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Sex Disaggregated Database System for Gender and Development

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Abstract
The Sex Disaggregated Database System aims to answer the problems of Gender and Development Program (GAD) in terms of faculty and employee database profiling. The system was developed to easily retrieved GAD related information needed by the University as well as other agencies who required the same information. The system allows the user to manage the profile of faculty and staff, wherein they can add details, update and search individual records. It can also view the profile of faculty and personnel in terms of sex, educational attainment, age bracket academic rank and civil status. It can generate statistical graph to determine the percentage of the faculty and employee who has different health issues based on their academic rank and age bracket. The functionality, reliability, efficiency, usability, maintainability and portability of the system were tested by the Gender and Development Coordinator and members of Iloilo Science and Technology University (ISAT U). The respondents of the study strongly agree that the using the above parameters the developed system conforms to the stated needs or requirements of the system and the system has been developed to be easily used by the target users.

Keywords: sex disaggregated, database profiling, gender and development.

Introduction
One of the priority programs of the government is the Gender and Development (GAD) Program. This program was established according to Subic Bay Metropolitan Authority [1] since the government recognizes the unequal status of men and women in the society. The program is also concerned with the specific roles and expectations of every institution to women within the organization. The program also analyzed the valuable contribution of women within the context of work and the community as a whole. [1].

Gender and Development Program has been developed since 1980's as a replacement for Women in Development (WID) program as discussed by Garcia [2]. GAD was conceptualized not only to address women needs but as well as the assign roles, responsibilities and expectation of both sexes, the male and the female.

As stated in pcw.gov.ph [3] the Philippine government made several efforts to make governance GAD responsive. The Magna Carta for Women makes sure that there will be no discrimination relating to gender as well as provide equal opportunity to all gender in their participation in the formulation, implementation and evaluation of all government programs. Moreover, the Philippine Framework Plan for Women (FPW) supports the plan for gender responsive governance. This includes mainstreaming gender in the bureaucracy, enhancing women's leadership roles and participation in decision-making, strengthening women's role in promoting gender-responsive governance and strengthening partnership with media in covering various women issues.

To support the advocacy of Gender and Development Program, the government mandated through GAD Budget Policy of 1995 requiring all agency to allot 5% of their budget to GAD activities. However, according to Rodriguez [4], only around 28% of the country's 380 government agencies have approved GAD plan from year 1995 to 2010. Moreover, not all agency has utilized all 5% budget allotted for GAD programs. NEDA has stated that poor commitment to mainstream GAD programs and activities and the tendency of women to lose in the competition for resources as the main causes of these problems.

The Iloilo Science and Technology University (ISATU) like other government agencies also has an approved GAD plan and budget. However, it is also difficult for the GAD focal person to accomplish the 5% requirement as well as designed GAD programs that are based on the needs of the entire ISATU community. This study answers the institutional mechanism on gender mainstreaming prescribed by the law. Regular monitoring and updating of statistics of men and women among the faculty and personnel of ISAT U was used in planning of activities and decision making of the Gender and Development program.

The research was derived from World Bank Organization [5]. The WBO creates the Genderstat, an electronic database to provide a comprehensive gender reference database for bank and staff development partners. This database provides sex-disaggregated statistics and gender relevant data on population, education, health, employment political participation, programs and policies for most country in the world.

The Philippine Commission on Women [6] as stated in The Magna Carta of Women (Republic Act 9710) seeks to eliminate discrimination against women by recognizing, protecting, fulfilling and promoting the rights of Filipino women and mandates all government instrumentalities to adopt gender mainstreaming as a strategy for implementing the law and attaining its objectives. One of the institutional mechanisms for gender mainstreaming prescribed by the law is the development and maintenance of a Gender and Development (GAD) database containing gender statistics and sex-disaggregated data. This provision recalls Resolution No. 8, series of 1994 issued by the Philippine Statistics Authority directing all government agencies to promote gender concerns in the production and dissemination of statistics for planning and policy/decision-making purposes.

