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ARTICLES:

ANALYSIS OF DATA LOGGER USING ZIGBEE (802.15.4) FOR WIRELESS APPLICATIONS

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ABSTRACT:
This dissertation is to produce data logger for remote system. It consists of a temperature sensor for constantly monitoring temperature and Zigbee module for wireless data transfer at short distances. The measured temperature parameter will be sent to microcontroller system. And with the help of Zigbee module temperature is sent to computer from remote area on digital displays. In recent time is sent with the help of inbuilt RTC which ARM7 (LPC2148) microcontroller system has got. There will also provision for setting of RTC time if user required in any case and it is done with the help of remote computer. When microcontroller circuit power up then user is ask to set RTC time after this data transfer take place continuously which appears on computer via Zigbee module connected to computer.

KEYWORDS:
Zigbee, microcontroller, monitoring Temp.

I. INTRODUCTION

The original model for this system consists of standalone data logger. As the requests from users are getting higher, the application of wireless communication as medium transmission rather than the use of wires. Other than that, extra features or some kind of bonus will be add to this system which is capable to access to wireless communication for alarming some events. Moreover, these systems which apply low power consumption are easy to manage and install. It is based on wireless sensor networks.

Wireless Sensor Network consists of large numbers of sensor nodes. The nodes are equipped with sensor devices that are used for a certain applications. For example, the sensor device is camera and it is used to retrieve the environment data visually, microphone is used to detect the sound, thermometer and thermocouple are used to detect the changes in temperature. Every sensor nodes are also equipped with wireless module in order to communicate with each other. The communication between the nodes are performed by establishing the routing topology in the system before the data can be transmit from the certain sensor node to the collection point or host

Wireless sensor network (WSN) is an emerging technology and has great potential to be employed in critical situations. Wireless sensor networks have been deployed in various monitoring applications such as industrial, health, environmental, and security The Wireless Sensor Networks comprise of

relatively inexpensive sensor nodes capable of collecting, processing, storing and transferring information from one node to another. These nodes are able to autonomously form a network through which sensor readings can be propagated [20]. Therefore, a standard is required that is capable of establishing the network between these nodes as well as provide low cost and less power consumption. Fortunately, there is a standard called ZigBee that is capable of accomplishing all these requirements.

ZigBee standard is developed by the ZigBee Alliance that defines the communication protocols for low-data-rate and short-range wireless networking. ZigBee based wireless devices operate at 868 MHz, 915 MHz, and 2.4 GHz frequency bands. ZigBee is developed on the top of IEEE 802.15.4 standard . is designed for low-power consumption and allows batteries to last up to years using primary cells without any chargers (low cost and easy installation). ZigBee has a wide application area such as home networking, industrial networking, system monitoring and many more having different profiles specified for each field.

II. MATERIALS AND METHODS

ADC working

Most real world data is in analog form. Whether it be temperature, pressure, voltage, etc, their variation is always analog in nature..so we have to convert this analog data into digital format so that computer or microcontroller can understand it and process on it. Sensor gives analog data in form of variation in current and voltage, ADC read this variation and process a digital data according to analog input and send to microcontroller to process it further.

Terms used in ADC

Resolution – The resolution of the converter indicates the number of discrete values it can produce over the range of analog values. A computer is a digital machine that stores a number in binary. If you are storing a digital 2-bit number you can store 4 different values: 00, 01, 10, or 11. Now, you can say ADC have 2-bit resolution and you have a device which converts an analog voltage between 0 and 10 volts into a 2-bit digital value for storage in a computer.

This device will give digital values as follows

Voltage	2-Bit Digital Representation
0 to 2.5	00
2.5 to 5	01
5 to 7.5	10
7.5 to 10	11

Table 1.0

Note:

- Higher the resolution smaller the step size
- Smaller the step size better accuracy

Step size – small amount of change in analog input that can understand
for example 8-bit ADC,
step size=Vref/2^8-1 = Vref/255
Vref – used to detect step size
Conversion –
Dout=Vinput/(step size)
Dout – decimal output digital data
Vinput – analog input voltage
For example – for 8 bit ADC, Vref = 2.56 V, calculate digital output for 1.7 V input.
step size=(2.56 V)/256=10 mV
Dout=(1.7 V)/(10 mV)=170=10101010

Method to inbuilt ADC

In this tutorial we will go through LPC2148 adc programming. Analog to Digital Conversion(i.e. ADC) , as the name suggests , is all about converting a given analog signal into its digital form or say a digital value. So, what does this mean? Well, basically its measuring the voltage of a given analog signal. The analog signal can be differential, single-ended unipolar, etc. The converted digital value represents the measured voltage. This conversion or measurement happens in presence of a fixed and accurate reference voltage. The analog signal is compared to this reference voltage and then estimations are made to get the final measured value.

ADC on LPC214x

ADC on LPC214x is based on Successive Approximation (SAR) conversion technique.

Pins relating to ADC Module of LPC214x :

Pin	**Description**
AD0.1 to AD0.4 (P0.28/29/30/25) and AD0.6,AD0.7 (P0.4/5)	Analog input pins. **Note from Datasheet:** "If ADC is used, signal levels on analog input pins must not be above the level of Vdda at any time. Otherwise, A/D converter readings will be invalid. If the A/D converter is not used in an application then the pins associated with A/D inputs can be used as 5V tolerant digital IO pins."
Vref	This is the reference voltage pin. It must be connected to an accurate reference voltage source.
Vdda,Vssa	Vdda is Analog Power pin and Vssa is Ground pin used to power the ADC module.

Table 2.0

Registers used for ADC programming in LPC214x

(For AD1 registers replace 0 with 1 wherever applicable)

1) AD0CR – A/D Control Register : This is the main control register for AD0

1. Bits[7 to 0] – SEL : This group of bits are used to select the pins(Channels) which will be used for sampling and conversion. Bit 'x'(in this group) is used to select pin A0.x in case of AD0.
2. Bits[15 to 8] – CLKDIV : These bits stores the value for CLKDIV which is used to generate the ADC clock. Peripheral clock i.e. PCLK is divided by CLKDIV+1 to get the ADC clock
3. Bit 16 – BURST : Set this to 1 for doing repeated conversions. Set this bit to 0 for software controlled conversions , which take 11 clocks to finish.
4. Bits[19 to 17] – CLKS : These bits are used to select the number of clocks used for conversion in burst mode along with number of bits of accuracy of the result in RESULT bits of ADDR.

