Research Article

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Enhancing Data Accuracy for Student Eligibility in Government Support Through Data Analytics Platform

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Abstract

In the current era of the Philippines, a nation facing with significant socioeconomic challenges, the effective implementation of social welfare programs stands as a critical project. With approximately thirteen million Filipinos living in poverty and a GDP-PPP per capita of ₱12,192 (Vera, 2024), the need for efficient governmental support systems has never been more pressing. The Department of Social Welfare and Development (DSWD) serves as the primary agency addressing these challenges through various initiatives, most notably the Pantawid Pamilyang Pilipino Program (4P's), which provides crucial educational and household support to underprivileged families [1].

The significance of this research lies in its potential to transform the management of social welfare programs in the Philippines, particularly the significant operational inefficiencies in the current manual systems of the 4P's program. By addressing the current limitations of manual processes and introducing data analytics capabilities, this study not only aims to improve administrative efficiency but also seeks to ensure more effective targeting and delivery of educational and financial support to those who need it most.

Keywords: Socioeconomic, Gross Domestic Product using Purchasing Power Parity (GDP-PPP), Department of Social Welfare and Development (DSWD), Pantawid Pamilyang Pilipino Program (4P's)

The Problem and It's Background

Philippines is one of the well-known third world country in the world, statistics shown that there are Thirteen Million poor Filipino's, who's waiting and depending on governmental aids and support, this research were being conducted by Social Whether Stations, Luca Vera (2024) Philippines Gross Domestic Product-PPP Per Capita (₱) is only Twelve Thousand One Hundred Ninety-Two.

It clearly shows that Philippines were facing variety of challenges in maintaining the country steadfast and continuously living, however the issues that we really need to address and pay an attention. The Philippine Institute and Development Studies conducted research on how many poor Filipino family were having kids who's not enrolled nor dropped due to poverty and incapability to sustain their academicals needs [2].

Facing this will surely a great pressure and requires time, effort and even a strong leadership to our government, hearing those concerns from studies and statistics will become a reflection of our country state. There are projects that are currently present to address the problem but then however some of them were still having challenges and loopholes making it still not being too effective addressing the challenges mentioned.

One of the most well-known departments that focuses on unfortunate and incapable family in our country is the Department of Social Welfare and Development also known as DSWD (Department of Social Welfare and Development), this department launch and promotes variety of projects that focuses on sustaining the incapability of our Filipino citizens, from individual household, to education, to employment to people with disability and even in financial support for the study, disaster and many more 4P's under their supervision or Pantawid Pamilyang Pilipino Program, is a project of DSWD (Department of Social Welfare and Development) that caters household incapability to support and also it has a financial aid for academics as well, family requires not of having older than

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18yr old kids in order to be eligible to the program, students under this project shall maintain a passing GWA, and must have a good set of attendance as well, has no guidance record [3].

Despite of having a program like this, it is still not capable to cater it all, there are still problem needs to address, for example the usage and reliance to hardcopies making it more vulnerable top destroy or loss, second will be the inaccuracy and inconsistency of announcement of payout, acceptance or reject notice, announcement for requirements, schedule and etc., third, is the application is still manual leading to a prolonged time of application and reviewing it, on the other side, which is the academic side, teachers were also require to pass a feedback and report of a student who's a member of the project they must provide the student's grades and their attendance, their guidance records and in general performance, however there's still a concern regards to this, DSWD (Department of Social Welfare and Development) personnel still comes and the teacher will manually input it on a hard copy form, making it an add up to their job as an educator.

Through this issue, the system aims to ais the gaps and concerns specifically in data management to makeit more convenient, the system will then provide an online application that was being processed by the social workers of DSWD (Department of Social Welfare and Development), after that it will reflect on the admin which is the DSWD (Department of Social Welfare and Development) brgy. Representative, through this the applicants shall no longer need to wait for years or longer, because the admin can now reject it or accept it in a click, there will be automated text and email that the applicant will receive the moment that the admin decides regards the applications, teachers as had no longer need to write it down manually and pass it physically because they can also encode it and write a report using the system, the feedback and recommendations will be then be write back if needed, students' status shall reflect as; Good, For Monitoring and For Termination.

The study and system improves the transaction of the 4P's DWSD (Department of Social Welfare and Development), it offers convenience of; student, teachers, social workers, families and even the DSWD (Department of Social Welfare and Development) itself, announcement and the issue of records will now become lesser since it will be kept in a database wherein they can duplicate and kept a backup, it will save time and energy and will no longer make the applicants wait for a long period of time.

The main goal of the study is to develop a website and enhanced the data accuracy of student eligibility DepEd (Department of Education) in governmental support DSWD (Department of Social Welfare and Development) through data analytics platform by following the objectives of the study which is: To design a framework that is capable of handling data collection and analytics improving accuracy, consistency and provides users convenience,

To develop an innovation using Data Analytics Management through Website, allowing teachers to manage and submit student performance using the platform, alongside with the DSWD (Department of Social Welfare and Development) side, who can approve, reject, and create a feedback on the submitted form; To implement a system that provides user friendly experience in maintaining data accuracy and consistency, a framework that allows you to manage data, analyze and conclude reel time into eligibility state or status; To test the performance of new data analytics platform, its accuracy, usability, convenience, conclusions and consistency by comparing it to the present methods that the institution is currently using.

The project fills the gap currently facing by DSWD (Department of Social Welfare and Development), the system shall be giving the users a more convenient and efficient way of managing papers, applications and academic reports, the system will eliminate the prolonged wait of the applicants, it will give the users a smoother transaction, making them save energy, time, and money.

The loss of records and applications and even feedback report will be lessened and can improve the service of DSWD (Department of Social Welfare and Development), it will eliminate the confusion in announcement in update such as notice of acceptance, pay out or even student status, the system will provide automated update regards the application and student performance so the beneficiary is well aware about their status and can create and submit proper actions regards the concern.

There are also some issues that arise regards of having data inaccuracy and delays making the student having deducted academic financial aid, through the system, they no longer need to worry if their requirements were being submitted on time or not, because their teachers had no longer need to wait for someone to fetch the information manually, they can straightly put it up on the system and the admin will also can create a feedback whether, good, for monitoring or for termination, though he system as well, making them all create a smooth and convenient and handy exchange of data.

Review of Related Literature

According from a studied of Jhonathan B. Ramirez,Ramil A. Purog a collection of information gathered from student graduating from college who's family is a beneficiary of the Pantawid Pamilyang Pilipino Program (4P's) that there are moments they are not be able to get the benefit in time due to improper or delayed submission of their data such as grades and class attendances, the action mentioned is still being processed manually and some students are still having and insufficient financial support problem due to the inaccuracy and delay of data management [3]. Aside from that, Castor V. Balucit states since this data inaccuracies and issues is present inside of the existing program it now tends to create a more challenges in the Filipino households such as lackness of daily food budget, lack of educational budget and of course in general expenses that they assume the project financial aid will cover [4].

DSWD (Department of Social Welfare and Development). Administrative Order No.22 Series of 2019:2019-2022, this government sector is aware how huge the affected and needy family are in present in this country, they pleaded and has visions that every Filipino family has to not be suffering in poverty and shall have rights to access with governmental subsidies equally, however, as years goes by the mean and measure is growing and

moving rapidly, manual data collection will be difficult to sustain a more accurate data leading to some empty and unresolved social problems, another challenge emerged as they discussed the matter DSWD-Digital Media Service on January 11,2021, the recommendations for the subsidy were being argumentative as time goes by due to the specific reasons including lack of financial capability of the department, continuously increasing of the beneficiaries of the program and even inflation [5].

On the other side, despite of the loopholes through the assessment of Tutor (2014),Chaudhury,Friedman and Onishi in (2013) it justifies that Pantawid Pamilyang Pilipino Program (4P's) is actually contributing in the growth of the Filipino family, it shows that enrolment had increased and the target citizens where being reached, based on the study of Agbon (2013) it also states there that the family appreciates the development that the project offers, on the other hand, Kris Ann Melad states there are also some families who complain about manual process and inconvenience of the program, in fact it shows that the 4P's program is less of 20% performance compared to the performance of international governmental aid, the claim is being justified by the current situation of the beneficiaries, wherein they have to travel far sometimes to get and update and cash assistance, the problem will surely be resolved if beneficiaries can be able to be updated and update their status remotely, Bolanos, Orcajada, Salazar, Mencias, Macaya, (2024) alongside with that, it is not just the family who experienced inconvenience regards the program, as well as the students itself, the study shows which held in Northern Samar, one of the most poorest place in the Philippines, students claims about the difficulty in submitting and updating the news and data they need, in fact t shows that the so called concern is actually affecting their studies directly as well, for example, absence or unable to know and catch up to the payout leading to lackness in allowance that may fruit to absences or unable to submit school requirements [6,7].

On the study of Melad, Araos, and Orbeta Jr., December (2020) not just in Northern Samar but with the beneficiaries' in general claims that they were having confusions and challenges regarding with how are they going to update and get the pay out of the program, the research of Niyang Bai, (2023) argues that despite of the effort to come up with the new technology Philippines still having a low competency in technology, it affects its economy, country opportunities, staying up to date international trend and updates but most of all the education field and Data Analytics Management performance; Some of the foreseen issues where poverty, lack of knowledge and of course county's budget and willingness (Clarke P-2017)the expansion of learning deficiency in the country is getting higher and higher because many countries have few systematic data on who is learning and who is not, Learning and data provides assessment, without proper handling of information due to absence of Proper Data Analytics Management it assumption may become inaccurate and unreliable.

Studies shows from Dr. Sinonski and Quinto (2024), Improving data accuracy in students using visual tools and data analytics is essential to identify trends, patterns and outliner in the data, alert users anomalies and can be correct the data on time that can reflect through decision making, it can help to present the data in a clear meaningful way, Tanja Tremmel (2024) Data Analytics based tools will improve the appeal and accuracy of the data's leading for the users to navigate the next steps precisely , also it will help them to properly create and track the future of the data and the organization involve, data analytics offers convenience and security at the same time, in a way that you don't know longer need to manually compute and assumpt for data, instead a computed data will simply be processed and present and the task remain is to assumpt and predict using the data presented.

On the study of Ronak Ravjibhai Pansara (2020) Embracing Data Analytics in general can literally boost performance, economy, business and in education, it does not only offer convenience alone but it can also offer accuracy and peace of mind handling your documents.

According to Fernandez,Gama,Sepulveda (2021) the studies show the worst effect of not acknowledging data analytics in the field of education. Due to inaccuracy of data many college students who lost their scholarship because of neglecting and accepting data analytics and as years goes by, unfortunately it kicks higher and higher, Nina Hymel Data driven based transactions offers the following; Personalized Learning, Assessment and Feedback, Student and Teacher Performance, Resource allocation, Early intervention, Parental Involvement, Accountability and transparency, Long term planning, supporting discussion from Ainash Rajput (2023) another advantage of Data Analytics are; ensures no data redundancy, Accurate tracking of the calendar, Automatic time table, Better management, It tracks resource distribution, Backup and recovery present data loss, Data security [8].

In addition Nina Hymel It is important to focus on data analytics, the study focuses on how and academic institution can improve using it, firstly it implements User- friendly Data Management systems, using this we can simply and easily elaborate what we see, we can highlight it more quickly and can be summarized the moment we wanted to, one of the example usage of it is what they called "FACT Student Information System) where it provides smooth collected transactions for the students such as grades, registrations and any other accessible data, According to Owan and Asuqou, Data is important in any research and in any field, that's why handling it properly and maximizing it will surely leads us to success and better set of decision making, the main goal of their studies is to asses and let scholars realize that data analytics is not something to be afraid with, but instead a helping friend Zhou,Xu ,Ashlynn [8-11]. The complexity and privacy issues inherent in social science research data makes research data management (RDM) an essential skill for future researchers. Data management training has not fully addressed the needs of graduate students in the social sciences, from the study of Fu, Blackson, Valentino (2022) RDS has been defined as any concrete and programmatic offering intended to support researchers (including faculty, postdoctoral researchers, and graduate students) in working with data, alongside with Perrier and Barnes (2018).