The study of Regitz-Zagrosek [7] states that there is a need for gender-specific health care system that can reflect the most important health issues in terms of gender. A gender-based prevention measures and medications are more effective rather than the fit-all mechanism approach in health care. There is a need for a new approach in handling health issues since the result an analysis of large databases reveals that gender remains an independent and important risk factor after controlling for age, comorbidities, scored risk factors and ethnicity because some genetic variants convey a different risk in women and men.

The researchers developed a study on Sex Disaggregated Database System for Gender and Development Program (GAD) of Iloilo Science and Technology taking into consideration the aforementioned literatures. This study includes the profiling of the faculty and employees in terms of sex, educational background, academic rank, age bracket and civil status. Moreover, health issues such as diabetes, allergies, hypertension, heart diseases etc. was identified to know the health status of the faculty and employees. Furthermore, this study can generate statistical graphs to determine the percentage of the faculty and employees with health issues based on their academic rank and age bracket.

Methodology

This study used software development methodology as well as descriptive research method. The prototyping process model is the software development methodology utilized in designing of Sex Disaggregated Database System for GAD Program. According to Rouse [8], prototyping model is an initial working model of the system being tested and revised until all the required specifications of the system has been meet. A prototype is a rudimentary working model of a product or information system, usually built for demonstration purposes. The Sex Disaggregated Database System was developed following the prototyping model which was continuously modified based on the suggestions and comments of the user. After completion of all recommendations, a final system was tested and implemented for use.

The researchers used descriptive research to collect data, structured and tabulated the data of the respondents. Descriptive research according Swatzell and Jennings [9] only explains what is common and prevalent in a population. This form of research does not attempt to predict or manipulate an outcome unlike experimental or inferential research but simply aims to answers the questions, who, what, when, where, and how. The researchers use descriptive research to determine the performance and acceptability of the system by interpreting the mean value of each ISO 9126 characteristics.

This study used open-source software in developing the system. According to Redhut [10], open-source software is software whose source code is available for modification or enhancement by anyone. The Laravel software on the other hand, was used as Hypertext Preprocessor (PHP) in developing the web component of the system. MYSQL, a structured-query language was utilized as the database management system. According to Motive [11], MYSQL is an open-source software used to store data and information in the form of related tables. Typically, it is used for web-programming application.

The Sex Disaggregated Database System for GAD was represented with Unified Modeling Language (UML) Activity Diagram as shown in Figure 1 which depicts high-level business processes, including data flow, or to model the complex logic of the system. As mentioned in Tutorial's point [12], Activity diagram is basically a flow chart to represent the flow form of one activity to another activity. The activity can be described as an operation of the system and the control flow is drawn to represent one operation to another in sequence, branched or in parallel.

The Sex Disaggregated System for GAD is consists of two (2) users. It includes the faculty/employee and the GAD Officers. The faculty/employee submits Personal Data Sheet to the Gender and Development officer. This information includes personal data of each employee, health concerns and other related Gad information.

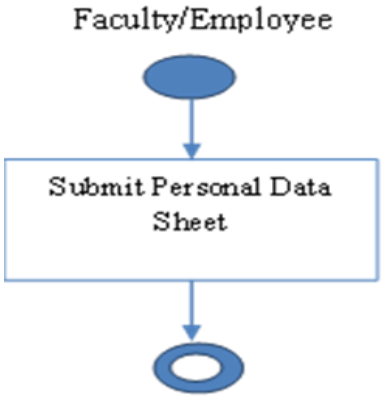

Fig.1: Activity Diagram of Faculty and Employee.

On the other hand, the GAD officer is responsible in coding the data in the system as shown in Figure 2. He/she needs to log in into the system using a valid username and password. The GAD focal person can view the profile of the faculty and employees in terms of sex, academic rank academic qualification and age bracket.