Value	**clocks / bits**
000	11 clocks / 10 bits
001	10 clock / 9 bits
010	9 clock / 8 bits
011	8 clock / 7 bits
100	7 clock / 6 bits
101	6 clock / 5 bits
110	5 clock / 4 bits
111	4 clock / 3 bits

Table 3.0

5. Bit 21 – PDN : Set it to 1 for powering up the ADC and making it operational. Set it to 0 for bringing it in power down mode.
6. Bits[26 to 24] – START : These bits are used to control the start of ADC conversion when BURST (bit 16) is set to 0. Below is the table as given in datasheet :

Value	**Significance**
000	No start (this value is to be used when clearing PDN to 0)
001	Start the conversion
010	Start conversion when the edge selected by bit 27 occurs on P0.16/EINT0/MAT0.2/CAP0.2 pin
011	Similar to above – for MAT0.0 pin
100	Similar to above – for MAT0.1 pin
101	Similar to above – for MAT0.3 pin

110	Similar to above – for MAT1.0 pin
111	Similar to above – for MAT1.1 pin

Table 4.0

7. **Bit 27 – EDGE :** Set this bit to 1 to start the conversion on falling edge of the selected CAP/MAT signal and set this bit to 0 to start the conversion on rising edge of the selected signal. (Note: This bit is of used only in the case when the START contains a value between 010 to 111 as shown above.)
8. Other bits are reserved.

AD0GDR – A/D Global Data Register : This is the global data register for the corresponding ADC module. It contains the ADC's DONE bit and the result of the most recent A/D conversion.

1. Setting up and configuring ADC Module for software controlled mode :

First we will define some values which will help us setup the AD0CR register to configure the AD0 block before we can use it.

```
#define CLKDIV (15-1) // 4Mhz ADC clock (ADC_CLOCK=PCLK/CLKDIV) where "CLKDIV-1" is actually used , in our case PCLK=60mhz
#define BURST_MODE_OFF (0<<16) // 1 for on and 0 for off
#define PowerUP (1<<21) //setting it to 0 will power it down
#define START_NOW ((0<<26)|(0<<25)|(1<<24)) //001 for starting the conversion immediately
#define ADC_DONE (1<<31)
```

Here we define CLKDIV which is divided by PCLK to get the ADC clock <=4Mhz. In our case we will be using a PCLK of 60Mhz hence we divide 60Mhz by 15 to get 4Mhz. But note that the ADC module actually needs a value of (CLKDIV-1). This is because it adds "+1" to the value internally (in case if user uses a CLKDIV of 0 it will be still valid). For our purposes CLKDIV is a 'zero-indexed' value hence we must subtract it by 1 before using it. In our case we need to supply a value of 14 i.e. (15-1) to AD0CR.
BURST_MODE_OFF(bit 16) , PowerUP(bit 21) and ADC_DONE(bit 31) are defined as required. CLKS_10bit has been defined for 10 bit resolution - you can change the bit combination as per your needs. Finally START_NOW is defined as "001" which is for starting the conversion 'now'.
Next we define AD0CR_setup which contains basic configuration for setting up the ADC Module. We feed CLKDIV , BURST_MODE_OFF and PowerUP into AD0CR_setup as follows

```
unsigned long AD0CR_setup = (CLKDIV<<8) | BURST_MODE_OFF | PowerUP;
```

Now we assign AD0CR_setup to AD0CR along with channel selection information to select channels as required. Finally we assign(by ORing) START_NOW to AD0CR to start the conversion process as shown :

```
AD0CR =  AD0CR_setup | SEL_AD06;
AD0CR |= START_NOW;
```

Note that AD0CR can be assigned/setup in a single step. But I am doing it in three steps to keep things simpler.

2. Setting up and configuring ADC Module for Burst mode :

Configuring ADC Module is similar to what was done in software controlled mode except here we use the CLKS bits and don't use the START bits in AD0CR. ADC_DONE is also not applicable since we are using an ISR which gets triggered when a conversion completes on any of the enabled channels.

```
#define CLKDIV (15-1) // 4Mhz ADC clock (ADC_CLOCK=PCLK/CLKDIV) where
"CLKDIV-1" is actually used , in our case PCLK=60mhz
#define BURST_MODE_ON (1<<16) // 1 for on and 0 for off
#define CLKS_10bit ((0<<19)|(0<<18)|(0<<17)) //10 bit resolution
#define PowerUP (1<<21) //setting it to 0 will power it down
```

3. Fetching the conversion result in software controlled mode :

In software controlled mode we continuously monitor bit 31 in the corresponding channel data register ADDR. If bit 31 changes to 1 from 0 , it means that current conversion has been completed and the result is ready. For example , if we have used channel 6 of AD0 then we monitor for changes in bit 31 as follows :

```
while( (AD0DR6 & ADC_DONE) == 0 ); //this loop will terminate when bit 31 of AD0DR6
```

4. Fetching the conversion result in Burst mode :

In Burst mode we use an ISR which triggers at the completion of a conversion in any one of the channel. Now , we just need to find the Channel for which the conversion was done. For this we fetch the channel number from AD0GDR which also stores the conversion result. Bits 24 to 26 in AD0GDR contain the channel number. Hence , we shift it 24 places and use a 3bit mask value of 0xF as shown below :

```
unsigned long AD0GDR_Read = AD0GDR;
int channel = (AD0GDR_Read>>24) & 0xF; //Extract Channel Number
```

After knowing the Channel number, we have 2 options to fetch the conversion result from. Either we can fetch it from AD0GDR or from AD0DRx of the corresponding channel. In the examples covered in 'examples section' of this tutorial I have used AD0GDR for extracting the conversion result as follows :

```
int currentResult = (AD0GDR_Read>>6) & 0x3FF; //Extract Conversion Result
```

Introduction of inbuilt UART

Here is a quick recap of UART basics : Uart uses TxD(Transmit) Pin for sending Data and RxD(Receive) Pin to get data. UART sends & receives data in form of chunks or packets. These chunks or packets are also referred to as 'transmission characters'. The structure of a UART data packet is as shown below :

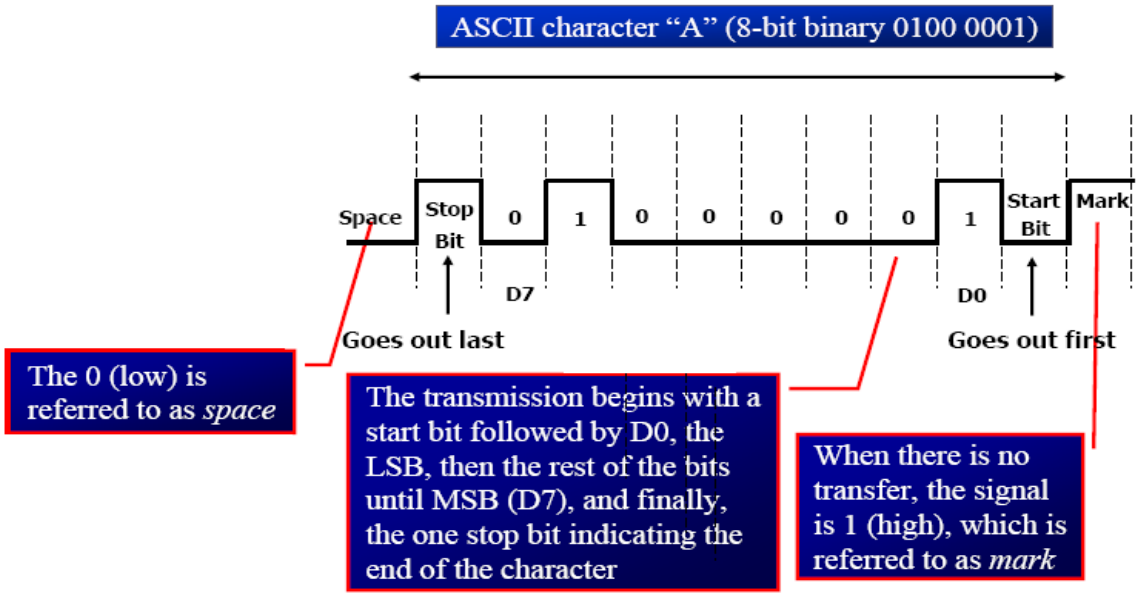

Figure 1.0

Now , Lets start with the main Tutorial. LPC214x has 2 UART blocks which are UART0 and UART1. For UART0 the TxD pin is P0.0 and RxD pin is P0.1 and similarly for UART 1 the TxD pin is P0.8 and RxD pin is P0.9 as shown in the table below :