Synthesis

From the different Literature and Research presented by the proponents, they logically analyzed based upon it that the immerged issues were being triggered with the common denominators.

Students tends to have unreasonable deductions due to delayed submission of their attendance and records, beneficiaries are not be able to get updated where the payout is, sometimes they have to take effort and time and money to travel in every DSWD (Department of Social Welfare and Development) satellite and inquire what date shall the assistance will be released, teachers had to experience additional works due to manual input that a mistake may occur when they did not submit is on time leading to the first issues which is the student deductions, DSWD (Department of Social Welfare and Development), had reports and concerns that they respond that may last for a couple years leading for the applicants to wait and left hanging, prone to loss of records and applications and of course repetitions and even slow processing of data and information making it least effective way of storing and managing data.

The common denominator is a poor Data Management System, they all do it physically and manually, the privacy and backup tactic and plan were poor leading them to have a dominant effect of chaos once compromised. Through this, the current study aims to aid the scarcity present, for the beneficiaries and for every user and involve in the 4P's operation of DSWD (Department of Social Welfare and Development).

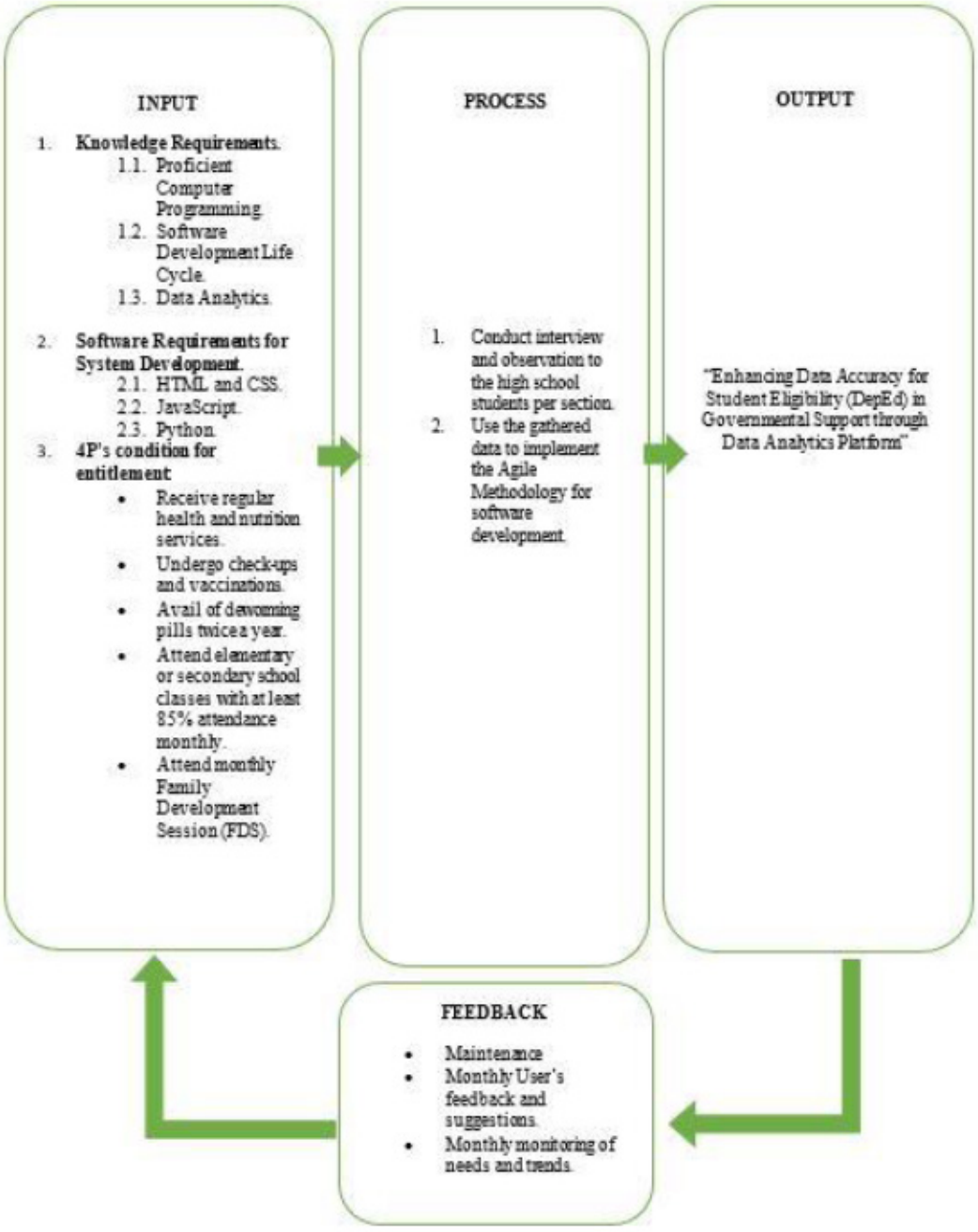


Figure 1: Conceptual Framework

Figure 1 showed that there are specific key components to consider in developing the system, it is the input, process, and output. Input focuses and suggest that the developers must have the knowledge in the field that will definitely help in making the system existing, also input highlights how knowledge can impact in making such innovation, hardware requirements were also present for the creation of the system, it is one of the essential tools wherein developers will craft their project, lastly for the input is the policy of the department, prior knowledge to this will lead developers to navigate what are the needed in the system and also to protect and avoid any violations that might be committed in doing the system.

Process emphasizes how the gathering shall be conducted, in this area developers will gather data and information to assess the future needs and even the current challenges of the stakeholders, by doing so, developers may now have the broader picture on what to expect and do with regards to this project, the data consolidated will become the foundation of how the system shall work, it must address the needs and expectations of the users to create and give useful platform for their future transaction.

Finally, the output, it is the face and final outcome of the input and process, the expected result and project extracted from the information being gathered. Alongside with this is the feedback, this will happen the moment that the system will be deployed or being used by the stakeholders wherein it pertains on the performance of the system and how the process will re answer or respond after the processing of so-called feedback.

Statement of the Problem

This section emphasizes the key components or challenges that is associated in Implementing and development of "Enhancing Data Accuracy for Student Eligibility (DepEd) Department of Education in Government Support (DSWD) Department of Social Welfare and Development through Data Analytics Platform" Specifically, it seeks to answer the following questions:

What is the respondent's evaluation of the current system of (DSWD) Department of Social Welfare and Development and in (DepEd) Department of Education and in the Implementation of "Enhancing Data Accuracy for Student Eligibility (DepEd) Department of Education in Government Support (DSWD) Department of Social Welfare and Development through Data Analytics Platform" in terms of:

- Document Submission
- Notifications
- Reliability in document handling
- System performance
- How can an online implementation of documents submission greatly save time and effort specifically teachers?
- How can a notification system will help beneficiaries in saving money, time and effort in terms of catching up updated new and relevant information?
- In what way online document management will ease the loss of papers specifically in beneficiary's application?
- What is the insight of the stakeholders in transitioning of specific transaction from traditional to online?
- What are the potentials of Data Analytics in improving the current system?

Significance of the Study

This project on an online application system for the Pantawid Pamilyang Pilipino Program (4Ps) expected to benefits stakeholders, with the potential to improve program efficiency, accessibility, and overall impact, not just in application but also in teacher's document submissions, eliminate anomalies and promote smooth transactions. 4P's Beneficiaries - will no longer need to wait for a long period of time months or unfortunately even years, they are now be able to move early and on time the moment they get updated by the automated text messages and email from the system, leading them not to face any future consequence and inconvenience.

The DSWD: (Department of Social Welfare and Development) will no need to use hardcopy forms of applications that are prone to lost and destruction, for example a typhoon or maybe a fire that might destroy their physical copies leading them now to have a inaccurate number of beneficiaries, the issue will create a domino effect in the field of DepEd (Department of Education) and in the Baranggay of the beneficiaries, it will now save their time on their part because they no longer need to wait and provide for may papers for massive applications and lastly announcement will be consistent as well as the notices making the beneficiaries be updated on time and get accurate and legitimate data.

Teachers: It also eliminates the paper works of them, and avoids the delay of submission of requirements, students on the other hand will now be updated accordingly and properly with a enough reason provided by the DSWD (Department of Social Welfare and Development). with the use of the system, through these students will be not left hanging and questioning their status on the program.

Researchers: They now be able to use their knowledge from their early years, apply and create a useful innovation in their society, the output may also serve as their portfolio on their future jobs. Future researchers - making them see and use the study, to be aware of what is the society is currently facing and to aspire to innovate something more and useful, "Para sa sarili, Para sa Bayan".

Scope and Delimitation

The scope of the study is the specific project of DSWD (Department of Social Welfare and Development) which is the 4P's (Pantawid Pamilyang Pilipino Program) and its beneficiary as well as their children who is the beneficiary of academic assistance of the program mentioned, the project will focus on the beneficiaries and applicants of the program living particularly at Panghulo Malabon City, and for the students they must be studying at Panghulo National High School.

The study does not cover the other project of DSWD (Department of Social Welfare and Development), such as for PWD (Person With Disabilities), for Medical Assistance and other beyond 4P's program, it is also limited in a way that the project will be only be tested and monitored only in the area of Panghulo, and lastly for those who are not inside and covered of the Pantawid Pamilyang Pilipino Program.

Definition of Terms

- **Data Analytics and Management:** Refers to logical and secure approach of analyzing and Delivering data.
- **Data Inacuracy:** Refers to unreliable data due to poor management, handling, analyzation.
- **4P'S (Pantawid Pamilyang Pilipino):** Refers to a project of the government that aims to aid the necessity of less fortunate
- **DSWD (Department of Social Welfare and Development):** Refers to a branch of government that focuses on aiding the needs of less fortunate Filipinos in general.
- **Data:** Refers to a fragment of information that is way more specific and precise.
- **Beneficiary:** Refers to someone who receive assistance or help coming from an organization, government or non-government.
- **Eligibility:** Refers to a person who passed through set of standards and requirements to get a specific benefit.
- **Usability:** (DEPED) Department of Education: Refers to a branch of government that handles educational and academical field of the country, it is also responsible for bridging the communication between student and the (DSWD) Department of Social Welfare and Development in terms of student performance.
- **Accuracy:** Refers to the correctness of data and information can be considered as reliable.

Methodology

Research Design

The objective is to design a framework capable of handling data collection and analytics with improved accuracy, consistency, and user convenience. This involves developing an innovative Data Analytics Management platform through a website that allows teachers to manage and submit student performance, while also enabling the Department of Social Welfare and Development (DSWD) to approve, reject, and provide feedback on submitted forms. By digitizing this process, the system aims to eliminate the risk of losing hard copies, particularly important documents related to payouts and financial transactions. The framework will prioritize user-friendliness, ensuring ease in maintaining data accuracy and consistency, as well as facilitating real-time data analysis to determine eligibility statuses. The platform's performance will be tested for accuracy, usability, convenience, and reliability by comparing it to current institutional methods. Additionally, user and developer insights will be evaluated to assess the website's impact on stakeholders' performance and its effectiveness in addressing the targeted issues, with improvements guided by user.