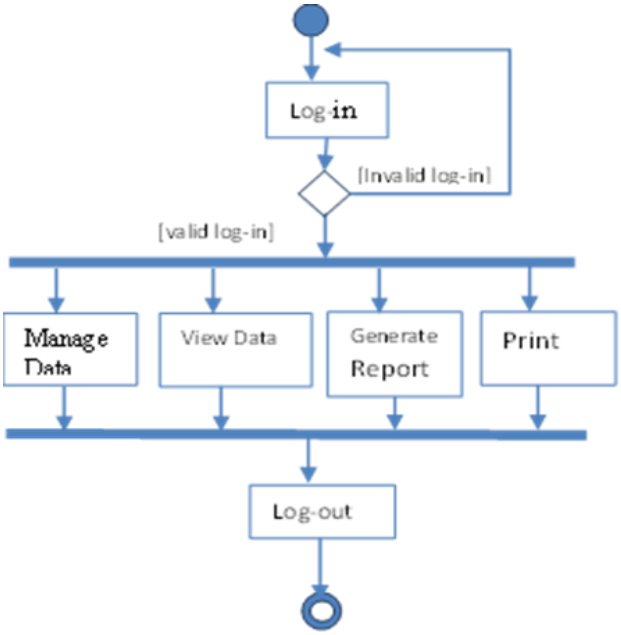

Fig.2: Activity Diagram of GAD Focal Person.

The focal person can also edit and update these data. The focal person can also generate statistical graph to represent managed data as well as the health issues of the faculty and employees. The focal person can also produce report necessary for the development of GAD Programs. The GAD focal person can also generate and print these reports.
The researchers used purposive sampling technique to identify the number of respondents to be included in the study. Purposive sampling according to Etikan, Musa and Alkassim [13] chooses the respondents of the study based on their qualities and willingness to provide data for the research. Purposive sampling is nonrandom and thus, allow the researcher to select respondents without underlying theories in selecting the number of participants. The respondents were selected based on their willingness to participate in the study and the knowledge and experiences they possess to assess objectively the system.
In evaluating the overall performance and functionality of the system, the researchers used white box and black box testing. According to Pressman [14], white box testing is a software testing method in which the internal structure, design and implementation of the system is known by the respondents. Respondents evaluate the system based on the source code, data structure, and program logic and database design. On the other hand, black box testing method is where the internal structure, design, and implementation of system were not known by the respondents. Respondents on black box testing tested the functionality and usability of the system.
The 10 faculty and employees of ISAT U, including the 1 coordinator and 1 office staff of GAD were invited to test the system using black box testing. The white box testing of the system was evaluated by Information and Communication Technology (ICT) professionals consisting of eight (8) ICT faculty and experts in the field of Information Technology. The International Standardization Organization (ISO) 9126 was utilized in the evaluation of the system. ISO 9126 is the international standard in software evaluation which consists of six (6) standard quality characteristics which include the functionality, reliability, usability, efficiency, maintainability, and portability [15]. The instrument of the study used was based on Panovski [16] which was revised to suit the needs of the study. The instrument undergoes content validation and review of ICT experts and professionals in the field of information technology. Microsoft Excel 2010 was utilized in the data processing of this study. The weighted mean was used in the acceptability and satisfaction of the system. The rating systems used by the respondents are as follow: 1.0-1.8: poor; 1.81-2.60: good; 2.61-3.40; satisfactory; 3.41-4.20: very satisfactory and 4.21-5.0 outstanding.

Results And Discussions

In determining the performance and the conformance of the system with the specified user requirements, the researchers tested the system using ISO 9126 as shown in Table 1.

Table 1: Overall results of the respondents.

Parameters	Obtained Mean	Interpretation
Functionality	4.15	Very Satisfactory
Reliability	4.11	Very Satisfactory
Usability	4.21	Outstanding
Efficiency	4.04	Very Satisfactory
Maintainability	4.13	Very Satisfactory
Portability	4.12	Very Satisfactory
Total	4.13	Very Satisfactory