Pins:	TxD	RxD
UART0	P0.0	P0.1
UART1	P0.8	P0.9

Table 5.0

Registers used for UART programming in LPC214x:

Before we can use these pins to transfer data , first we need to configure and initialize the UART block in our LPC214x microcontroller. But before doing that, lets go through some of the important registers: (for UART1 registers replace 0 with 1)

Data Related Registers :

1) U0RBR – Receiver Buffer Register (READ ONLY!): This register contains the top most byte(8-bit data chunk) in the Rx FIFO i.e the oldest received data in FIFO. To properly read data from U0RBR , the DLAB(Divisor Latch Access) bit in U0LCR register must be first set to 0.

2) U0THR – Transmit Holding Register (WRITE ONLY!): U0THR contains the top most byte in Tx FIFO and in this case its the newest(latest) transmitted data. As in the case with U0RBR , we must set DLAB=0 to access U0THR for write operation.

Baud Rate Setup related registers :

1) U0DLL and U0DLM – Divisor Latch registers: *Both of them hold 8-bit values. These register together form a 16-bit divisor value which is used in baud rate generation which we will see in later section.*

U0DLM holds the upper 8-bits and U0DLL holds the lower 8-bits and the formation is ***"[U0DLM:U0DLL]".*** *Since these form a divisor value and division by zero is invalid, the starting value for U0DLL is 0×01 (and not 0×00) i.e the starting value in combined formation is* ***"[0x00:0x01]"*** *i.e* ***0×0001. Please keep this in mind while doing baud-rate calculations. In order to access and use these registers properly, DLAB bit in U0LCR must be first set to 1.***

2) U0FDR – Fractional Divider Register : *This register is used to set the prescale value for baud rate generation. The input clock is the peripheral clock and output is the desired clock defined by this register. This register actually holds to different 4-bit values (a divisor and a multiplier) for prescaling which are:*

1. **Bit [3 to 0] – DIVADDVAL :** This is the prescale divisor value. If this value if 0 then fractional baud rate generator wont have any effect on Uart Baud rate.
2. **Bit [7 to 4] – MULVAL :** This is prescale multiplier value. Even if fractional baud rate generator is not used the value in this register must be more than or equal to 1 else UART0 will not operate properly.
3. Other Bits reserved.

Remark from Usermanual : "If the fractional divider is active (DIVADDVAL > 0) and DLM = 0, the value of the DLL register must be 2 or greater!"

UART Baud Rate Generation:

In most cases the actual baudrate will drift a little above or below the desired baud and also, as the desired baudrate increases this drift or error will also increase – this is because of the equation itself and the limitations on MULVAL , DIVADDVAL! For e.g. if the desired baud rate is 9600 and you get a baud like 9590 , 9610 , 9685 , 9615 , etc.. then in almost all cases it will work as required. In short , a small amount of error in actual baudrate is generally tolerable in most systems.

The master formula for calculating baud rate is given as :

$$\text{BaudRate} = \frac{\text{PCLK in Hertz}}{16 \times (256 \times \text{DLM} + \text{DLL}) \times (1 + \text{DIVADDVAL}/\text{MULVAL})}$$

which can be further simplified to :

$$\text{BaudRate} = \frac{\text{PCLK in Hertz}}{16 \times (256 \times \text{DLM} + \text{DLL})} \times \frac{\text{MULVAL}}{\text{MULVAL} + \text{DIVADDVAL}}$$

with following conditions strictly applied :

0 < MULVAL <= 15

0 <= DIVADDVAL <= 15

If DIVADDVAL > 0 & DLM = 0 then, DLL >= 2

As it can been seen this formula has 2 prominent parts which are : A Base value and a Fractional Multiplier i.e: BaudRate = [Base] x [Fraction(i.e. Prescale)]. This Fractional Multiplier can be used to scale down or keep the base value as it is .. hence its very useful for fine-tuning and getting the baudrate as accurate as possible. Where PCLK is the Peripheral Clock value in Hz , U0DLM and U0DLL are the divisor registers which we saw earlier and finally DIVADDVAL and MULVAL are part of the Fractional baudrate generator register.

III. RESULTS AND CONCLUSION

This thesis is developed for remote monitoring of system with respect of time. Therefore user does not need go to remote area to know the temperature of device .The device developed can work efficiently up to a 30m distance depending upon surrounding environmental and 100m for open air, which can be used as a modern technique as per requirement .

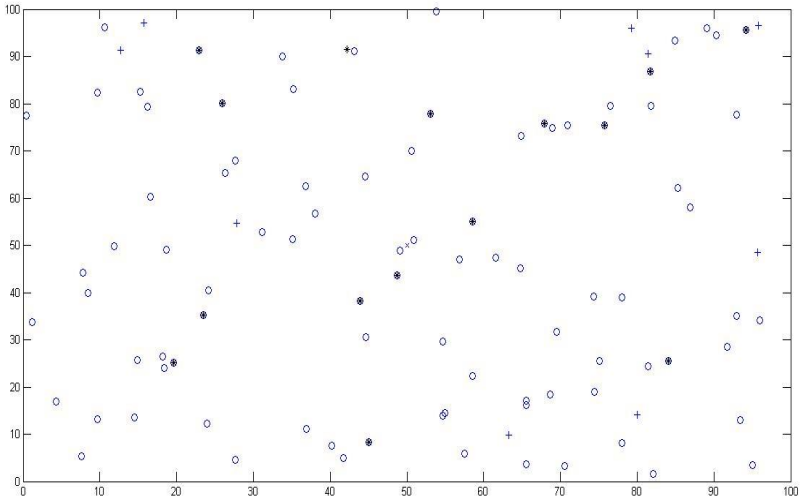

Figure 6.0

Limitations and difficulties

- Received data in computer cannot be stored for future analyses.
- Difficulties encountered while interfacing with the Xbee module and programming of ARM7 .

Future scope of work

- To control remote system
- If system is more than one then it can form WLAN for providing information regarding data like temperature

Some types of research for Xbee are used are:

- Cosmic ray astrophysics
- Gamma ray and X -ray astrophysics
- Optical and ultra - violet astrophysics
- Infrared/sub millimeter
- Atmospheric science

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CASE REPORT-DIAGNOSTIC & MANAGEMENT APPROACH IN CHOLANGIOCARCINOMA.