Software Development Methodology

This figure showed the basic flow and communications of stakeholders and data's revolving around the system; first, the social worker will log-in and then it will be routed to the social worker's dashboard, from that, the social worker has the power to view their profile and has the power to access the application so they could start creating application for the beneficiaries, once submitted, every application will now flow to ends of the admin, to access the admin page, admin must log-in, the moment that they log in it will be routed to the admin's dashboard, from there they can see their profiles, the set of applications that the social workers did, admin has the power whether to accept or not the application, every accepted application will directly go to the database wherein accepted applications is stored, within that data base, there is also rejected applications, Accepted applications were now be connected to the teachers dashboard, teacher's dashboard can be accessible once the teacher logged in, after that it will be routed to the teachers dashboard, from there you can see teachers profile and the calendar for student attendance and teacher's form for evaluating students' performance that she will eventually submit to the admin to determine whether the student is still eligible for the program or not.

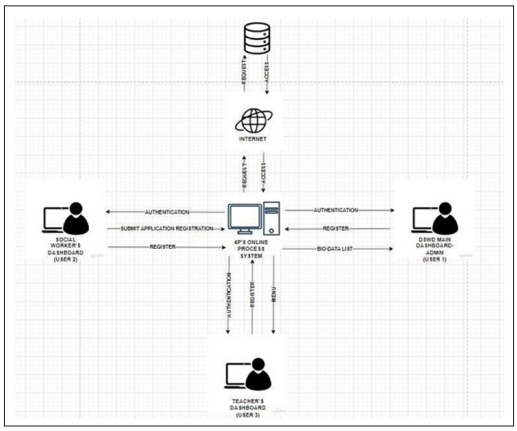


Figure 2: Software Architecture

This figure showed the basic flow and communications of stakeholders and data's revolving around the system; first, the social worker will log-in and then it will be routed to the social worker's dashboard, from that, the social worker has the power to view their profile and has the power to access the application so they could start creating application for the beneficiaries, once submitted, every application will now flow to ends of the admin, to access the admin page, admin must log-in, the moment that they log in it will be routed to the admin's dashboard, from there they can see their profiles, the set of applications that the social workers did, admin has the power whether to accept or not the application, every accepted application will directly go to the database wherein accepted applications is stored, within that data base, there is also rejected applications, Accepted applications were now be connected to the teachers dashboard, teacher's dashboard can be accessible once the teacher logged in, after that it will be routed to the teachers dashboard, from there you can see teachers profile and the calendar for student attendance and teacher's form for evaluating students' performance that she will eventually submit to the admin to determine whether the student is still eligible for the program or not.

Software Development Life Cycle

The systems development life cycle (SDLC) serves as a structured approach in project management, detailing the sequential stages of an information system development endeavor. It starts with an initial feasibility study, progresses through design and implementation phases, and concludes with the continuous maintenance and enhancement of the finalized application

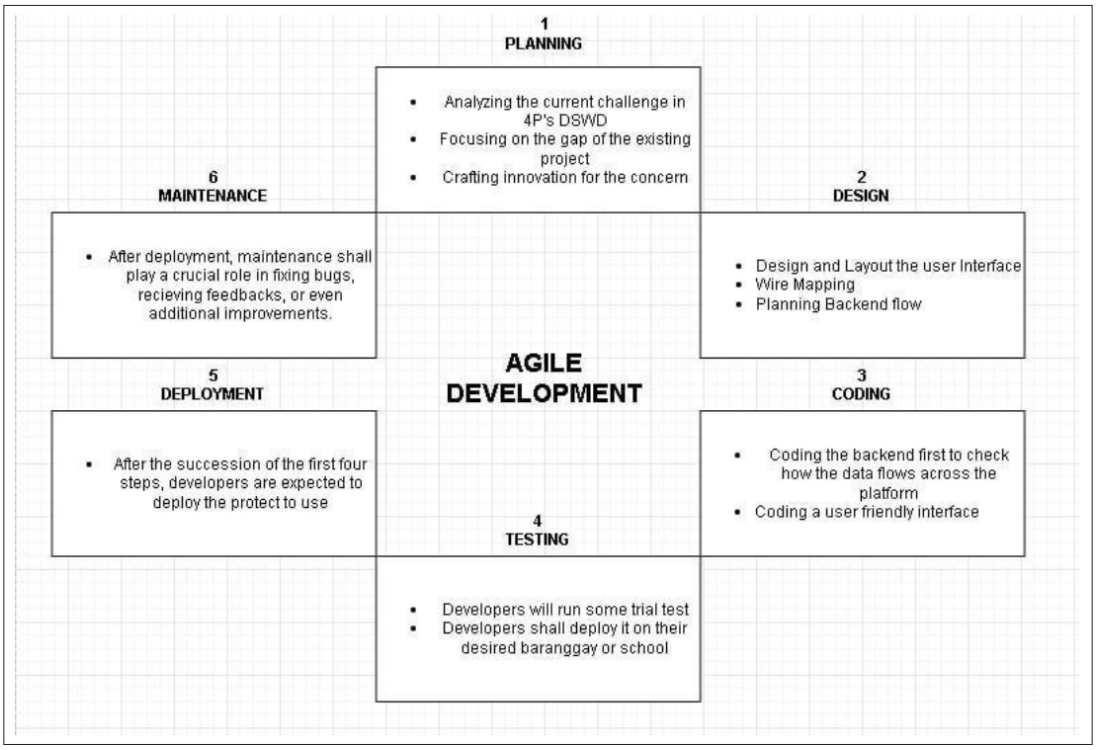


Figure 3: Software Development Lifecycle

Brainstorming/Requirements and Analysis

- Analyzing the current challenge in 4P's (Pantawid Pamilyang Pilipino Program) of DSWD (Department of Social Welfare and Development): Developers shall meet the "what" are the needs of the target population? What is the common issue needs be focused? "How" can we improve their life and experience?
- Focusing on the gap of the existing project: Finding the things and gaps that are need to improve.
- Crafting Innovation for the concern: From accumulated information and brain storming, finding the gap and analyzing it, developers will then now be able to create from it an innovation that will be more user friendly, accurate and less hassle to use.

Design

- Design and Layout the user Interface: Through hand drawn design, developers will now picture what would the system will look like.
- Wire Mapping: By using wire mapping, buttons and circulation of flow within the system will be more visible and easier to understand.
- Planning backend flow: The most crucial among the three, planning the backend will be the backbone of the whole system, developers will now picture how the data and information as well as communication will move within the system.

Coding

- Coding the backend first to check how the data flows across the platform: After planning, the developers will now code the desired backend, to see whether it is effective or shall choose another approach.
- Coding a user-friendly interface: Then the frontend will follow to make the backend more usable and pop.

Testing

- Developers will run some trial test: After the succession of data flow and front end, developers shall use it to see if there is something to improve and remove in general.
- Developers shall deploy it on their desired barangay or school: If sample dry run seems to be successful, the next test use will be from the target users directly, from them creators will gather feedback and information regards the usability and experience of the said platform.

Deployment

After the succession of the first four steps, developers are expected to deploy the project to use: After proving that the system is ready to use, deployment is expected to use the system in the field.

Maintenance

After deployment maintenance shall play a crucial role in fixing bugs, receiving feedbacks, or even additional improvements: After the first five steps, maintenance will be the last, to maintain the health of the systemn and to support if there is concerns needed to address regards the flow and anything.

In this figure it showed how the data flows inside the system Admin have the power to accept or delete the application inside of their panel, they can also view the set of application being held on that day on. In order for the admin to see the applications, social workers will then log-in to their respective divisions and access their dashboards wherein the application is being opened, from there they will be the one to process application for the beneficiaries and the processed application will then pop up to the admin page, with that, it will be sorted according to the decision of the admin.

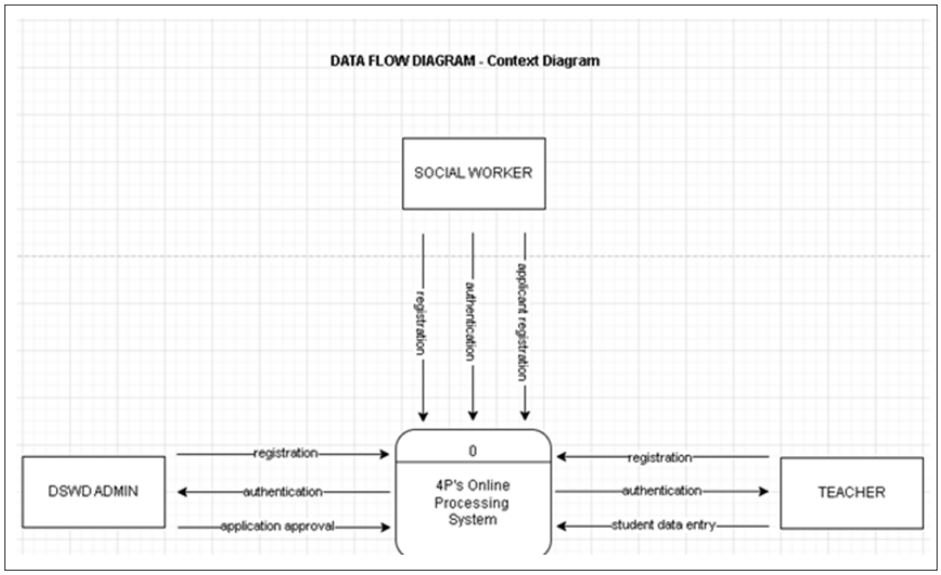


Figure 4: Context Diagram

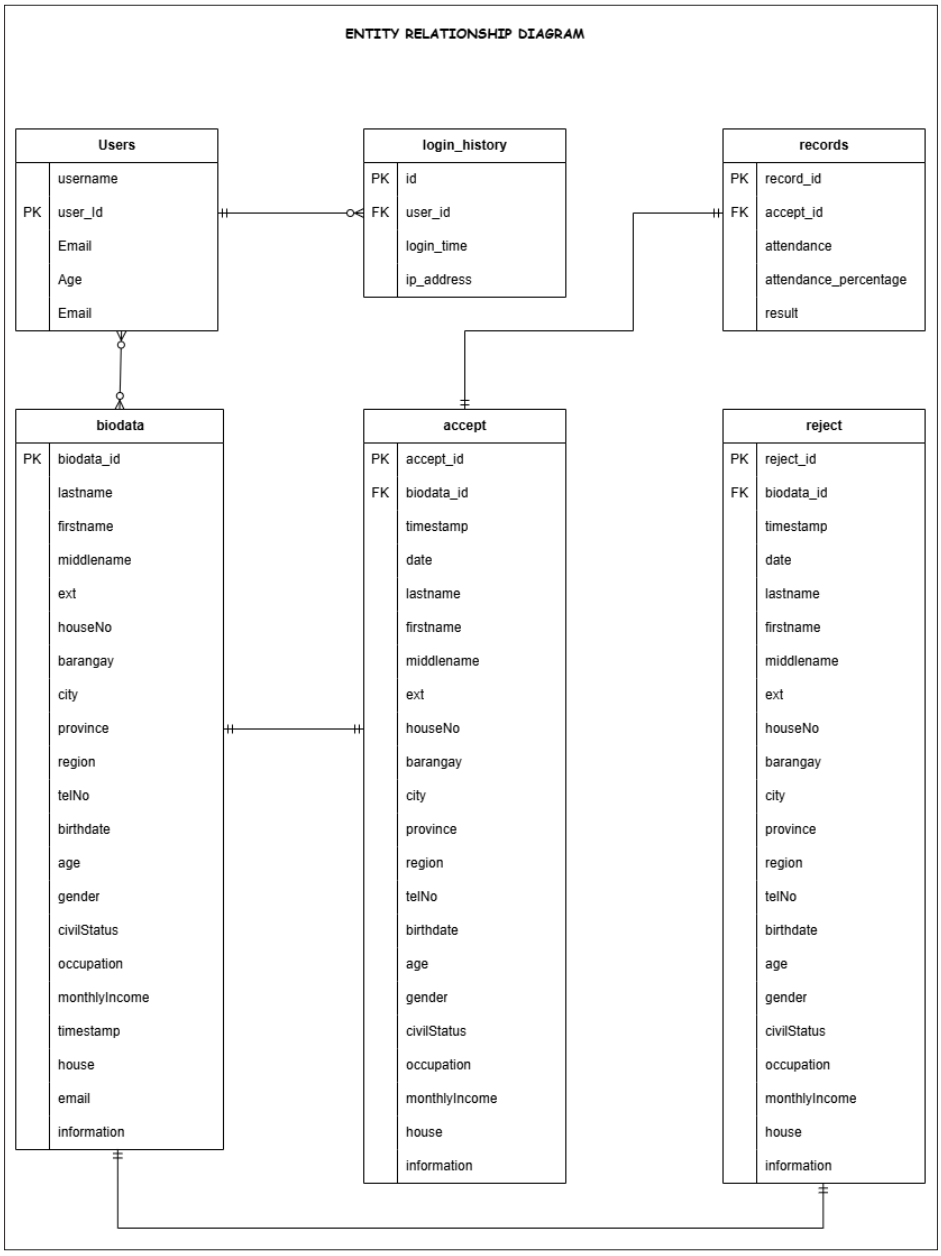


Figure 5: Entity Relationship Diagram

After the applications will being sorted, database of accepted applicants will be reflecting as well to the teachers so they could locate and find the students who were a beneficiaries that are currently enrolled to them, with this they can directly navigate the performance and history of the student, this will happened via clicking enroll on their dashboard and locating the students, once located it will be now inside their class list, in the class list they can navigate individual records of their students, they also have the capability to either remove or add students, alongside with things inside of it they can directly put the attendance and performance of the student.

