention that the conditions of Mexico in comparison with other countries of the first world are many deficiencies to solve, ranging from the economic situation of people living in the most retired towns, as well as Internet access, The resources available and the limited infrastructure of the centers or schools. In light of the above, it is necessary to ask questions about the true intention of this program and its impact, as well as the previous planning and the purposes for which it was designed.

2.1.2 Digital Skills for Everyone(DSE)

Because of the different educational situations the country was experiencing, in 2005 the Organization for Economic Co-operation and Development (OECD) made some recommendations, among which it was found that Mexico had to focus attention on the Incorporation of skills and abilities in literacy, mathematics and information technologies. To manage this recommendation, it was proposed the technological update of the Enciclomedia platform in its portable version, to make it compatible with the Internet; Experts with international experience in ICT applied to Education were contracted, who designed five components to implement the digital skills for everyoneprogram. The components are: pedagogical, accompanying, management, infrastructure and project operation (Navarro, 2011, pp. 713-714).

The main purpose of the program and its telematics classrooms was to improve the learning process using computer tools that, when used in the teaching-learning process, could expand students' competences and begin to generate a digital educational environment (Navarro 2011, p.707). However, like the previous program, the HDT implementation had to face the difficulties that the education system itself brings with it, the deficiencies in infrastructure, the inequalities in the different localities, the economic factor, the preparation of the teachers, and the lack of resources. In this sense, the HDT was an effort and set of actions directed to the solution of the real educational problems that are in line with the situations of each educational center. As Domínguez and Canto (2012) point out, integrating ICT into education is an opportunity to insert the new generations into a digital culture and to acquire the necessary skills to improve their living conditions in a knowledge society (p. 95). Technologies are resources that need to be included in the teaching-learning processes, however, this integration must be the result of a needs study.

2.1.3 Digital Inclusion Program (DIP)

Because of the rapid advance of technologies and the emergence of the knowledge society, the Federal Government established the incorporation of information and communication technologies (ICT) in the teaching-learning process as one of the strategies to achieve the national objective of developing the human potential of Mexicans with quality education. To support this incorporation, it was established as a commitment of the government to provide portable computer equipment to students in fifth or sixth grades of public elementary schools. The Secretaría de Educación Pública (SEP) [Ministry of Public Education], in compliance with this mandate, launched the Digital Inclusion and Literacy Program (PIAD) (SEP, 2015) from the school year of 2014-2015.

PIAD is a public education program that, within the framework of Educational Reform, aims to improve the quality of study processes and reduce the digital distance that exists in society with a strategy based on three main pillars: Access to technology, The development of digital resources linked to curricular themes and the training of teachers (SEP, 2015).

2.2 The educational challenge of teacher training in the use of ICT at national level

The efficient integration of ICT into education has not been a simple task. Its use has increased in the educational context, but its full potential has not been reached; moreover, pedagogical thinking has not advanced along with technological progress (Valdés, Arreola, et al., 2011, p.

There is a gap between the dizzying advances in technology and science and the changes that education has made. Part of this situation is the resistance to paradigm change, the need for infrastructure, the economic factor, openness to the use of technology and other educational needs that have not yet been resolved.

It is due the previously mentioned that the SEP (2001, in Elizondo, Paredes and Prieto, 2006) in the National Education Program indicates the promotion in the educational use of Information and Communication Technologies, as well as the design and development of Audio-visual and computer-based materials to support learning (p.212). On the other hand, the *Reforma Integral de Educacion Bàsica* (RIEB) urges teachers to make creative and permanent use of the reading, audiovisual and computer resources available to them, so that they do not rest exclusively in the Textbooks as the great prescribers of work in the classroom (Ruiz, 2012, p.54).

It is for all the above that the training of teachers for the implementation of the RIEB in primary is a fundamental challenge of the continuous training of teachers in Mexico. A challenge that has to do with the criticism of continuing education programs, failing to meet the true needs of teachers and the lack of an effective mechanism to communicate to administrators of the education system, what they need (Ruiz, 2012, Pp. 55 and 58).