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Course- Surgery Capstone Report Assessment

PATIENT PRESENTATION-

A patient with a history of primary sclerosing cholangitis presents of jaundice, pruritus, and abdominal pain. He also has noticed that his urine is dark, and stools are clay coloured. On physical exam, -generalized jaundice and a palpable right upper quadrant mass. Lab studies -elevated ALP, total bilirubin, ALT, AST, and CA 19-9. (Medbullets, 2019)

INTRODUCTION-

CHOLANGIOCARCINOMA-Cholangiocarcinoma is a rare tumour arising from biliary epithelium and found anywhere in the biliary tree. The most common location of these is bifurcation if right and left hepatic duct and these tumours also called klatskin tumour. surgical resection is only cure for these types of tumour, if the tumour is not resectable we can do palliation for the patient. Prognosis is good if we detect the disease in early stage.

1)SIGN AND SYMPTOMS-

Cholangiocarcinoma shows symptoms when the tumour obstructs the biliary tree system, causing painless jaundice

Extrahepatic cholangiocarcinoma (MC)-90%

Intrahepatic cholangiocarcinoma-(10%)

- Courvoisier sign-painless and enlarged gall bladder (Most common clinical finding in case of CCA patient)
- Sign of cholestasis are the Jaundice, pale stool, dark urine and pruritis are seen in these patients
- Abdominal pain and weight loss also be present
- In early stage these malignancies are asymptomatic
- Non-specific symptoms such as nausea, weight loss weakness, fatigue and anorexia seen in some patients
- Dull abdominal pain-RUQ (mccaskie, 2018, p. 1208) (F.Charles brunicardi, 2019, p. 1450) (Mattox, 2012, p. 1515)

2) ETIOLOGY-

- Primary sclerosing cholangitis

- Parasitic Liver fluke infection- (clonorchis sinensis and opistorchis viverrini)
- Cholelithiasis and Cholidocholithiasis
- Chronic viral hepatitis-hep-B & hep-C
- Liver Cirrhosis and biliary papillomatosis
- Environmental Toxin-PVC and Thorotrast
- Congenital biliary anomaly-caroli's disease and congenital hepatic fibrosis
- Alcohol and HIV (F.Charles brunicardi, 2019, pp. 1423-24; mccaskie, 2018, p. 1208) (Mattox, 2012, pp. 1514-15)

3) DIAGNOSTIC APPROACH –

The Diagnostic approach varies depending on the location of tumor and if PSC present.

If the patient presentation such as laboratory finding, and transabdominal ultrasound suggest biliary cancer then MRCP and MDCT are the best diagnostic test.

Objective examination-

We must do Physical exam like inspection, palpation percussion, auscultation

1) check the state of the patient whether he is normotensive or not

2) vital signs patient is body temperature is 37.1 pulse-90/min RR-18 b/min o2 saturation is 98% and the BP is 120/80mmmg

3)on abdominal palpation there is RUQ mass and pain. Patient is mild jaundiced.

4) urine analysis is unremarkable in these patients except for dark urine.

1) Laboratory Test-

- Liver function test such as INR, AST, ALT is elevated
- Cholestasis parameters are ALP & GGT are elevated
- Tumor markers are used to determine baseline but should not performed to confirm diagnosis.

- CA-19-9 and CEA
- ALP
- Biliary insulin like growth factor

2) Imaging-

- Transabdominal ultrasound is best method for suspected biliary tract carcinoma.
- It is helpful in for the localization of obstruction and evaluation of gallstone
- We can see gall bladder or bile duct dilation
- It is Useful for identifying locally metastasis disease

3) MRCP-

- These methods are Recommended for definitive diagnosis
- Finding on MRCP is bile duct dilation and mass lesion
- Cholangiocarcinoma –

On T1- image we can see the Hypo-intense lesion
On T2- image we can see Hyper-intense lesion
We can also use direct cholangiography by using ERCP to access the obstruction which is more distal in biliary tract
While PTC is used to access obstruction more proximal to biliary tract (Norman Williams, 2018, p. 1209)

4) Abdominal MDCT is commonly used as alternative for the MRCP
5) Endoscopic US for distal extrahepatic lesion and staging
6) Chest CT is used to do staging of advanced metastasis
7) PET scan for distant metastases and to access the lymph node involvement.
8) Biopsy with ERCP with ductal brushing or biopsy is recommended in some cases but it is not diagnostic purpose for all cases. (Mattox, 2012, p. 1516)
9) Fluorescence in situ hybridization (FISH)is a newly devolved cytogenic method to assess cellular aneuploidy and chromosomal duplication. (Norman Williams, 2018, pp. 1208-09) (F. Charles Brunicardi, May 8, 2019, pp. 1423-24)

DIAGNOSTIC ALGORITHM-
a) Cholestasis (clinically or lab)>
b) local imaging (CT, MRI/MRCP, CA19-9)>
c) ERCP-OR PTCD>STAGING(PET) (Boris Blechacz, 2016)

4) SCORING SYSTEM-
For perihilar cholangiocarcinoma-Klatskin tumor
The Bismuth-Corlette classification is the classification system for perihilar Cholangiocarcinoma which is more common form of carcinoma present at confluence at right and left hepatic duct.

BIOFORTIFICATION OF PEARL MILLET: A STRATEGY TO COMBAT MALNUTRITION

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ABSTRACT:
Biofortification is a cost-effective and sustainable agricultural solution to malnutrition. This is a multidisciplinary, cost-effective method that makes full use of crop development and nutrition science to address the persistent problem of micronutrient deficiency. A food-related issue known as micronutrient malnutrition is brought on by a dietary lack of certain vital elements such as iron (Fe), zinc (Zn), vitamin A, and others. Since many people who suffer from micronutrient deficiencies rely on staple crops to meet their nutritional needs, the cultivation of crop cultivars with higher concentrations of micronutrients in their edible parts is becoming more widely recognized as a sustainable choice. A key food crop of India and Africa, Nutri-cereal" Pearl millet with outstanding nutritional qualities and tolerance to climatic change is a good option for biofortification.

EFFECTIVENESS OF COMPLETE DECONGESTIVE THERAPY IN THE MANAGEMENT OF BREAST CANCER RELATED LYMPHEDEMA IN INDIAN POPULATION

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ABSTRACT:

Objective: To evaluate the results of the intensive phase of CDT, including clinical and demographic features, breast cancer and pre and post treatment characteristics of the response to treatment in patients with BCRL.

Method: Total 30 patients were included in this study. This study had pre-treatment and post-treatment design and all the measurements were taken at baseline and the duration of the treatment is 6 days, a week for 4 weeks. The participant's intervention has begun the day they visited the clinic. With each intervention session lasting for 45-60 minutes, the participant's attended 6 sessions separated by a one-day break between each week, spread over a period of 4 weeks.

