

## A Method for an Intervention for Gender and Development Issues and Problems

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**Abstract.** Gender and Development (GAD) seeks to achieve gender equality and transforms society's social, economic, and political structures. In State Universities and Colleges (SUCs), GAD programs and activities are conducted and annually monitored but lack of concrete data sources with particular data needed like the sex-disaggregated data. This paper presents a technology-based solution for GAD mainstreaming in SUCs. It is about the development of a new framework where data are analytically gathered, regularly updated and it also provides gender statistics and monitor the GAD projects. With the aid of web systems, GAD applications are integrated and highlighting relevant gender-related concerns and provide sex-disaggregated data for gender analysis and identifying the GAD interventions whether it is a project or other activities.

**Keywords:** sex-disaggregated data, gender and development, intervention, digital scheme

### 1. Introduction

Sex-disaggregated data refers to data that is collected and presented separately on men and women. In order to identify GAD projects and programs, there is a need for data collection and sex-disaggregated data. These data will be the basis of gender issues where the needs and concerns of women, as well as men, will be recognized. At present, identifying gender issues in the organization is difficult and not systematized and takes a lot of time and effort. Some of the State Universities in the Philippines have projects such as Child Development Center, Capacity Building programs for GAD Focal Point System and Gender Sensitivity Training for internal and external clients. However, they have a lack of digital databases that can manage, monitor and evaluate those programs. Similarly, most of the SUCs do not maximize the use of their GAD budget and failed in the approval of the Philippine Commission on Women in their accomplishment report and GAD Plan and Budget (GPB) [1].

As such, this paper presents a new mechanism to improve the collection of data, process, and analysis of determining the gender issues and problems from data then the GAD system can suggest different interventions such as programs, projects, and activities which can be used in developing GAD Plan for the gender and development center in higher education institution. This will develop and use a new framework using Digital Scheme data sources that help to manage and monitor their projects.

Using Digital Scheme it involves technology-based solutions such as survey application that collects data of students and employees relative to their profile, degree of well-being, organizational commitment and GAD PAPs Checklist. Furthermore, with the help of web systems, GAD software applications such as Knowledge Management System, Project Tracker, and Application for GAD Financial Assistance are integrated so that the projects become manageable, easily track and become the sources of finding relevant

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gender-related issues or concerns and provide a method that helps identify interventions or responsive GAD projects to the education institution.

The new approach can make a positive change to the GAD framework and operations because the new GAD systems have concrete databases, accessible, and can bring the result as a source of future projects to achieve equality.

## **2. Objectives of the Study**

This study focused on the mechanism, design, and development of digital scheme data sources with a method for interventions in decision support in Gender and Development (GAD) Mainstreaming for state universities and colleges in the Philippines.

Specifically, this study deals with concerns such as: To identify strategies on dynamic data collections for gender and development; To design, develop, integrate and evaluate the digital scheme applications to support the GAD mainstreaming; To collect data for data patterns recognition and processing for GAD decision support system; To provide reports and the system automatically recognize possible gender issues and problems then provide necessary GAD interventions; Impact of this research to the GAD programs and projects in state universities and colleges.

## **3. Related Works**

Kimoto identified that analyzing big data with one source is not enough. And we should have more data and then integrate them in order to get the analysis more effectively. This article has enlightened the researchers to use heterogeneous sources in gender mainstreaming. In addition, the tool and data mining algorithms applied in the databases of this paper can also be used so that to create patterns that becomes the basis of the interventions.

In their case study, the Digital Scheme data correspond to traffic accident data and road traffic census data. The Manual Scheme data correspond to street view with G-map, YouTube, Twitter, and News. In their application interface, it is possible to refer to both Digital Scheme data and Manual Scheme data. They mentioned the use of computer applications and identify six kinds of national data for supporting road renovation. In addition, they discuss the effectiveness of integration and refer to many types of data.

Although they applied data mining to the databases with the use of WEKA in preliminary experiments, it is not enough to utilize one source of data according to them. Obtaining maps, photos of the national highways and traffic accident data are needed to properly select the roads to repair. Therefore, it implies in their study that the more sources they have, the more accurate they get as the basis of the road to construct [2].