In this sense, criticisms of teacher training programs in the field of technology have been diverse, however, what is evident is the need to prepare them in pedagogical field and in the technological competences to operate in a timely manner and according to the requirements Of this new society of information and knowledge, to train them for the development of skills that allow them to use ICT and integrate them in a relevant way to their educational practice.

3. Methodology

The methodology used for the study was based on the mixed approach, this approach consists of a process of collecting, analyzing and linking quantitative and qualitative data in the same study, in order to respond to a problem approach. (Hernández, Fernández and Baptista, 2010, p.544). It represents a set of systematic, organized and empirical processes in a single study so that a complex analysis and discussion of the information collected with instruments and under the quantitative approach and research techniques of the qualitative approach is carried out, as well as their integration and discussion, In order to achieve a better understanding of the phenomenon under study (Hernández and Mendoza (2008 in Hernández et al., 2010 p.546).

3.1 Instructional Model PRADDIE

In the construction of the course, the instructional model called PRADDIE was followed (Cookson, 2003). The activities that were carried out as part of each of the phases that compose said model are described below.

Pre-analysis. In this first phase of instructional design, the main policies related to the training of teachers in the use of ICTs were identified and analyzed, as well as the mission, vision, values and policies of the study center, which form the basis for this innovative proposal and determined the relevance of the actions to be carried out.

Analysis. At present, the need to train teachers in the use of ICT has become a priority, so the offer of courses related to this subject has been increasing; However, the reality is that these programs in some cases are neither planned according to the needs of teachers nor they have a focus on the particular context of the school. It is for this reason that in this phase, a diagnosis of training needs in the use of ICT was made. Based on the information obtained from the diagnosis, it was worked on the construction of the course outline; It was based on the needs and interests of basic education teachers regarding the use of ICT in education. Then, as can be seen in Figure 1, the main topics of the course are presented, which were the basis for the design, development and implementation of the course.