Result: The mean age was 49.5±9.9 and BMI was 28.6 kg/m2. Tumor Involved in breast; 14 (46.6%) cases of right breast and 16 (53.4%) cases of left breast. T stage (Tumor size in the Breast) were seen 1(3.35%) in Tis, T1 (20mm) in 17 (56.7%), T2 (20-50mm) in 11 (36.6%). None of the patient had stage T4. Nodal involvement; 18 (60%) patients had N0 and 12 (40%) had N+ and metastasis was seen 30 (100%) in M0. After 4th week total reduced mean volume of affected arm was 196 mL, total 36.6 % of reduction in the lymphedema volume

Conclusion: Significant difference ($p<0.0001$) was seen in the mean volume of affected arm (pre and post-treatment). And there was no significant difference ($p<0.980$) seen in the mean volume of the normal (pre-treatment and Post-treatment).

KEYWORDS:

Breast Cancer, Lymphedema, CDT, MLD, Modified Radical Mastectomy, Surgery

INTRODUCTION

Breast cancer is the commonest cancer of urban Indian women and the second commonest in the rural women breast cancer accounts for 14% of cancers in Indian women[1]. Breast cancer has ranked number one cancer among Indian females with age adjusted rate as high as 25.8 per 100,000 women

and mortality 12.7 per 100,000 women[2]. The lack of consensus leads to confusion regarding the incidence of lymphedema after breast cancer treatment and difficulty in measuring treatment efficacy[3].

Breast cancer-related lymphedema (BCRL) results from obstruction or disruption of the lymphatic system associated with cancer treatment (removal of lymph nodes and radiotherapy); patient personal factors [obesity or higher body mass index (BMI)] can increase the risk of lymphedema; and infections or trauma can trigger lymphedema[4]. BCRL can occur months or years after treatment. As advances in the treatment of breast cancer continue to progress, health care providers and patients are increasingly focused on post-treatment quality of life[5]. BCRL negatively affects a patient's quality of life, causing elevated rates of depression and anxiety in addition to physical impairment compared to patients without BCRL[6]. Management of lymphedema remains a major challenge for patients and health care professionals. Routine check-ups for lymphedema management, long-term physical therapy, management equipment (compression garments, bandages, special lotions), and repeated cellulitis, infections, and lymphangitis create financial and economic burdens not only to survivors but also to the health care system [7].

The aim of this study was to evaluate the results of the intensive phase of CDT, including clinical and demographic features, breast cancer and pre and post treatment characteristics of the response to treatment in patients with BCRL.

METHOD

67 patients were screened and 37 individuals were excluded as they did not meet the inclusion criteria. The 30 participants were made aware of the purpose and procedure of the study. The participants were aged between 25 to 65 years female, and had modified radical mastectomy or lumpectomy and axillary nodal dissection or other (simple mastectomy, tumor excision alone) for breast cancer. This study had pre-treatment and post-treatment design and all the measurements were taken at baseline and the duration of the treatment is 6 days, a week for 4 weeks. The participant's intervention has begun the day they visited the clinic. With each intervention session lasting for 45-60 minutes, the participant's attended 6 sessions separated by a one-day break between each week, spread over a period of 4 weeks. Patients underwent complete physical examination and were evaluated for symptoms such as numbness, tightness, stiffness, and heaviness. On initial assessments, both arms were measured. Patients have completed radiotherapy and chemotherapy sessions. A signed informed consent was obtained from each participant.

Treatment in patients (BCRL)

The affected arm was measured at the start of treatment and weekly during the intensive phase of treatment Component of Decongestive Therapy (CDT)[8]. During the intensive phase, treatment lasts for 1 h daily for up to several weeks depending on the severity and response. (CDT) consists of four

components. The first is Manual Lymphatic Drainage (MLD), which causes volume reduction by removing excess fluid and protein. MLD is a skin-stretching form of massage performed to open the lymphatics in unaffected regions to drain fluid from the affected regions and increase lymphatic activity. Second, compression therapy is applied to mobilize the edema fluid after each MLD session for 23 h/d, including weekends. Bandages and specific padding are applied in a precise way to the affected limb using a graded pressure. The bandage material used determines the depth of the compression effect. Short-stretch bandages are primarily used in our institution. Bandage application causes high pressure during activity and relatively low pressure in the limb when the body is resting. The third and fourth components are remedial exercises for the arm and shoulder and deep breathing to help promote venous and lymphatic flow. Patients are instructed about skin and nail care. The home program involves 1 h of training on self-lymphatic drainage and education on scrupulous skin care and remedial exercises. In our study, none of the patients received pneumatic compression therapy. Once the intensive phase was complete, the patient was measured for a custom garment and attended a few sessions to maintain the fluid volume loss until the compression garment was ready to wear (20–30 mm Hg). During the maintenance phase, which is permanent, the patient was instructed to wear the garment daily while awake and to remove it at bedtime. The patient was encouraged to do self-lymph drainage at least once daily.

Inclusion Criteria:

The participants were aged between 25 to 65 years female. Patients have completed radiotherapy and chemotherapy sessions. Patients who developed lymphedema of more than 2 cm compared to the contralateral extremity were included.

Exclusion Criteria:

Participants with primary lymphedema, bilateral lymphedema, pulmonary edema, congestive heart failure or any contraindications limiting CDT were excluded.

Statistical analysis

We applied the chi-squire test and paired t test to the absolute volume in milliliters to evaluate treatment effectiveness. Our data satisfied the assumption of the paired t test. Absolute concordance (degree of difference between the volumes pre and post treatment) was also assessed through the paired t test.

RESULTS

The 30 participants were made aware of the purpose and procedure of the study. The mean age was 49.5±9.9 and BMI was 28.6 kg/m2. Tumor Involved in breast; 14 (46.6%) cases of right breast and 16 (53.4%) cases of left breast. T stage (Tumor size in the Breast) were seen 1(3.35%) in Tis, T1 (20mm) in 17 (56.7%), T2 (20-50mm) in 11 (36.6%). None of the patient had stage T4. Nodal involvement; 18 (60%) patients had N0 and 12 (40%) had N+ and metastasis was seen 30 (100%) in M0. (Table: 1)

EMPLOYEE RIGHTS AND RESPONSIBILITIES

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Employees have certain rights and responsibilities in the workplace. These rights and responsibilities are typically defined by law or by contract. Some of the most important employee rights include:
Employee Rights

- The right to be treated fairly and with respect
- The right to a safe and healthy work environment
- The right to privacy
- The right to be paid fairly
- The right to join a union
- The right to file a complaint with the Equal Employment Opportunity Commission (EEOC) if they believe they have been discriminated against