The article by Romero et al (2015) has a very significant contribution to the present study. The background presented broadly the different data mining classifications such as statistical classifications, decision trees, rule induction, fuzzy rule, and neural networks. The discussion on the data mining tool has also enlightened the researchers on the process of execution of data mining techniques and the use of the KEEL Framework for building data mining representations. As presented, decision trees are considered to easily comprehend models since the understanding procedure can be given for each inference. It also identified its simplicity and comprehensibility. So C4.5 and CART algorithm are simple and easy to understand and interpret [3].

Eveline and Bacchi(2016) took a deep discussion on the gender mainstreaming models of the two countries such as Canada and the Netherlands. Based on their research, to make the mainstreaming more effective the two models need to focus on the process rather than a static way where can incorporate the programs for feminists and do the gender mainstreaming not a partial implementation but to reach its goal and attain the gender equality. It implies that there is a need to mainstream gender and development not only in selected projects but in all aspects that concern the men and women [4].

The article of McNutt and Beland shows that there are many nations adopted the gender equality policy tools but the problem is that they do not institutionalize it. It means that the efforts in mainstreaming gender

equality is not enough and need to improve. Canada reaches the gender-based analysis but lacking in the implementation of programs and projects for gender equality [5].

Since 1995 the gender mainstreaming has been recommended at the worldwide level but the effectiveness of the strategy was gradually examined. More researches are directing on understanding the progress and influence of mainstreaming strategies in a comparative context. The article of Hankivsky (2017) contributes to the works in the gender mainstreaming field like advancement and implementation in Canada and Australia such as women's movements, the institutional machinery and feminist, and gender research within academe. A number of important conclusions can be made by the author. First, for any mainstreaming strategy to be successful, a number of factors are essential. There must be a political commitment, leadership, adequate resources, and proper evaluation. Secondly, governments have to re-energize the participation of civil society by not only funding but ensuring the meaningful participation of a wide range of community-based and equity-seeking organizations [6].

The article of the Philippine Commission on Women in 2017, stated the launch of the mobile app VAWfreePH last November 25, 2017, in the Celebration of the 18-day campaign to end Violence against Women. The app is a practical tool can help women and girls to fight VAW. This is an Android-based mobile app for personal safety developed by the BSIT students of the Technological Institute of the Philippines-Quezon City. It can be used during an emergency and in other crisis situations [7].

#### 4. Research Design

The researchers used the developmental method in developing and integrating the applications as digital scheme data sources for gender and development mainstreaming. According to Richey (1994), the developmental method is a systematic study of designing, developing, and evaluating programs, processes, and products that must meet the criteria of internal consistency and effectiveness [8].

Fig 1 shows the stages of the Generic Framework for Software Engineering such as communication, planning, modeling, construction, and deployment. According to Pressman (2010), these five generic framework activities can be used in the development of large web applications, and for the engineering of large, complex computer-based systems. [9]