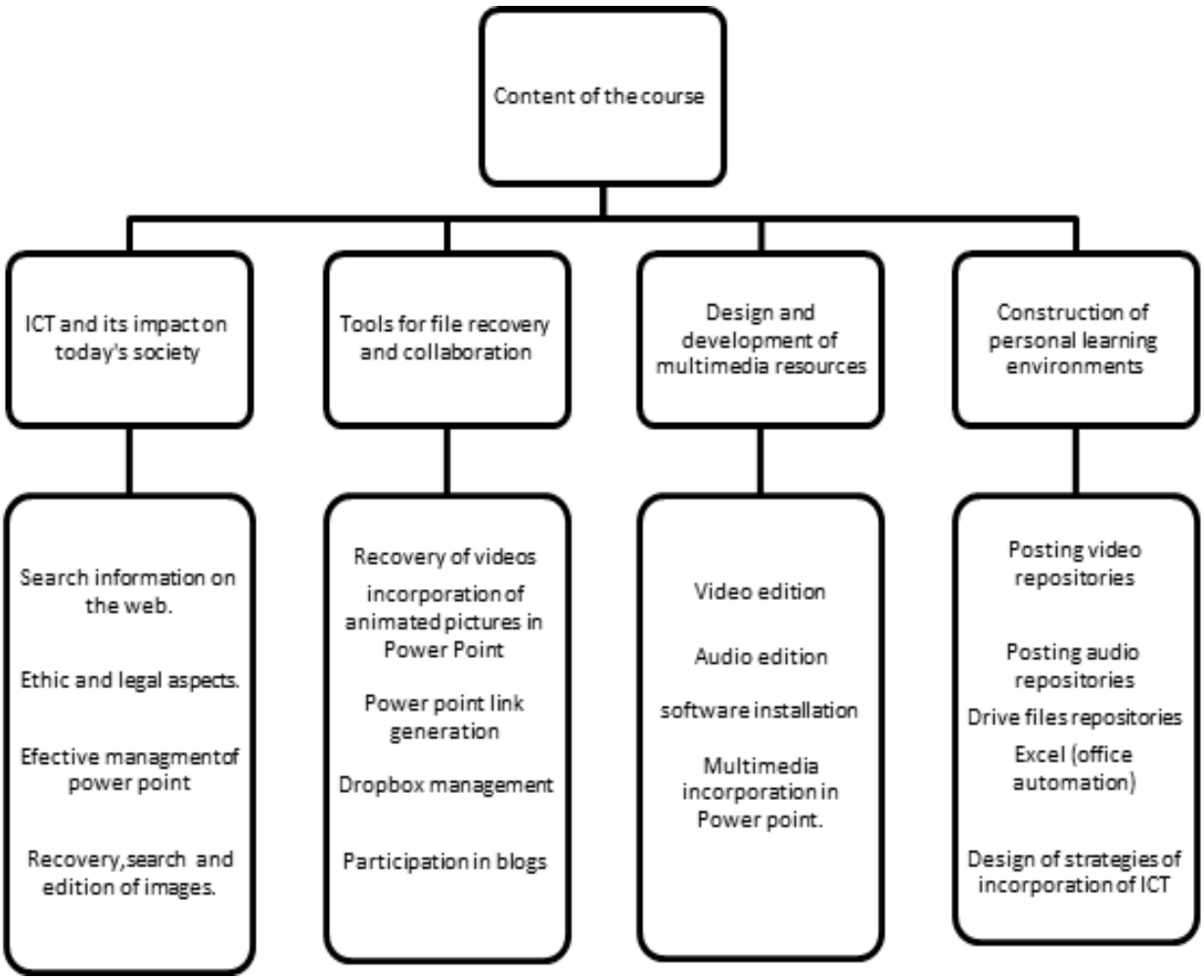

Figure 1. Course content

Design. In this phase the mode of the course was determined, which was implemented in a virtual and presential way, the b-learning modality, which is characterized by the juxtaposition or mixing between teaching and learning processes face-to-face with others that are developed at a distance through use of the computer (Area, 2009, page 68). The proposal of the course design was elaborated, which was articulated in 4 sessions, having as reference the outline of the content. In this case, the main topics of each session, the content, the competences to be developed, the evaluation strategies and criteria, as well as the learning activities were determined. In the learning activities, it was established the face-to-face or online modality, the form of work, individual or team, the execution time, strategies for learning and the resources of the platform that would be used.

Development. In this phase the elements of the design were considered for the elaboration of the didactic sequences of each session. The didactic sequence is defined as the articulated set of activities for learning and evaluation; Mediated by a teacher for the achievement of educational goals (Tobón, Pimienta and García, 2010, p.20).

The activities (see figure 2) were organized in the four sessions, trying to maintain a balance between them and the modalities of face-to-face and online work. Also, it can be observed that the learning journal is present in each session as a key point for the achievement of meaningful learning.