After submitting the performances record, it will now trigger the data analytics, 85% is the passing score of attendance, automatically the system will label the attendance passed or failed depending upon the day of student being present. The data will now pop up to the admin in the form of report from the teacher's side, from this, admin has the visibility and authorization whether to toggle it as terminated or simply just notify the beneficiary regards to the various possibility upon reviewing the performance processed by the teachers.

An Entity-Relationship (ER) refers to the framework used to represent the logical structure of databases. It is a concept commonly used in database design to model how data is organized and interrelated.

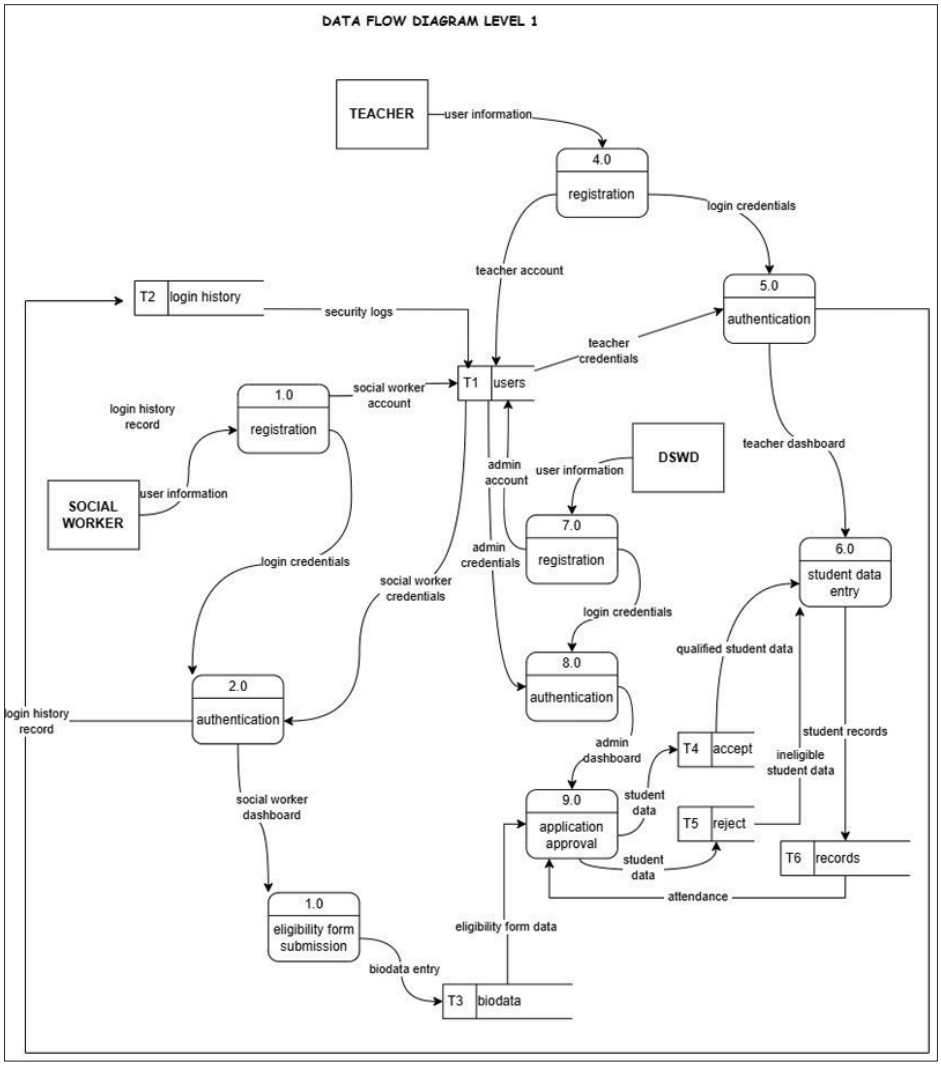


Figure 6: Data Flow Diagram (Admin, Teachers, Social Workers)

In this diagram it visually showed the capabilities and communications of the stakeholders, all of them has access on their dashboards, and every dashboards has a unique functionalities as well, Social worker will Log-In, proceed to their dashboard, and then process applications for the beneficiaries, Admin on the other hand receive applications, sort them according to standard, accept or reject, a database will then catch these decisions and project the accepted to the teachers dashboard, teachers are now able to pick students from this database, enroll in their class list and then input their performances, once that had happened, students' performance will then reflect back to the admin for further decision making and review.

In this diagram it showed how a registration is happening from all of the main users, Admin, Teacher and Social Workers, user will enter their basic registration information and then the system will validate whether the said information is exiting or not, every credentials will be stored to the database as reference and record for future logging in.

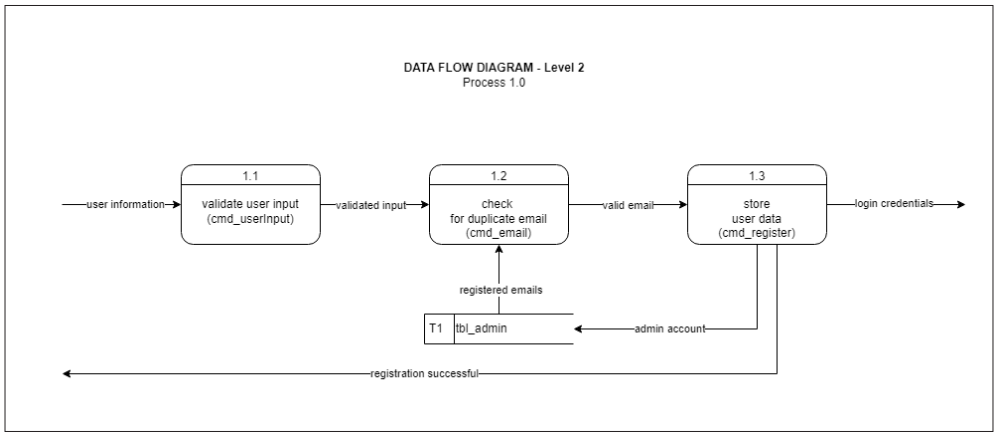


Figure 7: Data Flow Diagram- Sub level 2

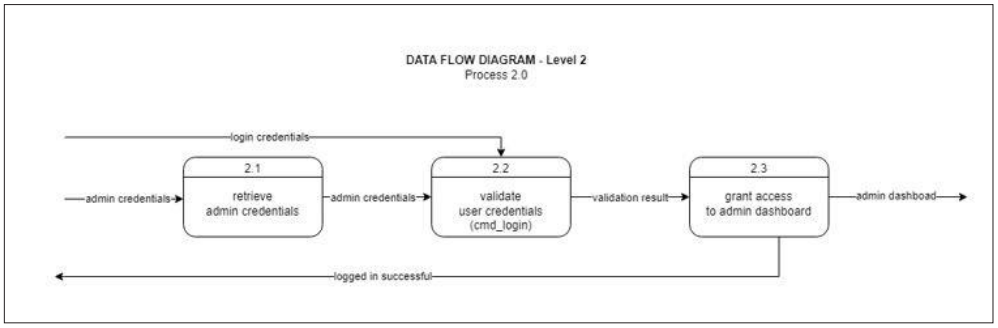


Figure 8: Data Flow Diagram- Sub level 2 (Admin Log-In)

In this figure it showed the process of admin logging in, after the sublevel 1 registration, this sublevel shows how admin having access to its respective dashboard. After that, within the dashboard there is a various component exclusive only for admins.

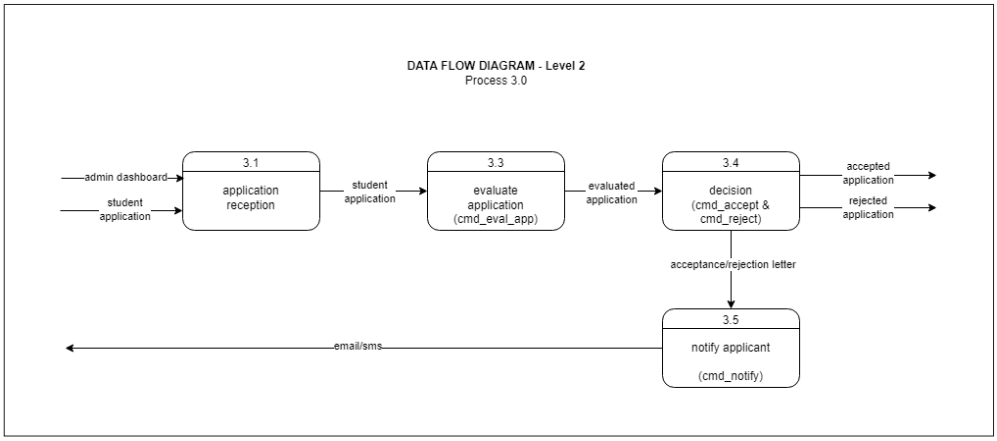


Figure 9: Data Flow Diagram- Sub level 2 (Admin Dashboard-Accept & Reject Application)

Upon successfully going through sublevel 2 process 2, Admin will now finally able to create a decision whether an application is accepted or rejected, the data will now flow to the data base and may now travel to the other eligible stakeholders.

In this diagram it showed how a registration is happening from all of the main users, Admin, Teacher and Social Workers, user will enter their basic registration information and then the system will validate whether the said information is exiting or not, every credentials will be stored to the database as reference and record for future logging in Upon successfully going through sublevel 2 process 4, Social Workers will now finally able to create an application for the beneficiaries it will then now submitted right after ,every submitted information the data will now flow to the data base and may now travel to the other eligible stakeholders.