DEVELOPING DATA FOR POLICY: MAPPING THE POLITICAL ECONOMY OF MEASURING GOVERNANCE

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Extended Abstract
This paper contributes to the debate on data for policy by presenting new data that sheds light on structures and hierarchies of measuring governance quality and identifies the actors that fund, produce and manage governance measures. In our contribution, we aim to analyze how political economy factors influence framing within the current global indicator culture, consequently setting the policy agenda in global governance.
Measuring the governance quality and capacity of states has become a crucial tool for global development. Most scholars and policy-makers agree that the design of rules and regulations, the effectiveness of policies, and the competence of public bodies play a central role in the functioning of states and economies (Baland, Moene and Robinson 2010). However, existing measures of governance do not reflect a globally and politically shared notion of governance quality. In terms of economic and political preferences, they rather reflect the views of a specific subset of the 'international community' (i.e., international organizations and donor countries). Hence, their legitimacy as approximations to 'good' governance is conceptually and politically challenged. In the process of data production for policy, this issue raises particular criticism in view of the political acceptability and statistical desirability of existing governance measures (Hulme, Savoia, and Sen 2014). This contestation can have unfavorable effects not only on the conceptual debate surrounding state capacity and governance metrics, but also on the overall engagement of actors in their production.
The subjectivity and power of measuring governance is widely discussed. Scholars have critically examined the relationships of power embedded in the construction and use of contemporary measures of governance, corruption, development (Cooley and Snyder 2015; Davis et al. 2012; Kelley and Simmons 2014; Malito, Umbach, and Bhuta 2018; Merry, Davis, and Kinsburg 2015). Some have looked at the role of global performance indicators as a means of soft (Merry, Davis, and Kinsburg 2015) and productive power (Davis et al. 2012a). Others have paid greater attention to the power of rankings in world politics (Cooley and Snyder 2015), as well as their potential to stimulate political pressure on state behavior (Kelley and Simmons 2014). Although this literature has contributed to

framing the contemporary reflexive indicator culture (Bhuta, Malito, and Umbach 2018), where quantification, indicators, and rankings are trusted and approached as a way of doing politics, a systematic analysis of who sets the agenda of measuring governance and how measuring affects agenda-setting powers is still missing. This opaque understanding of how aspects of political economy and geography affect measuring governance nurtures a rich research agenda combining the analysis of development policies with data analysis and data science. On this research agenda, scholars have so far yet paid little attention to the implications of power imbalances in framing and of the subscription to Eurocentric avatars (Wallerstein 1997) when measuring and monitoring governance resulting from it.

To address this gap, we approach measures of governance as intersubjective concepts and paradigms that are complex, instable, not clearly delimited and for which we need a better understanding of the political ecosystem in which they are made and make sense. This political economy of measuring governance is understood here as the study of political and economic variables shaping the production and funding of governance measures. Consequently, we map the geographical and governance level distribution of state capacity and governance measures to sharpen the systematic view on the distinctive nature, purposes and spatial character of the actors, networks and institutions involved in their funding and production. Knowing who funds, who generates, who rates and where these actors are located sheds light on the notion of governance quality of current governance measures. It enables us to investigate the setting of international standards and the monitoring of governance goals to understand how measures become part of a standardized activity of producing high-quality internationally comparable data for policy.

In our contribution, we argue that political economy factors influence framing within the current global indicator culture and consequently set the policy agenda in global governance. Combining three dimensions of measuring governance – quality of metrics, political economy, and geography of production – can yield a scalar (geographical and governance level) understanding of the type and quality of governance measures. Such an analysis enhances our understanding of policy frameworks, governance, and data-driven innovation towards the SDG, especially related to power relations in governance at transnational level caused by the political economy and geography of measuring. We elaborate on a new dataset created by us that combines data from 81 metrics of governance and state capacity and extends over the period from 1789 to 2020. The dataset generates new data for policy and provides insights by categorising the content and governance dimension of such measures. It takes stock of measurement and assessment tools and presents the variables used by these tools. By considering the absence of cohesion on the fundamental definition of what constitutes governance, the dataset does not privilege one approach over the other. It aims to present a valid overview of existing measures of state performance and hence includes a variety of measures that are broadly considered governance measures, even if they capture different aspects and dimensions of governance and are used by different entities. The dataset presents stylised facts of comparative and cross-national governance measures produced by a range of different actors. The measures included capture a wide range of dimensions that mostly focus on the assessment of state governance: state

capacity, democratic governance, corruption, and integrity, press freedom and accountability, rule of law, protection of property rights, functioning of political institutions.

The contribution finds a Global North-Global South divide in the production and use of governance metrics. It also outlines the mechanisms through which the nature of producers and funders, and their geographical location, may influence measuring and monitoring SDG 16 and how states' policies may be influenced through the use of governance measures.

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THE POTENTIAL OF ASKING AND CRITICAL THINKING OF STUDENTS IN THE COURSE OF DEVELOPMENT OF TEACHING MATERIALS THROUGH PROBLEM-BASED LEARNING MODELS

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The purpose of this research is to describe the potential of students to ask questions and think critically in the subject of developing teaching materials using the problem-based learning model. Research using descriptive method; data collection using observation sheets of asking activities, and tests of critical thinking skills in the form of essays. Data analysis was carried out descriptively. The results showed that the average percentage of student questions was dominated by the low-level thinking category (LOTS) by 80%; question category of higher order thinking (HOTS) by 20%. The percentage of student questions in the HOTS category is 69.2% lower than the LOST category. In the aspect of critical thinking skills, the mean value of the interpretation indicator is 82.80; analysis 84.05; inference 79.6; evaluation 81.0; explanation 75.3; and indicators of selfregulation worth 70.5. Based on the results of the study, it can be concluded that the problem-based learning model can facilitate students to increase their potential to ask questions and think critically in learning the development of teaching materials.

KEYWORDS:
Potential to ask questions, critical thinking, problem based learning, development of teaching materials.

INTRODUCTION

Learning is the most important part of the educational process that must be carried out to achieve its goals. The learning process that is carried out in a planned and serious manner will be able to facilitate students in developing their various potentials, including the potential to ask questions and think critically. These two potentials are important aspects to be owned and mastered by every student, including college students. Therefore, the learning process is expected to be able to facilitate students to train and empower these two potentials through the learning process.

Asking is a very basic part of literal human behavior. Questions asked by students can activate their initial knowledge or concepts, and help students to describe this knowledge (Schmidt, 1993). Asking activities can provide clues that these students have a tendency to think critically. According to Chin and Osborne, 2008), asking is a thought process related to critical thinking, creative thinking, and problem solving. Asking questions is a key activity in implementing active and meaningful learning. Questions are an indicator of students' thinking abilities which are known through quantity and quality (Chin and Osborne, 2008).

Critical thinking skills are skills that can be learned. Thus these skills can be taught. Critical thinking skills will not develop properly without conscious effort to develop them during learning (Zohar,

Weinberger, and Tamir; 1994). Critical thinking skills require continuous and deliberate learning and practice in order to develop to their potential. Questioning skills and critical thinking are two things that are interrelated, and become potentials that are needed by students in the learning process. Both of these potentials become an indispensable part of a person's maturity process, and become part of important life skills for students to master, including university students. Therefore, matters relating to students' questioning and critical thinking skills need to be trained and empowered through the learning process or lectures.