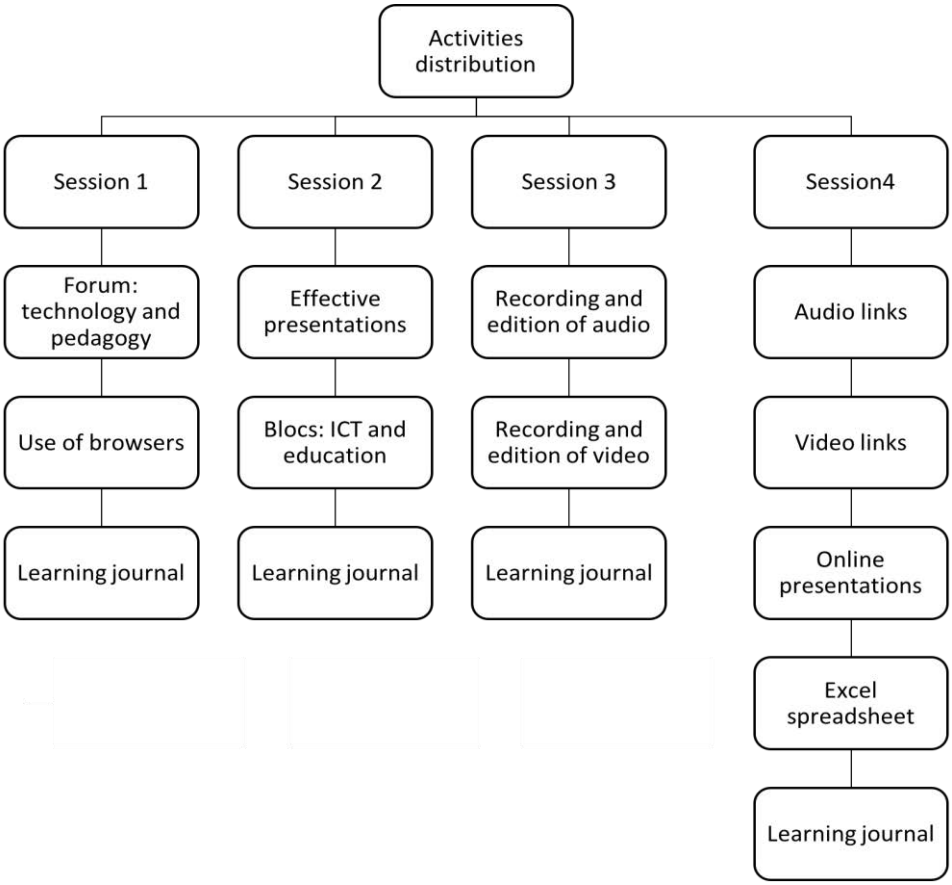

Figure 2. Organization of the activities by session

Implementation. In this phase, the dates of the four working sessions were established. Likewise, the work schedule was determined, which began at 8:00 am and concluded at 12:00 pm in each case.

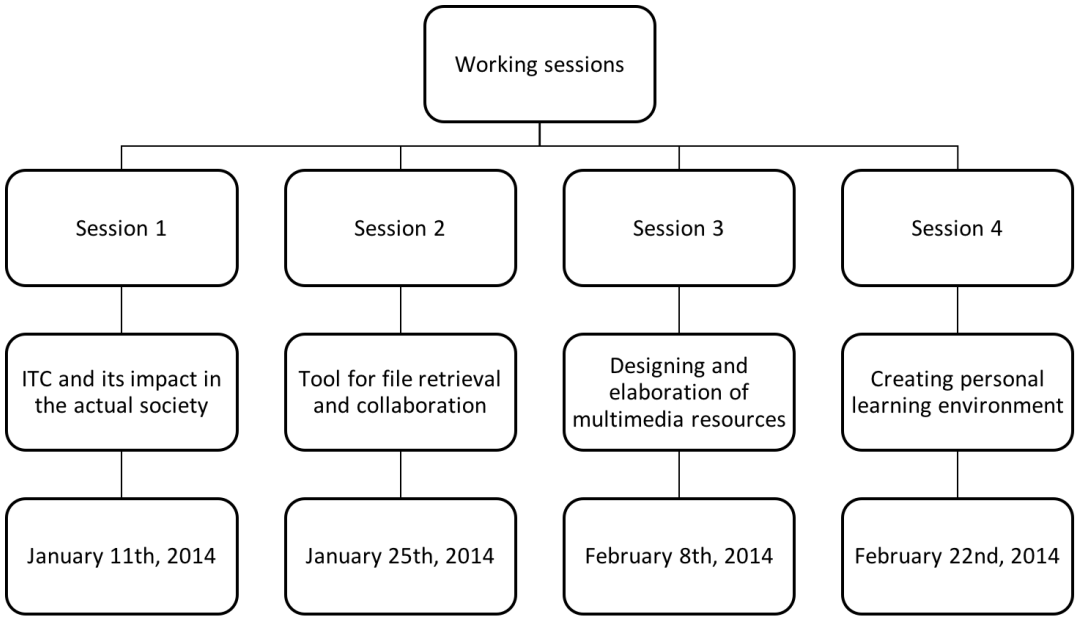

Figure 3. Working sessions

As can be seen in figure 3, the implementation period corresponded to the months of January and February

of this year. Thereon, it is necessary to mention that the organization was based considerate providing the participants with the necessary time for the execution of the various activities of the course.

Evaluation. As Cookson points out in his proposal, evaluation is considered as a continuous process in this instructional design model. In this sense, the evaluation was present in all phases, so that in each of them the necessary adjustments were made according to the demands and needs of the participants and the educational institution.