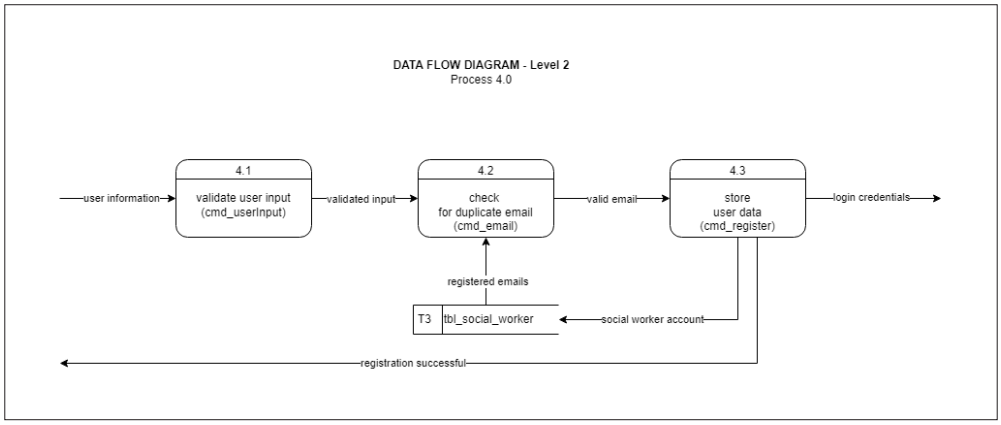


Figure 10: Data Flow Diagram- Sub level 2 (Social Worker Registration)

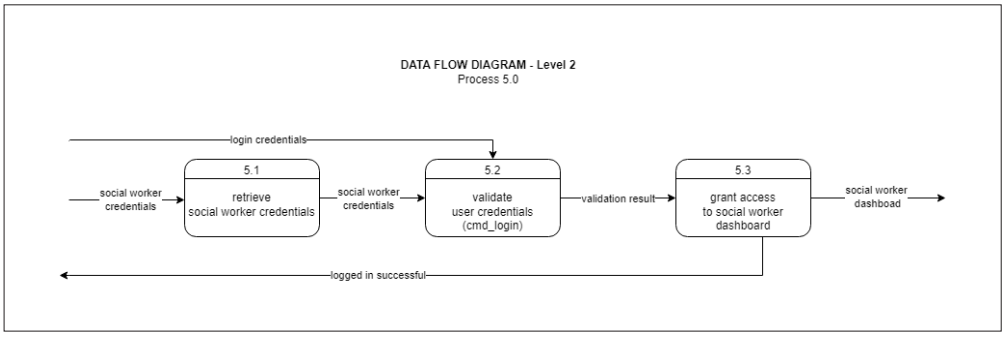


Figure 11: Data Flow Diagram- Sub level 2 (Social Worker Dashboard)

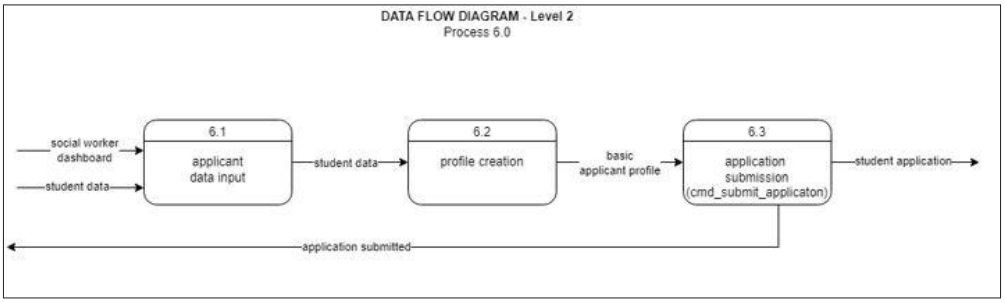


Figure 12: Data Flow Diagram- Sublevel 2 (Social Worker Application Process)

Extracting the information needed from the beneficiaries, this will serve as the backbone of information of individuals being processed, especially as record when being accepted.

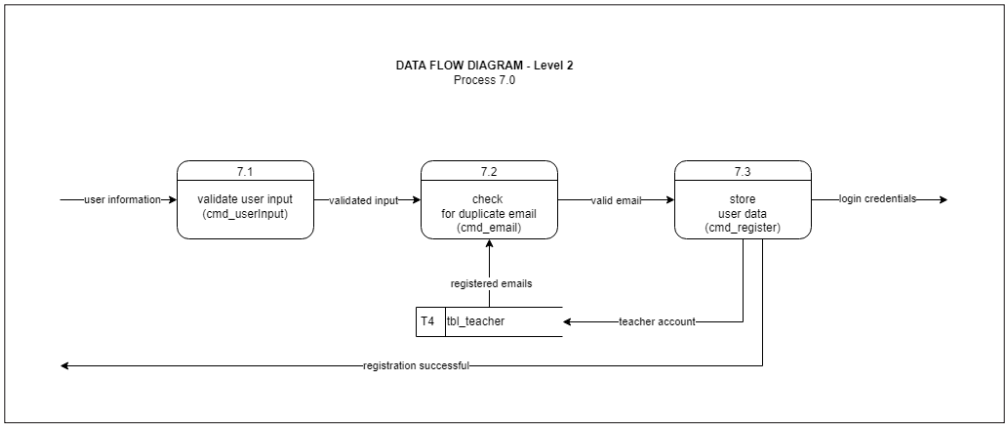


Figure 13: Data Flow Diagram- Sub level 2 (Teacher's Registration)

In this diagram it showed how a registration is happening from all of the main users, Admin, Teacher and Social Workers, user will enter their basic registration information and then the system will validate whether the said information is exiting or not, every

credential will be stored to the database as reference and record for future logging In.

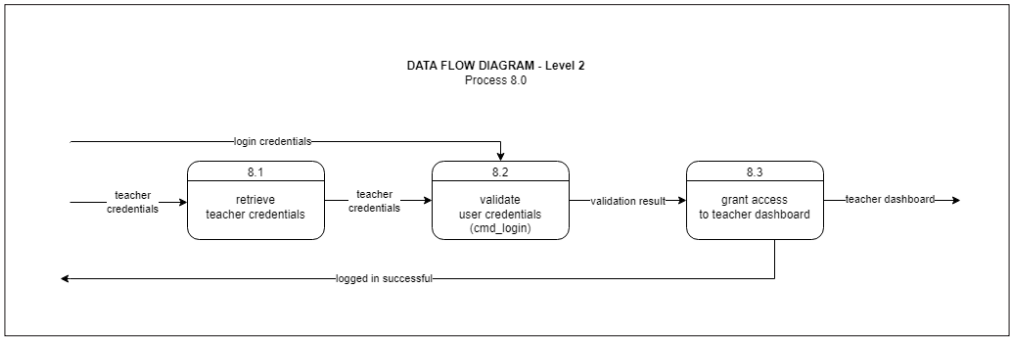


Figure 14: Data Flow Diagram- Sub level 2 (Teacher's Log-In)

Teachers after successfully being done with sublevel 2 process 7, they are now being routed to their logging in of credentials, this will allow them to see and access their personal dashboards

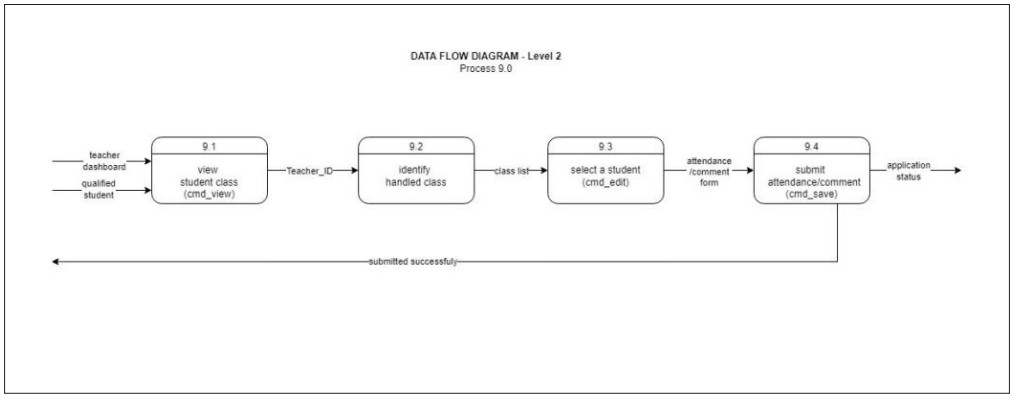


Figure 15: Data Flow Diagram- Sub level 2 (Teacher's Dashboard)

In this level, teachers had successfully gone through sublevel 2 process 7 and eight, they are now able to access their dashboards, inside it there are various navigations that will help them process students and performance and as well as keeping in track of it as time goes by. Teachers are now having student class list wherein they can fetch a specific student from the Database connected, after adding it up to their class list they can now click it and enter the progress and performance from attendance to commentary performance, the submitted results will prompt to the admin side and admin can easily determine the performances of students from various schools.

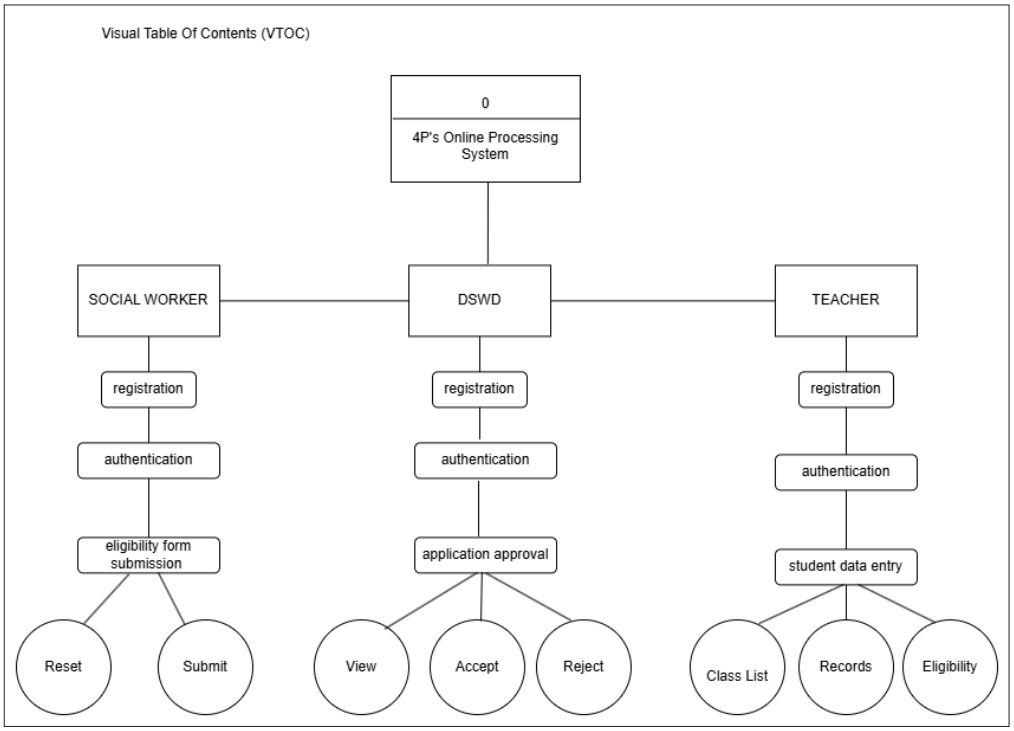


Figure 16: Visual Table of Contents

A **Visual Table of Contents (VTOC)** in a system or software documentation is a graphical representation of the content structure, making it easier for users to navigate and understand the organization of the material. It replaces or complements the traditional textbased Table of Contents by using visuals, icons, or diagrams.