The development of teaching materials is one of the elective courses that students can program in the biology education study program at FMIPA UNG. The teaching material development course combines theoretical studies and practice in developing a teaching material product through lectures. This is intended so that students not only know and master knowledge theoretically, but are also able to apply knowledge practically. The hope is that lectures on the development of teaching materials can make a positive contribution to developing students' self-potential, especially in the aspects of asking questions and critical thinking.The importance of the potential for asking questions and critical thinking for the intellectual development of students needs to be addressed with thoughts and concrete steps. One of them is through a learning-based study or research process, by applying a learning model that can train and empower students to ask questions and think critically.

The application of the Problem Based Learning (PBL) model or problem-based learning in teaching material development learning, to develop the potential to ask questions and think critically is an appropriate step. The basic thing to consider is that the Problem Based Learning model has a learning syntax that has the potential to empower students' questioning and critical thinking skills. The hope is that by applying the Problem Based Learning model in teaching material development learning it is expected that students' potential in asking questions and critical thinking can increase. Thus, the results of his research will become the basis for establishing Problem Based Learning as a learning model that has the potential to facilitate students in increasing their potential to ask questions and think critically.

METHODS

This type of research is descriptive quantitative, carried out in the odd semester of the 2021-2022 Academic Year, in the Biology Education Study Program, the Biology Department, FMIPA UNG. Using a problem-based learning model (Problem Based Learning). The population is all students who take teaching material development courses. The sample is all students who make up a population of 24 people.

Research data includes data on the quantity and quality of questions obtained through observation during lectures. Student questions were identified based on the Revised Bloom's Taxonomy according to Krathwohl (2010). Question quality and quantity data were analyzed descriptively, and grouped based on cognitive level. Critical thinking data, obtained from the results of critical thinking essay tests according to Facione (2010). Data on critical thinking skills were analyzed descriptively based on the components of critical thinking according to Facione (2010), namely interpretation, analysis, inference, evaluation, explanation, and selfregulation.

RESULTS & DISCUSSION

1. Description of the Potential of Asking Students

The potential of students in asking questions orally and in writing in teaching material development lectures, with a problem-based learning model (Problem Based Learning) can be identified based on cognitive level in the Revised Bloom's Taxonomy. The results of the identification and analysis of the potential to ask questions from biology education students based on their cognitive level can be seen in the following table.

Table 1. The Number and Quality of Student Questions in the Teaching Material Development Lecture Based on the Subject.

PB	Number of Students			Number of Questions %		Questions Cognitive Levels			
C1	C2	C3	C4	C5	C6				
PB1	24	6	24	2	2	1	1	0	0
PB2	25	8	32	3	2	2	1	0	0
PB3	25	11	44	3	3	2	2	1	0
Amount		25	100	8	7	5	4	1	0
Percentation (%)			32	28	20	16	4	0	
Cognitive Levels			80 (LOTS)		20 (HOTS)				

Informations:
PB.1= Main Points of Teaching Materials Posters and Leaflets
PB.2= Main Points of Teaching Materials Handouts and Modules
PB.3= Main Discussion Student worksheets
C1= Remembering, C2= Understanding, C3= Applying, C4= Analyzing, C5=Evaluating, C6=Creating, Mhs = Students

The results of data analysis in table 1 show that the number of student questions in the teaching material development course during three meetings was 25 questions. The number of questions at each meeting varies based on the subject matter and cognitive level of the questions. On the subject matter of poster and leaflet teaching materials, there are 6 questions or as much as 24%, and are dominated by low-level cognitive questions as much as 83.3%. On the subject matter of handouts and modules, there were 8 questions or 32%, and dominated

JOB MISMATCH: THE CASE OF REGISTERED NURSES IN THE PHILIPPINES

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A B S T R A C T:
Job mismatch remains to be a subject that is given strong attention as it affects labor market productivity and economic growth. The literature revealed a growing number of nurses who are working in fields not related to the nursing profession. The purpose of this study is to explore the lived experiences of job-mismatched registered nurses. Using a qualitative phenomenological research design, a one-on-one interview has been utilized to take a look at the experiences of nine registered nurses who qualified in the inclusion criteria set by the researchers. Specifically, it gives light on what opted them to work in other fields, the difficulties they encountered, and their coping mechanisms. The result shows that participants find nursing as an exemplary education that brings together the concept and skills of competency and productivity. However, even with all their preparations for the profession, participants cited that wage gaps, stressful working environments, and employment scarcity are the reasons why nurses leave their profession. They encountered complexities during their transition to a new career in technical-related skills, work environment, and routine. Under these circumstances, participants still expressed willingness to work again as nurses in the future even with some reservations. In conclusion, the five thematic insights drawn from the experiences of the participants were the following: Unfavorable Working Conditions for Nurses, Moving to Other Career Paths to Meet Needs, Struggling Over the Mismatched Syndrome, Coping with Change, and Clinging to Nursing Profession. Thus, the researchers recommend that government, nursing, and health institutions must coordinate and discuss the plan to intensify programs and laws to promote better management and accommodation of professional nurses in the country.

K E Y W O R D S:
Job mismatch, Lived-experiences, Registered nurses

INTRODUCTION

Job-mismatched cases seem to be so common in today's workforce. Estimates of mismatch between qualifications and skills of the employed and those required by their work have been an issue for years. According to the International Labor Office (2014), there is a total mismatch of between 30-50% among workers. In the Philippines, an estimated 1.2 million graduates are at risk of unemployment or underemployment because of a rising mismatch between their skills and the training needed (Associated Labor Unions-Trade Union Congress of the Philippines, 2017). Specifically, mismatch among registered nurses has been noted. In fact, more than 200,000 registered nurses in the country are working in a non-healthcare-related setting. This phenomenon stems from low wage

compensation, limited career opportunities, poor working environments, and lack of benefits (Li et al., 2014).

This situation may impose hazards due to work imbalances and discontent among workers. It should not be disregarded since it can diversely affect not just the individuals' job satisfaction, and group performance but also the macro-economic efficiency (Kim & Choi, 2018). These concerns can be factors of hesitancy to enter the nursing profession. The Bureau of Labor Statistics recent study revealed that the employment of registered nurses is anticipated to rise at a faster rate of 16% by 2024. There are sufficient opportunities for career changers and nurses seeking advancement. Another study conducted by Carnevale et al. (2015) on Nursing: Supply and Demand through 2020 revealed the growing need for qualified nurses. Particularly, it estimates the creation of about 1.6 million job opportunities for nurses. The 700,000 of which will be newly-created positions, and the 880,000 will result from retirements. There are many factors why the demand for nursing is likely to increase in the future. Among the reasons are the aging of the population, increased survival of people who are ill, and organizational changes in the health care industry (Pindus et al., 2002).
With this gap between the huge number of nurses working outside health care facilities and the high demands of health professionals today, the researchers would like to know the lived experiences of job mismatched nurses. Using qualitative methodology, the researchers explored the registered nurses' perceptions about why they choose to work in other sectors rather than practice their nursing profession, the difficulties they encountered, as well as whether and under what conditions they are willing to return to the profession. The result of this study would have important implications on the role of other industries as a buffer in the unstable labor market for professional nurses. Moreover, it would serve as a reference for promoting the progression of better management, better hiring, and accommodation of nurses.