During the implementation phase of the course, the teachers made learning journals of each session using the Moodle platform. Thereon, Vélez, González, Hernández, Rodríguez and Matesanz (2012) point out that the journal is defined as an instrument of formative evaluation that considers the student as the axis of the formative process, promoting the reflexive practice, because the main idea of the journal is write to learn (p.91).

The learning journals, in this case, were created with the purpose of promoting reflection and critical thinking about the learning process and the way in which it was acquired. In the same way they allowed to establish the learning and experiences of the participants regarding the use of ICT. At the end of the implementation phase, an evaluation process was carried out from two different approaches. On one side, on a quantitative research, a questionnaire with a Likert scale was elaborated to determine the degree of teachers‘ satisfaction with four dimensions: design of the course in its virtual modality, development of the course in its virtual modality, learning activities and the work of the instructor.

On the other hand, according to the qualitative paradigm a focus group was organized, in which the participants' experiences concerning the course were identified. Focus groups according to Barbour (2007 in Hernández, et al., 2010):

> Represent a method of collecting data in which a group of people is gathered and working with it in relation to concepts, experiences, emotions, beliefs, categories, events or issues that are of interest in the research approach. What is sought is to analyze the interaction of the participants and how to construct meanings in groups. Focus groups not only have descriptive potential, but also have great comparative potential that needs to be harnessed (p. 426).

In this context, a questionnaire was designed to guide the participation of teachers during the focus group. The first question was addressed to the analysis of teachers' experiences and feelings in making use of technological resources; The second question allowed to identify the significant learning (s) of the teachers; The third question determined the relevance of content and / or learning to teaching practice; Question four consisted in questioning and reflecting on the relationship and use of technological tools in their practice; In question five, informants were asked about the achievements made through the course; In the sixth question, it was explore about how the change in the way technology was perceived; Finally, the seventh question was a general evaluation of the course.

4. Results

4.1 Descriptive analysis of B-learning course satisfaction

The instrument implemented to assess the satisfaction of the course in its B-learning modality consists of the following dimensions: a. Design of the course in its virtual modality; b. Development of the course in

its virtual modality; c. Learning activities; and d. Instructor performance. Measurement of the global frequency of instrument dimensions was also considered to enrich the analysis of information.

Furthermore, the instrument is considered reliable, since it can be observed that the result of the internal consistency analysis estimated with the Cronbach's alpha, the index that gave the test is 0.923 (N = 30), close to unity. This means that the measurements that were obtained from the instrument are stable and consistent: they are reliable.

Next, the analysis of each of the dimensions of the questionnaire is presented, considering as base the following scale: 1 not at all; 2 moderately satisfied and 3 very satisfied, indicating in this way the level of satisfaction of the user in each of the dimensions.

In the first dimension, which is related to the design of the course in its virtual modality, as can be seen in Table 1, most of the teachers are at the level of very satisfied and a lower percentage is moderately satisfied.

Table 1. Design of the course in its virtual modality

		Frequency	Percentage	Valid percentage	Cumulated percentage
Valid	Moderately satisfied	2	18.2	18.2	18.2
	Very satisfied	9	81.8	81.8	100.0
	Total	11	100.0	100.0	

In relation to the development of the course in its virtual modality, Table 2 indicates that 100% of the population is at the level of very satisfied.

Table 2. Development of the course in its virtual modality

		Frequency	Percentage	Valid percentage	Cumulated percentage
Valid	Very satisfied	11	100.0	100.0	100.0

Likewise, in the dimension of the learning activities developed during the course, as it is expressed in table 3, 100% of the teachers affirmed that they are at the level of very satisfied.

Table 3. Learning Activities

		Frequency	Percentage	Valid percentage	Cumulated percentage
Valid	Very satisfied	11	100.0	100.0	100.0

On the other hand, in relation to the teacher's performance during the sessions, the majority indicated to be at a very satisfied level, as shown in table 4.

Table 4. Instructor performance

		Frequency	Percentage	Valid percentage	Cumulated percentage
Valid	Moderately satisfied	3	27.3	27.3	27.3
	Very satisfied	8	72.7	72.7	100.0
	Total	11	100.0	100.0	

An overall analysis of the dimensions was also carried out (see Table 5). In general, the group stated that they were very satisfied with the implementation of the course in its b-learning modality.