System And Program Flowchart

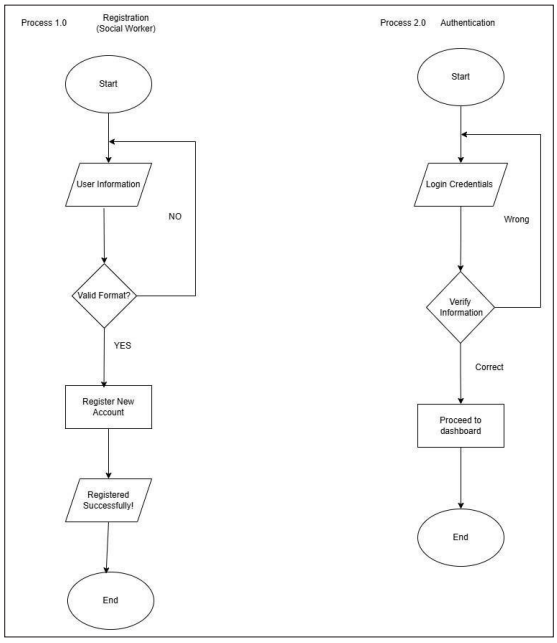


Figure 17: Flow Chart (Social Worker Registration and Authentication)

The image contained two flowcharts representing different processes: Process 1.0 – Registration (Social Worker) and Process 2.0 – Authentication. In the registration process, it starts with the user entering their information. The system checks whether the information format is valid. If the format is incorrect, the user must re-enter the information. If it is valid, a new account is registered, and a confirmation message appears, indicating successful registration before the process ends. In the authentication process, the user starts by entering login credentials. The system verifies the provided information. If the credentials are incorrect, the user is prompted to try again. If the credentials are correct, the user is granted access to the dashboard, completing the authentication process. Both processes ensure proper data validation, with registration focusing on new account creation and authentication verifying user access.

The diagram illustrated two processes: Process 3.0 ("Eligibility Form Submission") and Process 4.0 ("Registration (Teacher)"). In Process 3.0, the process begins with the applicant providing information. If the Information is incomplete or not in a valid format, the process loops back to correct the data. Once the information is complete and valid, it is submitted to the DSWD administrator, who successfully processes the submission, marking the end of the workflow. In Process 4.0, the process starts with the input of user information. If the information is not in a valid format, the user is prompted to re-enter it. When the data is in the correct format, a new account is registered successfully, concluding the process. Both workflows emphasize accuracy and data validation before proceeding.

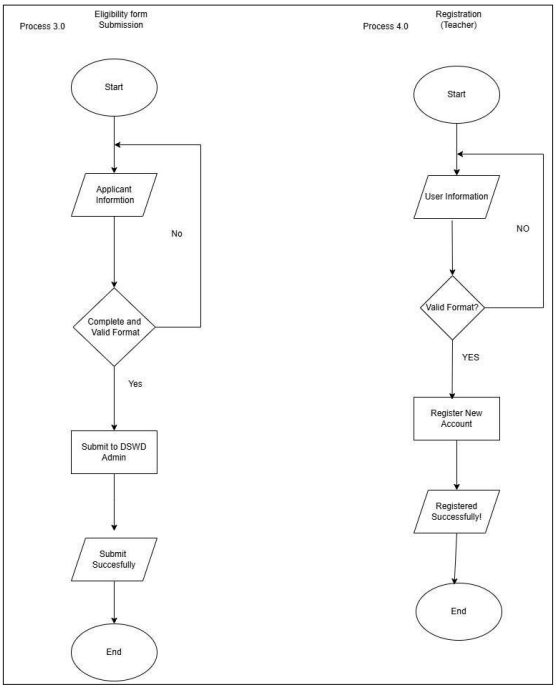


Figure 18: Flow Chart (Forms Submission, Teachers Registration)

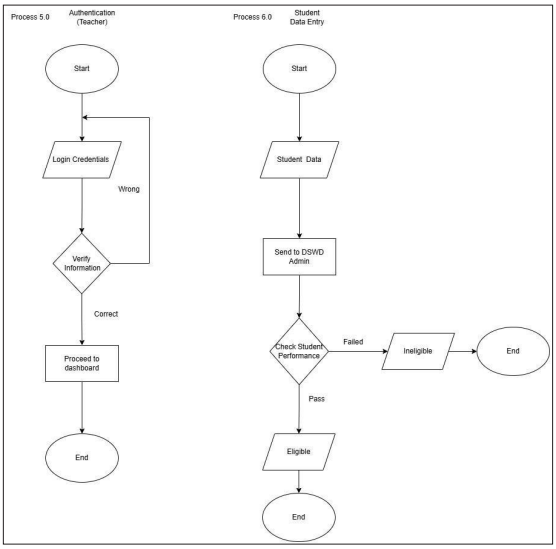


Figure 19: Flow Chart (Teacher's Authentication, Forms Submission)

The diagram showed two separate processes. Process 5.0 represents the "Authentication (Teacher)" workflow, where teachers log in with their credentials. If the login credentials are incorrect, the system loops back to reattempt verification. Once the credentials are verified as correct, the teacher can proceed to the dashboard, completing the process. Process 6.0 outlines the "Student Data Entry" process, where student data is submitted and sent to the Department of Social Welfare and Development (DSWD) administrator for review. The student's performance is then assessed. If the student fails the performance check, they are marked as ineligible, ending the process. If the student passes, they are deemed eligible, and the process concludes. Both workflows emphasize decision points for verification and eligibility to proceed.

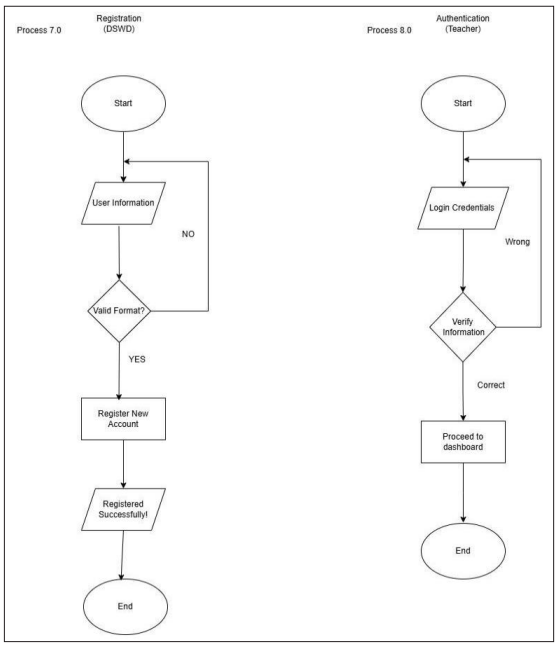


Figure 20: Flow Chart (DSWD Registration and Authentication)

The image contains two flowcharts representing different processes: Registration (DSWD) – Process 7.0 and Authentication (Teacher) – Process 8.0. The registration process starts with the user providing their information. If the input format is invalid, the user is prompted to re-enter the information. If the format is valid, a new account is registered, and a confirmation message indicates successful registration before the process ends. The authentication process begins with the user entering login credentials. The system verifies the information, and if incorrect, the user is prompted to try again. If the credentials are correct, the user proceeds to the dashboard, completing the authentication process. Both processes involve decision points ensuring data validity and accuracy before proceeding to the next step.

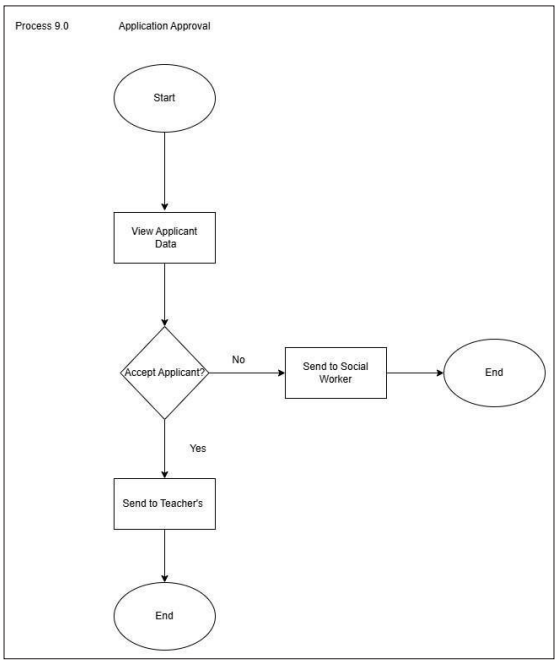


Figure 21: Flow Chart (Application Approval)

The flowchart represents Process 9.0 – Application Approval. The process begins with reviewing applicant data. A decision is then made on whether to accept the applicant. If the applicant is accepted, the data is sent to the teacher's department, concluding the process. If the applicant is not accepted, the information is forwarded to a social worker, and the process ends there. This structured approach ensures a systematic evaluation of applications, directing accepted applicants towards teachers and referring rejected cases for further social intervention.

Sample Prototype



Figure 22: Stakeholders Registration Form

In this section, all of the stakeholders who does not have yet registered all of them shall go through this process, this is for them to access their respective dashboards to work and submit respective documents, and after this they are now eligible to Log-In and access exclusive tools and navigations per classifications. After successfully registration, there will be a confirmation to proceed.



Figure 23: Teacher's Log-In

After signing up for registration, teachers were now eligible to log-in and proceed to their dashboards.

Teacher's dashboard has features, including Class List, Records, Eligibility and Log-out, Class List is the feature wherein teacher will navigate the student whose part of the program who are currently under their bucket, records are the documentation and history of student's performance and eligibility is the attendance and performance.

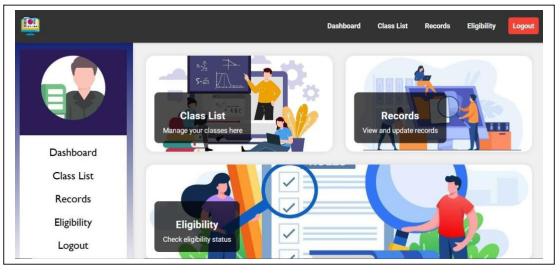


Figure 24: Teacher's Dashboard



Figure 25: Admin Log-In Page

After registration, this will be the routing page for admin afterwards.

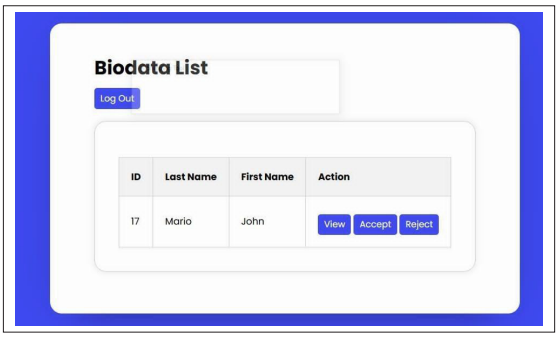
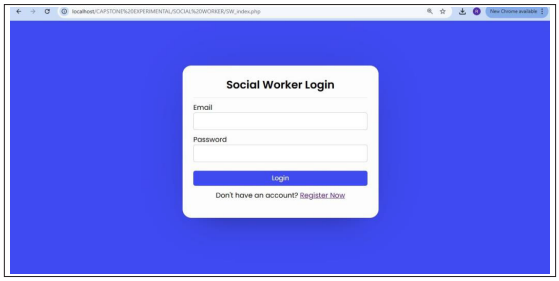


Figure 26: Admin Accepting of Rejecting Applications

In this figure, after the social workers made the applications on behalf of the applicants, every submitted form will then now prompt to the side of the admin, they have now the choice depending upon assessment whether the application is passed or rejected.

After logging in, social worker had now access in their dashboards, this is where we can access the application form, and also this is where the information flow starting, entering all of the necessary information by asking the beneficiary is crucial to fill this form.

Using Data Analytics, it allows us to process information and organizes it, it also allows us to transform it into a more meaningful information, Data analytics helps us to predict and picture necessary information ahead of time, " Enhancing Data Accuracy for Student Eligibility for Governmental Support" uses If-Else condition to automatically determine the performance of the student inside the school, it is crucial to be correct since this is where the support and the project itself is relying whether they are still eligible or not for the program, also it eases the workload of the teachers to manually writing down and manually travelling or waiting for a representative to fetch the information needed.