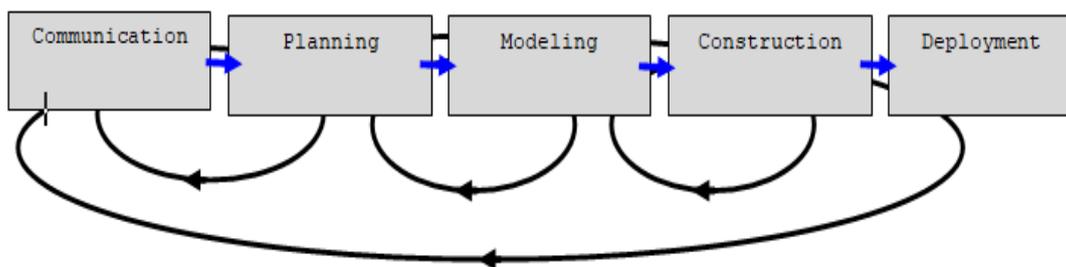


Fig 1: Software Process Model -Iterative Process Flow

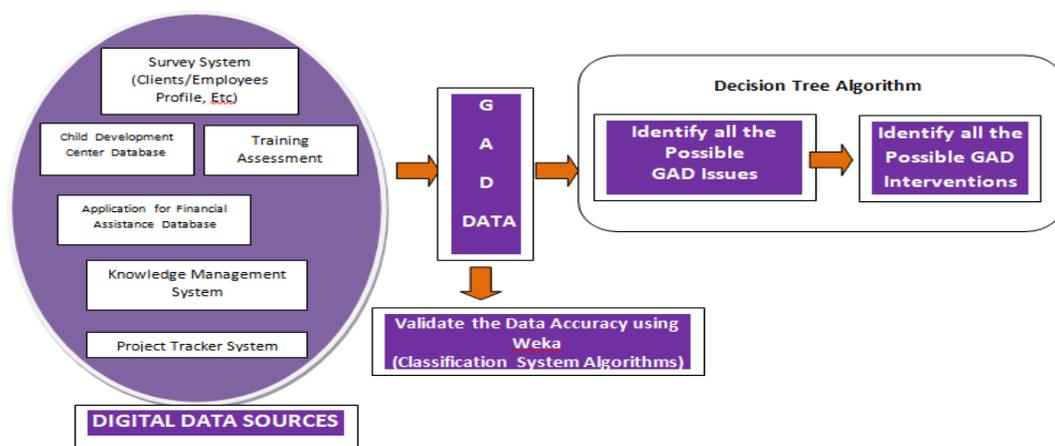


Fig. 2. Conceptual Framework

Fig. 2 shows the conceptual framework where there are various GAD data sources available that are in a form of technology-based solutions. From these sources, the system used a decision tree algorithm to identify gender issues and problems based on the GAD data available. From these identified gender issues the system has a method to check for the equivalent interventions. As of these outputs, it will bring new ideas for new projects and programs can be placed to GAD Plan and Budget to be implemented and somehow achieve gender equality in the institution.

The instrument used is in the form of a questionnaire that is composed of two sets such as for IT professionals and GAD Focal Point System. For the questionnaire for IT Professionals has three items each for the criteria of functionality, performance efficiency, compatibility, usability, reliability, and security. For the GAD Focal Point System and GAD Experts has three items each for the criteria of Satisfaction, Freedom from Risk and Context Coverage.

## 5. Discussion

### 5.1. Strategies on dynamic data collections for gender and development.

The researchers made reviews on different mechanisms in GAD data collections applicable in state universities and colleges. Also, they identify some existing works that can be the basis of databases that can be attached within the new scheme of GAD systems. The strategy for dynamic data collections involves technology-based solutions that can help to collect data. The researchers decided to make different applications as digital scheme data sources of GAD that includes the Survey Application, Application for GAD Financial Assistance, Project Tracker, Knowledge Management System, and HGDG/GMEF database.

### 5.2. Design, development, and integration of digital scheme applications.

The researchers communicate and validate the questionnaire used in the Online Survey System with the different GAD focal persons of the state universities in Region3 such as in Tarlac State University, Tarlac Agricultural University, Central Luzon State University and Nueva Ecija University of Science and Technology. Also, the authors request them to verify the other requirements to complete the digital scheme for GAD System. The Commission on Higher Education Region 3 and the Philippine Commission on Women consultants also share their insights and give their suggestions for the improvement of the GAD database system. The researchers utilized different models in designing the system such as data flow diagrams, entity relationship diagrams, and use case diagrams to enable to clarify things and technical needs of the system. In the construction phase, the researchers follow the procedures in the iterative process flow. They did a combination of coding, verification, unit testing and debugging for necessary working meaningful applications using the Laravel Framework and Maria dB as the database management system used.

### 5.3. Integration and Evaluation of the System.

There are necessary data sources identified which build and integrated in order to manage the GAD data. These are survey systems, training assessment, application for financial assistance, project tracker, knowledge-based system and child development information system. The Fig.3 shows the home page of the Admin Account.