Table 5. Overall frequency of instrument dimensions

		Frequency	Percentage	Valid percentage	Cumulated percentage
Valid	Very satisfied	11	100.0	100.0	100.0

4.2 Qualitative analysis on the course implementation, the experiences and learning of the teachers

Qualitative analysis was done of teachers' opinions regarding the implementation of the course, their experiences and lessons learned. The data collection technique that was used was the focus group and a qualitative analysis was developed through seven main previous categories. The results are presented.

Experiences of how they felt using technology tools

The teachers expressed that they were nervous, anxious about the challenge of using an unknown resource, excitement and interest for continuous improvement and satisfied with the results obtained.

Most significant learning of the use of technological resources

The most significant learnings expressed by teachers relate to the use of different programs such as PowerPoint, including audio, videos, animations, as well as Movie Maker to create stories through drawings (Draw my life) and the use of Audacity for the construction and edition of audios.

Relation of the obtained learning with his teaching task

Concerning their teaching task and learning achieved, teachers said that tools are useful not only because they allow the classes to be dynamic, but because they attend different learning styles, now they can create resources according to the themes, maturity of the child and learning needs, as well, they mentioned as benefits the reinforcement of knowledge through this type of activities and the stimulation of children for the use of technology.

Use of the tools included in the course in the practice

In general, the teachers affirmed that the tools are useful for the different subjects they teach, as well as the students' styles, maturity and needs, because they involve the teacher and the student in an interaction that it is a challenge for them to achieve and with it a transformation of the innovative learning situation.

The progress made during the implementation of the course

Concerning the achievements made during the course, teachers generally expressed that they made significant progress in developing their own resources and developing the skills to create their materials and the interest to continue learning in a innovative way.

Opinion about ICT

Regarding the opinion about the use of ICT, most of the teachers said that the progress was in the change of attitude regarding its use; As well as their commitment to their profession and to the educational community by innovating and attending to the needs of the students, continually being trained.

General view about course content, learning activities and instructor

Teachers indicated that the course had an adequate organization, the contents were according to the needs, the work was simple and the instructor solved the different doubts that were emerging. The use of the platform to develop tasks, interacting with their partners made an interesting and innovative activity as it involved transforming their vision regarding ICT and especially the collaborative work.

4.3 Analysis of learning journals

One of the learning activities that the teachers developed at the end of each session was the construction of the learning journals, which were written under the guidance of the following questions: ¿What did I learn? How did I learn it? What do I have to learn? What was my meaningful learning?

Analysis and reflection of the teacher training experience from the journals

Teachers identified as main learning the concept of educational platform, its operation, the construction of effective presentations in PowerPoint, the download of images and the search strategies of reliable information, as well as the use of ICT in the practice.

On the other hand, based on the contents studied, the teachers identified as main learning the construction of PowerPoint presentations with hyperlinks, images, gifs, animations, use of the drop box to store information and share it, as well as the use of commands on the computer keyboard.

According to the themes addressed, the teachers expressed different learning, among it can be found: the installation of programs to the computer, downloading of videos, creating of videos, which involved planning, filming and editing, as well as recording and audio editing, the use of PowerPoint presentations in different moments of instruction (beginning, development and closing), as well as audio and video integration.

Based on the content studied in the course, the teachers affirmed that they had obtained the following learning that allowed them to improve their mastery of ICT: Sharing videos and audios in the network (YouTube, Goear), the need to develop Search, innovate and create, recognizing that using technology can be fun but requires time investment, use of Excel to average student ratings and planning of learning activities (at each instructional moment) in the use of one or more technological resources.