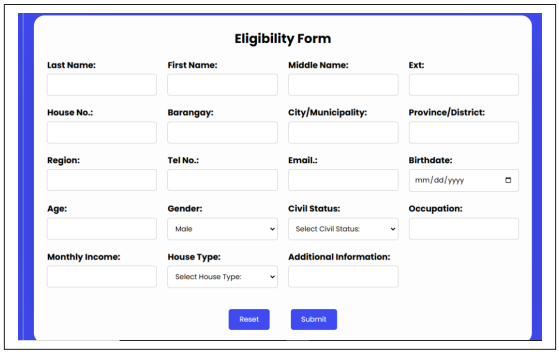


Figure 27: Social Worker Log-In page and Application Form

Through this condition, admins can also see the performance of students without actually counting manually or waiting for the papers to arrive before making decisions with regards to the performance of the said student, under the dashboard of the teacher, attendance in a form of calendar were being implemented, this is where they are going to plot the days that students did come to school, 85% passing attendance is needed for the program, upon entering the attendance system will automatically compute it, 85% or above will be labeled as passed and 84% and lower will be labeled as failed, they don't need to actually do it and fetch it manually before taking action, the so called label and assessment will prompt directly to them the moment a teacher will toggle submit button.

In Line with this, this method saves time and allows stakeholders to make an action and decision ten steps ahead, this will make the process smoother and even way more easy to comprehend, as the data syncs, visual interpretations were already serve so that stakeholders will simply proceed on decision making, the algorithm will prevent the delay and even inaccuracy in computing the students' performance which were having so much impact in terms of allowance and records in the program, also for any inaccuracies and inconvenience it is an add up to the works of the stakeholders specifically our teachers. In today's system action in every concerns were kind of slow and seems to be unresponsive due to the hindrances which are timeframes and monetary concern.

Upon this algorithm, it will not just save us time, but it will also allow us to process better and predict better, save our time and effort and mostly avoid inconvenience and inaccuracies.

Population and Sampling Technique

The research method used for the project is "Focused Group Research", this method allows the researchers to focus on a specific group of people with common experience and shared insight towards one thing or concern, it will allow the researchers to accumulate adequate and accurate responses and can dodge

the idea of having irrelevant data. Through the help of "Agile Methodology", it will help navigate the user's opinion and feedback towards the system, since agile methodology is design to pinpoint users and producer's needs and communication, we can now improve the system accurately by gathering necessary and precise information through focused group research and can now elaborate and analyzed it through agile methodology for the desired target audience.

Respondents

Researchers will use stratified sampling method, Panghulo Malabon 4P's beneficiary as the whole population and Specific Class advisers in Panghulo National High School/ beneficiaries per street as "Strata" Researchers will use and focus on the strata for the testing and launching of the system allowing it to become a "non-parametric", since non-parametric selection is used only for small population and can be more flexible and continuous overtime.

To be specific, it will be twenty beneficiaries from around Panghulo and ten teachers in Panghulo National High School.

Research Instruments

In Instrument that may use on this study are: Scoresheet Questionnaire: Scoresheet will be given to the users specified as the; DSWD Panghulo Beneficiaries, and Teachers from Panghulo National High School, as they are comparing the current system to the approaching innovation, they can rate or grade each area with designated questions, areas are; Notification system, Data Accuracy, Communication of two departments and present System performance. The scoresheet will be administered and guided by the developers for further concerns and suggestions; it will then return to the researchers so they can use the scoresheet to predict accurately their system performance.

Questionnaire

The Researchers used a simple survey questionnaire that uses a simple scoring metric system that utilizes a level of agreement and disagreement on the context of comparing manual and digital approach in communication, system performance, and accurate information regarding students and beneficiaries.

This allows us to see and compare the current system and to see the users taste and preferences.

Construction

To make this system exist, partnership with the stakeholders and professionals are needed, the insight of every group was highly contributed on the creation of the idea of the project, the system was built simple and functional to suits all of the users and stakeholders expectations, especially to fit in their technical capabilities as well, the functions of the project were made simple and easy to navigate so the users will not having a hard time experiencing it.

Validation

Validations is the important part in the side of the proponents, developers undergo validations from the personnel of DSWD (Department of Social Welfare and Development) to ensure that we are not going to violate any policies under (DSWD) Department of Social Welfare and Development) Alongside with the few clarification from the teachers who made these forms to be submit to the DSWD (Department of Social Welfare and Development), know that these two department were separate entities ad has policies to follow ensuring this is crucial to avoid any breaches and inconvenience.

Seeking for advisers' insight and correction is important as well, as a professional roaming in this field for almost a couple of year, guidance and precise measure from them will guarantee the performance of the system, this allows the researchers to eliminate the possible threat and loophole of the project, aside from it, this will serve as backbone and foundation of the correctness and objectiveness of the project.

Data Gathering Procedures

The instruments used in this study include a Scoresheet Questionnaire, which will be distributed to the DSWD Panghulo Beneficiaries and teachers from Panghulo National High School. This questionnaire will enable participants to compare the current system with the upcoming innovation by rating or grading various areas of interest. The areas assessed include the Notification System, Data Accuracy, and Communication between the two departments, and the current system's performance. The developers will provide guidance during the administration of the scoresheet to address any concerns or suggestions, and once completed, the scoresheets will be returned to the researchers. The data gathered will be used to accurately predict the system's performance and guide further improvements.

In addition to the scoresheet, the research method employed for this project is "Focused Group Research." This method allows the researchers to focus on a specific group of individuals who share common experiences and insights regarding the system. By focusing on this targeted group, the researchers can accumulate relevant, high-quality responses while minimizing the risk of collecting irrelevant data. Furthermore, the study incorporates "Agile Methodology," which facilitates the collection and analysis of user feedback. Agile is designed to prioritize user and producer needs, ensuring that feedback is accurately captured and addressed. Combining the principles of Focused Group Research with Agile Methodology allows the researchers to gather precise, actionable information, improving the system based on direct user input. Through this approach, the researchers can analyze the data, make necessary adjustments, and enhance the system to meet the expectations of the target audience.

Data Analysis and Statistical Tools

The data gathered will be analyzed and interpreted, the following formula will use:

Figure 28 shows how the information and data were being computed under weighted mean computation. The results will be measured according to scales that are equal from highest to lowest.

Shows the scale rating that will going to be used in very questionnaire, 1 for strongly Disagree ranging from 1.00 to 1.49, 2 for Disagree ranging from 1.50 to 2.49, 3 for agree ranging from 2.50 to 3.49 and 4 for Strongly agree ranging from 3.50 to 4.00, This scale will be used to measure the preferences and

expectations of the respondents in the given set of questions Testing and Evaluation Process.

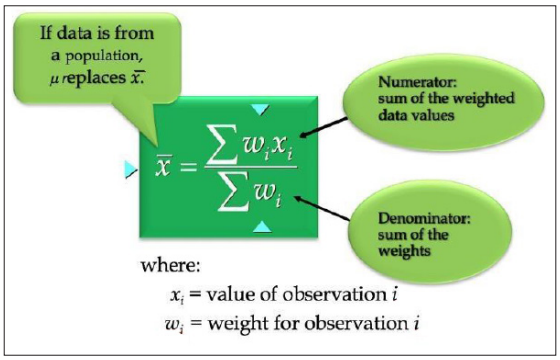


Figure 28: Statistical Formula

Table 1: Likert Scale

Scale Level	Range	Interpretation
4	1.00-1.49	Strongly Agree
3	1.50-2.49	Agree
2	2.50-3.49	Disagree
1	3.50-4.00	Strongly Disagree

Shows the scale rating that will going to be used in very questionnaire, 1 for strongly Disagree ranging from 1.00 to 1.49, 2 for Disagree ranging from 1.50 to 2.49, 3 for agree ranging from 2.50 to 3.49 and 4 for Strongly agree ranging from 3.50 to 4.00, This scale will be used to measure the preferences and expectations of the respondents in the given set of questions Testing and Evaluation Process.

Testing And Evaluation Process

Table 2: Log_In History

Scale Level	Range	Interpretation
1	The user launches the page	They will be routed to the main pageand has registration
2	The user clicks Log-In	The user must be able to go to their respected dashboard
3	The user clicks Forgot password	The user shall be routed to the forgot password section
4	The user check profile	The user profile hall pops up with them information
5	The user will view dashboard	They must be able to view and check the navigations on their respected dashboards
6	The Social worker view dashboard	They should see the application form and their profile
7	The admin views its dashboard	The admin shall see the applications and see their profiles
8	The admin rejects or accepts applications	They must remove in their end
9	The teacher views their dashboard	They must see class list and teachers' navigation
10	The teacher submit the attendance and performance sheet	The data must be seen on the admin's end

Results and Discussion

This chapter presents the research answer, components, features and methods used, the objective of this project is to further improve and aid the current challenges that the stakeholders were facing. To discuss further the figures and tables below are shown Features of "Enhancing Data Accuracy for Student Eligibility (DepEd) Department of Education in Government Support (DSWD) Department of Social Welfare and Development through Data Analytics Platform"

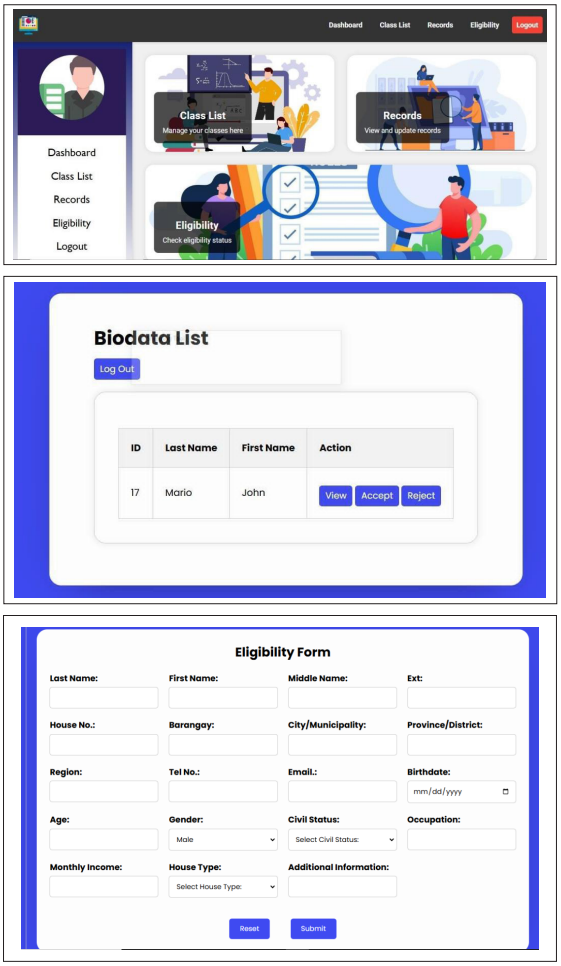


Figure 29: Dashboards

Figure showed the three main dashboards that the operations is happening, Admin Dashboard, Teacher's Dashboard and Social Worker Dashboard, all of the Dashboards haS unique key component that has capability in every scales and assessment and action needed of the system.

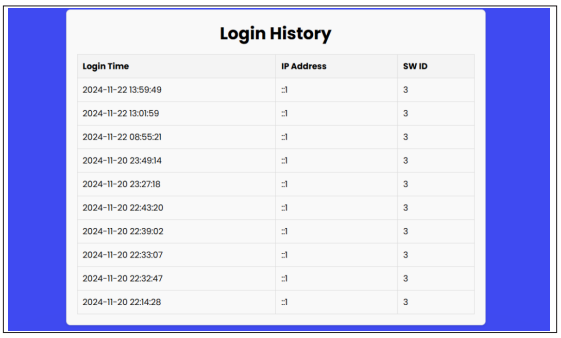


Figure 31: Log_In History

Features allowed stakeholders specially admin to navigate the log-in history, this feature is not just to record the log in information but to navigate as well and track potential person whenever an incident or an inconvenience had happened.