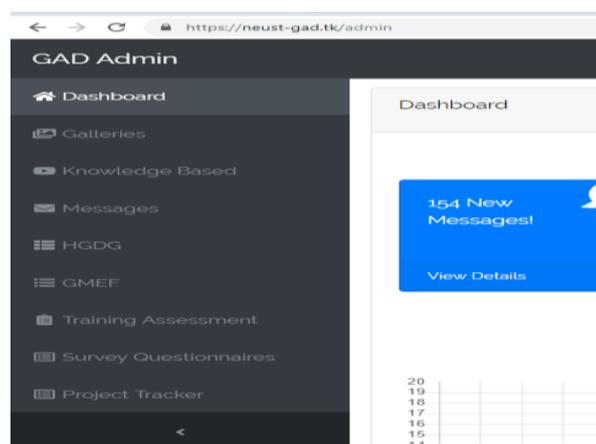


Fig.3. The screen of Admin Account

## 5.4. Collection of data for data patterns recognition and GAD Interventions

On October 2018 the black box testing was done in different Nueva Ecija University of Science and Technology Campuses such as Sumacab, Gabaldon, Atate and Gen. Tinio Street. This was done to attempts to find errors such as incorrect or missing functions, interface errors, performance errors and initialization, and termination errors. The 1800 students and 60 employees tested to answer the survey system. They encountered slow loading when using phones and some campuses have hard times to connect on the internet especially when their laboratories are not properly set-ups the internet network connections. At this point, the IT infrastructure of the university is needed to upgrade to sustain online transactions such as this.

The researchers conducted data gatherings to ensure that the system functions well and meets its purpose. The survey system was utilized again to gather data from those remaining students who do not yet register and save their records. It was done during enrolment of the Second Semester of 2018-2019 on January 7-20, 2019 where there are 6,000 records gathered from users of the two campuses.

The system provides necessary reports to assist the GFPS in identifying gender issues. There is also sex-disaggregated data and statistical reports to assist the decision system particularly in identifying interventions to the problems identified from clients and employees data.

To implement the intervention in the different applications, Decision Algorithm was used. The system will check the sex-disaggregated data and the data available for it to determine the gender issues or no gender issue in the data. Wherein from GAD issues there can have GAD interventions and classified as projects, programs or strategies.

The table below shows some of the results in the survey for the GAD issues and the equivalent GAD Interventions.

Table 1. GAD Issues and its GAD Interventions

Gender Issues and Sample GAD Data Collected	GAD Intervention																		
	Project	Programs /Activities	Training	Strategies															
<p>There is a big disparity or stigma that the courses such as BS in Electrical Engineering, BS in Mechanical Engineering, BS in Information Technology and BS in Criminology are good only for men and cannot be performed by women or not advisable for women</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">M</td> <td style="text-align: center;">F</td> </tr> <tr> <td>BS in Electrical Eng</td> <td style="text-align: center;">207</td> <td style="text-align: center;">36</td> </tr> <tr> <td>BS in Mechanical Eng</td> <td style="text-align: center;">266</td> <td style="text-align: center;">36</td> </tr> <tr> <td>BS in Information Tech</td> <td style="text-align: center;">974</td> <td style="text-align: center;">551</td> </tr> <tr> <td>BS in Criminology</td> <td style="text-align: center;">340</td> <td style="text-align: center;">175</td> </tr> </table>		M	F	BS in Electrical Eng	207	36	BS in Mechanical Eng	266	36	BS in Information Tech	974	551	BS in Criminology	340	175	<p>Provision for financial assistance for women who enroll in program/courses with no or fewer women</p>	<p>Counseling Program on GAD Sensitivity</p>	<p>Symposium on choosing the Right Career Path</p> <p>Training on Gender Sensitivity</p>	
	M	F																	
BS in Electrical Eng	207	36																	
BS in Mechanical Eng	266	36																	
BS in Information Tech	974	551																	
BS in Criminology	340	175																	
<p>There are many identified LGBTQ students enrolled in the campuses who are needed for guidance and acceptance</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td>Lesbian</td> <td style="text-align: center;">47</td> </tr> <tr> <td>Gay</td> <td style="text-align: center;">87</td> </tr> <tr> <td>Bisexual</td> <td style="text-align: center;">196</td> </tr> <tr> <td>Transgender</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Other</td> <td style="text-align: center;">8</td> </tr> </table>	Lesbian	47	Gay	87	Bisexual	196	Transgender	3	Other	8	<p>Provide projects that can use their talents and accept what they are in the community</p> <p>Provision of All gender comfort rooms in the university</p>	<p>Provide free HIV Test</p> <p>Guidance Program for LGBTQ</p>	<p>Provide symposium /Seminar on Sogje, bullying, GAD concepts, and HIV awareness</p>	<p>Recommend them to join in the Student Organization or any LGBTQ community or other organization where they feel accepted</p>					
Lesbian	47																		
Gay	87																		
Bisexual	196																		
Transgender	3																		
Other	8																		
<p>There are many Solo parents enrolled in the university that experienced difficulties to attend classes and pursue studies</p> <p>Marital Status: Solo parent Male – 2   Female – 41</p>	<p>Financial Assistance for students with 15,000php per semester</p>	<p>Their children with ages 3-5 can be enrolled in the Child Development Center</p>	<p>Provide symposium /Seminar on GAD concepts, Solo Parent Acts and Career coaching</p>	<p>Provide publications like a brochure about Solo Parent Acts, Career coaching and the like</p>															