5. Discussion

In this study, the satisfaction of the teachers of basic education was evaluated, regarding the course in B-learning mode; As a first result it was found that in the dimension "course design in its virtual modality", 81.8% of teachers mentioned being very satisfied and only 18.2% stated that they were moderately satisfied. With regard to the dimensions "course development in its virtual modality", "learning activities developed during the course" and "teacher performance during the classroom sessions", 100% of teachers said they are very satisfied. These results coincide with what Dominguez and Canto (2012) affirmed, in the sense that the contemporary teachers, work in a technological environment of teaching and learning, where they have to develop competences (digital) result of the influence that the context has about their professional task; This makes them appreciate the fact of being trained through courses that allow them to develop digital skills, to benefit the teaching and learning process. Likewise, the findings obtained from teachers' opinions regarding the implementation of the course, coincide with that mentioned by Valdés, Angulo, et al. (2011), in the sense that the incorporation of ICT in educational programs has acquired special relevance, under the assumption that these technological tools can promote a better educational quality and facilitate learning. In relation with was mentioned before, basic education teachers stated in the interview that the technological tools are useful not only because they allow the classes to be dynamic, but because they attend to the different learning styles; Now they can create resources according to the themes, maturity of the child and learning needs.

Another aspect to be highlighted is what Ramírez (2006 cited in Valdés, Angulo, Urías, García and Mortis 2011) points out, "the incorporation process of ICT by teachers in educational institutions has happened quickly, resulting in new demands for teachers ", this agrees with teachers' assertion that they, through the digital literacy course, had a significant learning in order to develop their own resources and develop their skills in the use of ICT; This allowed them to increase their interest to continue learning in an innovative way based on the implementation of technology. Therefore, this helped them a lot in their institutions, which day by day demands more as trainers of the basic level.

Finally, teachers expressed through their learning journals that the digital literacy course allowed them to develop their ICT skills, for example they mentioned that they could install programs to their computers without fear of damaging them, download and prepare educational videos, recordings and audio editions; Use PowerPoint presentations at different times of instruction (beginning, development and closing), as well as integrate audio and video into various educational projects; All this learning helped the quality of teaching. What was mentioned above is related to what Rodríguez and Gutiérrez (2011) point out, "it is urgent to integrate ICT into teachers‘ practice, in such a way that it not only benefits themselves, but that lay on academic achievement of students and, Therefore, on the quality of the teaching and learning process.

6. Conclusions

Based on the study carried out, some conclusions were formulated regarding the theme of the training of teachers of basic education regarding the use of ICT that are presented below.

In order to carry out a course for the training of teachers regarding the use of ICT, and in this case,

specifically in B-learning and Enciclomedia, it is necessary to make a needs diagnosis regarding the knowledge, skills and attitudes to have a solid basis that allow a good design, development and implementation of the course for the training of skills in the use of ICT.

The analysis of the context, including the educational policies, the framework of competences in ICT established by the organizations and in particular, by the SEP, as well as the characteristics of the institution, the educational policy of the school, the technological resources it has, teacher training, students' characteristics and infrastructure, these are elements that must be taken into account for the design, development and implementation of a course on the training of Basic Education teachers in the use of ICT.

The theory and practice are elements that cannot be separated in the development of a training course in the use of ICT, since this creates a trusting environment between teacher and student, this result in safety and confidence of the student during the learning process.

In addition, in the design of the course in the educational platform must be clear enough, so that the work in it is simple, creative, has an internal logic and promotes in the student the interest in learning. It is necessary the incorporation of materials, resources, tutorials, readings, activities, relevant to the contents and the teacher's work.

When implementing a course in the B-learning modality, it is necessary to establish the means of communication between student and teacher for the resolution of doubts. In this sense, the dates, working hours and the delivery of tasks will be determined. Likewise, the participants' access to the Internet and the instructor must be corroborated. Before starting with the content of the course, it is necessary that the student identifies the usefulness of the course, the purposes, topics, strategies, activities, the tools that will use and the expected learning.

On the instructors, it is necessary to know the origin and purposes of the project and course; their academic training and work experiences; they must master aspects on the use of technology and its direct application to the educational field.

To conclude, this study had an impact on the different participants of the educational community. First, teachers were benefited by acquiring the tools for the development of skills in the use of ICT available to them at school, as well as the strategies to integrate into their practice.

Second, students having the opportunity to receive instruction with a different approach and taking an active role in class sessions, this helps them to improve their school performance; And lastly, to the managers, since they had at their disposal a training program directed to its personnel and according to its context.

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