The functionality of the system was rated by the respondents as very satisfactory with an average mean of 4.15. The functionality of the system according to Ramnath [17] is a set of attributes or a set of system functions that specifies the properties of the system that satisfy stated or implied needs of the users. The functionality of the system includes the user requirements as well as its user objectives. For the system to be functional, the system should provide the right or agreed-upon results or effects, and the system should interact with the specified components of the systems. The result of the study implies that the system was able to manage GAD data, edit and update these data as deemed necessary and generate the necessary report. The system was also able to generate valuable report for the development of GAD plan and programs such as the health issues of the members, their needs and their skills. Moreover, the system also helps the GAD focal person to track every ISAT U member. The study conforms to what Ramnath [17] has stated that the system to be functional should provide all the necessary requirements as specified by the users.
In terms of software reliability, the respondents rated the system as very satisfactory with an average mean of 4.11. According to Ramnath [17], a reliability of the system is a set of attributes that maintain the performance level of the system under a specified condition within a period of time. This means that the system can avoid failure from faults and errors, the system can maintain a specified level of performance when the system encounters software faults or of infringement of its specified interface, the system can re-establish the necessary level of performance and recover data which is directly affected of a failure. Moreover, the

result means that the system is capable of maintaining the performance level and handling errors that made it more reliable to the end users to use.

The usability of the system is rated by the respondents as very satisfactory with an average mean of 4.21. According to Ramnath [17], the system's usability means that the system enables the user to understand whether the software is suitable, and how it can be used for particular tasks and conditions of use, the system enables the user to learn its applications, the system enable the user to operate and control it and the system is liked by the user. Overall, the result implies that the systems functions and is design to be easily understood by different users. The result conforms to Santos et al. [18] who said that in order to design a friendly user interface, which is easy to learn and use, software developers have to take into consideration the importance of software usability.

The respondents rated the efficiency of the system as very satisfactory with the average mean of 4.04. According to Ramnath [17], the efficiency of the system is the attributes of the system that determines the level of system performance and the amount of resource used to maintain the system's desired performance. This implies that the system was able to provide appropriate response and processing times and throughput rates when performing its function under stated conditions and the software uses appropriate resources in an appropriate time when the software performs its function under stated conditions. This also implies that the system can response quickly and utilize the resources efficiently.

The respondents rated the maintainability of the system as very satisfactory with an average mean of 4.13. According to Ramnath [17], maintainability of the system means that the system can accept the necessary effort needed to make specified modifications which may include corrections, improvements, or adaptions of software to environmental changes. The system was able to diagnose itself for deficiencies or failures for all its parts or components that needs to be modified. The system is also changeable which means that the system can be modified to be implemented efficiently. Moreover, the system can also minimize unexpected effects from system modifications. The result of the system also implies that the system can be modified and tested easily by the end users.

The respondents rated the portability of the system as very satisfactory with an average mean of. 4.12. According to Ramnath [17], the portability of the system refers to the ability of the system to be transferred from one platform to another which may include the organization, hardware or software environment where the system is installed. Moreover, the result implies that the system can be modified for different specified environments without applying actions or means other than those provided for this purpose for the software considered. The system can also be modified for different specified environments without applying actions or means other than those provided by the system and the system can also coexist with other independent software in a common environment sharing common resources. This also means that the system can be moved to another operating system or environment.

Overall, the system was rated by the respondents as very satisfactory with a mean value of 4.13. This means that the system conforms to the specified characteristics of ISO 9126 software quality model.

Conclusions And Recommendation

Based on the results presented, the researchers were able to conclude that through the Sex Disaggregated Database System, the University GAD focal person was able to identify the valuable information of all ISAT U members related to GAD programs such as their health concerns, needs and expectations form the GAD program. The office was also able to determine timely and significant programs suited to the needs of the entire ISATU community.

Moreover, the system was able to provide the GAD office with what seminars, training and workshop each member needs related to GAD and assess the GAD plan as to whether it address the needs of ISAT U community. This could also help the GAD Office assign and utilize GAD fund efficiently. The GAD focal person could also provide valuable information to other agency who needs GAD data from the ISAT U GAD office.

Based on the results shown and the conclusions drawn, the following recommendations are hereby presented by the researchers. The system can be implemented and utilized by GAD Program and the system can be further enhanced or modify to be adaptive as a mobile application for easy access and retrieval.

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