OBJECTIVES

This study aimed to explore the lived experiences of nine job mismatched registered nurses. Specifically, it sought to answer the following objectives:

1. Explicate how nurses are influenced to work in a non-healthcare-related setting.
2. Explore the challenges that job-mismatched nurses experienced.
3. Describe the nurses' coping mechanisms.

METHODS

Design

The research design that was used is qualitative using a phenomenological approach. This approach focuses on the similarity and agreement of a lived experience of a specific group. Through this process, the researchers construct the universal meaning of the lived experience of the participants.

Thus, the researchers deemed that this design was suitable for exploring the lived experiences of registered nurses who are job-mismatched.

Instrument

The researchers designed a semi-structured interview guide as a data collection instrument for this study. An interview guide is an instrument that is composed of major questions about the subject being studied and possible probing questions under each that captured the experiences lived and told by the participants on the explored study (Dela Fuente, 2019). Questions relating to the reasons that influenced them to work in non-healthcare settings, the difficulties they encountered, the perceptions of people to them being job mismatched, and their fears and worries of working back to health care settings were asked during the interview. The order followed in the inquiry was predetermined as well as the opportunity for the interviewer to explore particular themes or responses. The contents of the narratives of the participants served as the primary data of this research study. These are the data that the researchers documented in the hope that these would contribute to the existing knowledge of the nursing profession. Furthermore, the interview guide was subjected to content validation from a Guidance Counselor to ensure that the items are relevant and the approaches respect the participants' backgrounds, literacy, and experiences.

Participants

The participants of the study were nine Registered Nurses who qualified in the inclusion criteria set by the researchers. Specifically, (a) a registered nurse; (b) currently working in a non-healthcare-related setting; (c) at least three years on the current job. A purposive sampling design was used to get participants that can be logically presumed to be representative of the population on the subject explored. The table below shows the brief demographic data of the participants. Pseudo names were used to maintain the confidentiality of the participants' identities.

Table 1. Demographic profile of the participants

Participant	Age	Sex	Marital Status	Year Graduated	Year Passed the NLE	Current Job
P1 "Teresa"	48	F	Single	1993	1993	Admin Aide 6
P2 "Tara"	29	F	Single	2009	2010	Admin Aide 6
P3 "Tomy"	35	M	Married	2006	2007	Police Officer
P4 "Tyron"	49	M	Married	1989	1990	Police Officer
P5 "Tanya"	28	F	Married	2011	2012	Entrepreneur (Agri-Business)
P6 "Talia"	29	F	Single	2010	2010	Entrepreneur (Construction Business)
P7 "Tina"	29	F	Single	2010	2010	Quality Manager (BPO)
P8 "Tasha"	40	F	Married	1999	2000	Agent (BPO)
P9 "Timothy"	29	M	Married	2010	2011	Marketing Professional

Legend: NLE (Nursing Licensure Exam); BPO (Business Process Outsourcing)

Data collection

The researchers personally handed a letter of permission to the participants for the conduct of the study. Full consent from the participants was secured. The data gathering approach of this study was a direct formal interview to the participants themselves. The researchers interviewed registered nurses who are working in a non-healthcare-related setting with a minimum of thirty minutes per participant. Participants were encouraged to talk freely and tell stories using their own words. The discussions on the participants were according to their availability and convenience. Most of the interviews were done on their scheduled day off, others were after their work at their chosen venue. The researchers ensured a quiet and well-lit room. After the interviewers discussed a brief overview of the study, the discussion proceeded to the main purpose of the study which is to extract information regarding the lived experiences of registered nurses who are job-mismatched. The documentation process was in a form of audio recording using a cellphone. After data saturation was reached, the researchers then, checked for the completeness of the data gathered and made a transcription, analysis, and themes. To ensure the validity and reliability of the data, an audit trail was done to establish the confirmability of the research findings.

Data analysis

In achieving the objective of the study, the researchers opted to use Colaizzi's seven-step analysis to have an in-depth understanding and to elucidate the unique experiences of the participants (Dela Fuente, 2021). Each transcript was read and re-read by the researcher while listening to the audio recording several times until a general sense of the participant's experience was obtained. For each transcript, the researchers identified sentences and phrases that are related to the phenomenon studied, by highlighting, copying and pasting them onto another page and sequentially numbered them as Significant Statement 1 (SS1), SS2, SS3 and so on. The researchers then formulated meanings from these significant statements by considering both the explicit and implicit meanings inherent in each statement. The formulated meanings were sorted into categories, clusters of themes, and themes making sure that there was a confluence between the formulated meanings and the themes. The researchers then integrated all related information of the phenomenon under study and provided exhaustive descriptions. The basic structure of the experience was explained. Finally, verification of the finding was asked from the research participants to counter-check it with the researchers' descriptive result with their experiences. This was achieved by providing the participants with an exhaustive description of their comments and confirmation. All of the participants agreed that the exhaustive description reflects their experience.

Ethical considerations

The researchers observed ethical conduct by addressing ethical considerations in an effective manner. Research participants were not subjected to harm in any way whatsoever. Participants participated on the basis of informed consent, without any coercion being applied. The scope of the study, their right to decline participation, and the likely risks and benefits were presented. The protection of the privacy of research participants in the study was ensured by not disclosing any information about the

participants. An adequate level of confidentiality of the research data was secured through proper storage in a hard drive device with a password. Furthermore, the anonymity of those who participated was ensured through the creation of pseudonyms patterned after all the names which start with the letter "T" and the removal of any identifier components which can possibly be associated with any participants.

FINDINGS AND DISCUSSIONS

This section presents the analysis and interpretation of the data collected during the face-to-face interview with the participants on their experiences as registered nurses who work in a non-clinical setting. The experiences of these registered nurses are presented through themes as they emerged from the transcribed manuscript during the interviews. Important statements in the actual words used by the participants are presented to provide the depth and richness of the description of their insights, meaning and inspirations that they have gained from their experiences.

Theme 1: Unfavorable working conditions for nurses

Nurses serve an essential role in the healthcare industry, providing direct care to patients. They are crucial components of a well-functioning health system. Their motivation has significant ramifications for patient health outcomes. However, there are currently many glitches that affect the motivation of nurses, making it difficult for them to do their job. Participants expressed that the low salary of nurses here in our country, the limited employment opportunity, the lack of security of tenure, the "volunteer nurse" and "job order nurse" practice, the padrino system, and the poor working condition discouraged them and made them leave for foreign countries. According to Halcomb et al. (2018) employment conditions, like, employment status, benefits and pay, unpaid work, work-related expenses, and income stability were found to be stimuli among nurses to stay at their job. Participants expressed that nursing is a job-scarce profession and, even for those with jobs in the health care sector, poor working conditions often affect quality care. Different predicaments were expressed by the participants, Tanya shared, "the nurse-patient ratio really is an issue. Imagine 1 nurse is to 60 patients seems to be normal and acceptable."