The data above is just some of the GAD data and gender issues with equivalent interventions. The intervention identified from data is so much plenty which 10 times or more as compared to the existing GAD plan and budget that have only 13 interventions.

There are also data coming from Financial Assistance Application, Knowledge-based system and child development center data which also have recommended programs and projects.

As new scheme introduce for the GAD Focal Point System to easily gather GAD data and instantly have gender issues and GAD concerns with interventions on each GAD issues. With this they have more projects and programs to be implemented for GAD Center. As compared with the new scheme where there is a method to identify GAD interventions, it has more choices for programs, projects, and activities, where it is quite obvious for the coming year the university, has more GAD projects to offer on its clients and employees. Aside from that by having the digital scheme, the universities has its concrete and maintain a GAD database containing gender statistics and sex-disaggregated data that have been systematically gathered, regularly updated and subjected to gender analysis for planning, programming and policy formulation as comply with the Magna Carta of Women and mainstream the GAD in the university.

## 6. Conclusions

Based on results the following data are determined: (1) the researchers successfully identifies strategies on dynamic data collections for gender and development. From this, the researchers decided to which database will be developed and used as a strategy for data collections that help to manage, monitor the GAD projects and make a method for interventions in GAD issues. The strategies for data collections are digital scheme applications such as survey system, financial assistance app, project tracker, message system, training assessment app, and knowledge-based system. (2) it was productively executed the iterative process flow software process model in the design, development, integration, and evaluation of the digital scheme applications to support the GAD mainstreaming; (3) the data collections are done successfully. Under the survey system we have a total of almost 8,100 students and 67 employees. Their data about training needs assessment was tested using Experimenter in WEKA and it confirms that the data is 81.02% correct under Decision Tree Algorithm (J48) and 79.57% under Naïve Bayes.(4)the digital scheme provides sex-disaggregated data and statistic reports, and the survey system automatically recognizes possible gender issues and problems with necessary and numerous GAD interventions offer. The logical framework of the Decision Tree Algorithm was used in identifying the GAD interventions; and (5) this research has a positive impact in State Universities and Colleges where they have instant data sources numerous GAD interventions can be suggested and identified which is necessary for preparing GAD Plan and Budget.

## 7. Acknowledgments

The authors sincerely appreciate all the insights and expertise shared by the GAD focal persons of the different SUCs, IT instructors and practitioners, IT faculty members of Angeles University Foundation, administrators, students and employees of Nueva Ecija University of Science and Technology, staff of Commission on Higher Education R3, Philippine Commission on Women and to our families who always inspired us in doing and make this study completed.

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