The weighted mean of this questionnaire, stated the most of the respondents is evident that the current transaction process of the 4Ps program under the DSWD faces numerous challenges, including delays in notifications, loss of documents, frequent re-applications, and challenges in accessing information and submitting documents. These issues result in inefficiencies, data inaccuracies, increased workload for teachers and other stakeholders, and a higher potential for administrative errors. The manual operations of the program hinder timely and accurate data processing, causing unnecessary resource wastage and increased administrative burden. The need for a digital solution in the 4Ps transaction process has become apparent, as it would streamline operations, improve data accuracy, reduce administrative workloads, and enhance accessibility and convenience for all stakeholders. Transitioning to an online system would help overcome the limitations of the current manual processes, minimize errors, and enable better communication and coordination among departments and beneficiaries, ultimately leading to a more efficient and effective 4Ps program [12-17].

Results and Discussion

Table 3: Survey Answer

SYSTEM PERFORMANCE	1	2	3	4	FREQUENCY	WEIGHTED MEAN	INTERPRETATION
How would you rate your 4P's transaction experience?	7	12	1	0	20	3	GOOD
A digital transaction for 4P's would save me money, time and effort	3	0	13	4	20	3	AGREE
Do you find the current DSWD system convenient?	1	1	16	2	20	3	AGREE
REQUIREMENT SUBMISSION	**1**	**2**	**3**	**4**	**FREQUENCY**	**WEIGHTED MEAN**	**INTERPRETATION**
As a beneficiary, do you think it will be more convenient to you if we innovate the current system to online?	2	1	10	7	20	3.1	AGREE
As a beneficiary is there a time that comes to your mind that it will be easier and avoid inaccuracy and some anomaly if we implement the process online?	2	1	11	6	20	3.05	AGREE
In our modern day era, do you think beneficiaries, thru the assistance of social workers were ready to transition the traditional system to online)	2	2	11	5	20	3	AGREE
COMMUNICATIO N BETWEEN TWO ENTITY AND DEPARTMENT	**1**	**2**	**3**	**4**	**FREQUENCY**	**WEIGHTED MEAN**	**INTERPRETATION**
Have you encountered multiple challenges in the current system, such as delays in notification, loss of documents leading to re-applying on the 4P's, repeatedly going to bank checking allowance and any more situation regards the system that you find inconvenient	2	2	9	6	19	3	AGREE
DATA ACCURACY	**1**	**2**	**3**	**4**	**FREQUENCY**	**WEIGHTED MEAN**	**INTERPRETATION**
Does the current DSWD process of notifying beneficiaries were on time, accurate, confusing, and having adequate information needed.	1	4	13	2	20	2.8	DISAGREE

Personally, have you ever been heard the anomaly of lost application forms, document, or even inaccuracy in terms of record handling in DSWD, leading to a new problem?	0	8	6	6	20	3	AGREE
NOTIFICATION	**1**	**2**	**3**	**4**	**FREQUENCY**	**WEIGHTED MEAN**	**INTERPRETATION**
Do you find the current system and steps of applying and informing DSWD beneficiaries difficult?	2	6	10	2	20	3	AGREE
OVERALL WEIGHTED MEAN : 3							AGREE

System Performance

1. How would you rate your 4Ps transaction experience?

o **Result:** Weighted Mean = 2, Interpretation: GOOD

Most respondents rated their experience as satisfactory (level 2), indicating that while the current system meets basic expectations, there is room for improvement.

2. A digital transaction for 4Ps would save me money, time, and effort. o Result: Weighted Mean = 3, Interpretation: AGREE Respondents agree that transitioning to a digital system would bring convenience and efficiency, highlighting a positive attitude toward modernization.

3. Do you find the current DSWD system convenient?

o **Result:** Weighted Mean = 3, Interpretation: AGREE Beneficiaries agree that the existing system is generally convenient but may still have areas to improve for optimal performance

Requirement Submission

1. As a beneficiary, do you think it will be more convenient to innovate the system to online?

o **Result:** Weighted Mean = 3.1, Interpretation: AGREE

There is a consensus that moving to an online system would improve convenience, reflecting beneficiaries' readiness for digital innovation.

2. Would online processes be easier and avoid errors and anomalies? o Result: Weighted Mean = 3.05, Interpretation: AGREE Beneficiaries recognize that online processes could help streamline procedures, reduce inaccuracies, and minimize errors.

3. Do beneficiaries think social workers were prepared for online transition?

o **Result:** Weighted Mean = 3, Interpretation: AGREE This result indicates that beneficiaries generally feel that social workers are adequately prepared to assist in transitioning to an online system.

Communication Between Entities and Departments

1. Have you encountered multiple challenges in the current system (e.g., delays, reapplying for 4Ps, etc.)?

o **Result:** Weighted Mean = 3, Interpretation: AGREE Respondents agree that challenges like delays and repetitive tasks exist, showing a need for better communication and streamlined processes.

Data Accuracy

1. Does the current DSWD process notify beneficiaries accurately and on time?

o **Result:** Weighted Mean = 2.8, Interpretation: DISAGREE There is some dissatisfaction with the accuracy and timeliness of notifications, suggesting that data handling and communication require improvement.

2. Have there been issues with lost forms or inaccuracies in DSWD record-keeping?

o **Result:** Weighted Mean = 3, Interpretation: AGREE Respondents agree that record-keeping issues have occurred, pointing to a need for better data management systems.

Notification

1. Do you find the current system for applying and informing beneficiaries difficult?

o **Result:** Weighted Mean = 3, Interpretation: AGREE Beneficiaries agree that the application and notification process is somewhat challenging, emphasizing the need for a more user-friendly system.

Overall Weighted Mean

• Weighted Mean = 3, Interpretation: AGREE overall, respondents agree that while the system is functional, there is a strong desire for innovation, specifically through digitalization, to address existing challenges and improve efficiency.

System Performance

1. Do you find the current DSWD system convenient in terms of updates, student performance submissions, and even workloads?

o **Result:** Weighted Mean = 2.4, Interpretation: DISAGREE Respondents disagree,indicating dissatisfaction withthe convenience of the current system. They perceive challenges in handling updates, submissions, and workloads.

2. Have you experienced challenges in the current system (e.g., loss of files, delays, challenges in paper submissions)?

o **Result:** Weighted Mean = 3, Interpretation: AGREE

Respondents acknowledge encountering issues such as delays and inefficiencies, reflecting a need for system improvement.

3. Do you think the transition from manual to online will ease up workloads and be manageable?

o **Result:** Weighted Mean = 2.3, Interpretation: DISAGREE Respondents are skeptical about whether transitioning to an online system will effectively ease workloads or be manageable.

Table 4: Survey Answer

SYSTEM PERFORMANCE	1	2	3	4	FREQUENCY	WEIGHTED MEAN	INTERPRETATION
Do you find the current DSWD system convenient, in terms of updates, student performance submissions and even in workloads?		6	4		10	2.4	DISAGREE
Personally, have you ever been experienced one of these challenges in the current system? (loss of files/documents, delay announcements, challenges in paaper submissions, challenges or inconvenience due to manually inputting of student information such as attendance, performance and etc.			10		10	3	AGREE
Do you think the transition from manual to online will came up smoother and manageable?		7	3		10	2.8	DISAGREE
REQUIREMENT SUBMISSION	**1**	**2**	**3**	**4**	**FREQUENCY**	**WEIGHTED MEAN**	**INTERPRETATION**
For a year(s) of using manual method in DSWD submission, is there a time that comes to your mind that a data analytics (online) innovation might save your time, energy, and might lessen the workload.			8	2	10	3.2	AGREE
How inconvenient to you doing all the paper works manually and in hard copy?			6	3	10	3.2	AGREE
Does the current system of DSWD adds up to the works of the teachers?		5	5		10	2.5	AGREE
COMMUNICATIO N BETWEEN TWO ENTITY AND DEPARTMENT	**1**	**2**	**3**	**4**	**FREQUENCY**	**WEIGHTED MEAN**	**INTERPRETATION**
Do you think the transition from manual to online will came up smoother and manageable?			7	3	10	3.7	AGREE
DATA ACCURACY	**1**	**2**	**3**	**4**	**FREQUENCY**	**WEIGHTED MEAN**	**INTERPRETATION**
In our modern-day era, do you think we must eliminate this “unnecessary” manual processes to ease teacher’s workloads and save time and effort.				10	10	4	STRONGLY AGREE
Do you think the current system and methods were prone to inaccuracy		1	6	3	10	3.2	AGREE
OVERALL WEIGHTED MEAN : 3.11							AGREE

Requirement Submission

1. Does data analytics (online innovation) save time, energy, and lessen workloads?

o **Result:** Weighted Mean = 3.2, Interpretation: AGREE Respondents agree that online innovations could bring efficiency and reduce manual workloads, suggesting support for modernization.

2. How inconvenient is it to perform manual submissions and paperwork?

o **Result:** Weighted Mean = 3.2, Interpretation: AGREE

Respondents agree that manual processes are inconvenient, highlighting the need for digital solutions.

3. Does the current system of DSWD add up to the workload of teachers?

o **Result:** Weighted Mean = 2.5, Interpretation: AGREE Respondents moderately agree that the current system increases teachers' workloads, further suggesting the need for process improvement.

Communication Between Entities and Departments

1 Do you think the transition from manual to online will improve communication?

o **Result:** Weighted Mean = 3.6, Interpretation: AGREE Respondents strongly agree that moving online would enhance communication between departments, emphasizing a perceived benefit of modernization.

Student Performance

1 Will an online system be more manageable for both students and teachers?

o **Result:** Weighted Mean = 3.7, Interpretation: AGREE Respondents agree that integrating an online platform would ease processes for both students and teachers, showing strong support for digital transformation.

Data Accuracy

1. Should manual processes be eliminated to save time and effort?

o **Result:** Weighted Mean = 4, Interpretation: STRONGLY AGREE Respondents strongly agree that eliminating manual processes would significantly improve efficiency and reduce unnecessary burdens.

2. Do you think the current system is prone to inaccuracies?

o **Result:** Weighted Mean = 3, Interpretation: AGREE Respondents agree that the current system has inaccuracies, underlining the importance of a more reliable system.

Overall Weighted Mean

Weighted Mean = 3.11, Interpretation: AGREE

Overall, respondents support the idea of transitioning to an online system. They recognize its potential benefits in reducing workload, improving accuracy, and streamlining communication. This survey was conducted to gather feedback from teachers regarding the current DSWD system and its impact on their work, particularly in relation to updates, student performance submissions, and overall workload management. The results reveal several concerns, with many teachers expressing dissatisfaction with the current manual processes. Specifically, there is a notable disagreement regarding the convenience of the current system, with a weighted mean of 2.4, suggesting that the system is not considered user-friendly. Teachers also reported challenges such as loss of files, delays in announcements, and difficulties with paper submissions, all of which contribute to an inefficient workflow. On the other hand, there is strong support for transitioning to an online system, with a weighted mean of 3.2, indicating that teachers believe digital solutions would save time, reduce workloads, and help streamline operations. Additionally, the teachers strongly agreed that the current system often leads to inaccuracies, with a weighted mean of 3.2, emphasizing the need for data accuracy improvements. Overall, the findings strongly suggest that a shift from manual to online processes would enhance efficiency, accuracy, and communication, ultimately benefiting both students and teachers.

Summary, Conclusion and Recommendations

Summary

This research aims to aid the gap of the current system, it promotes convenience, and saves time and effort of the stakeholders especially teachers. To achieve the goal, researchers design a simple yet very helpful tool to manage and deescalate the inconveniences that every user is mentioning. Summary: Researchers design a platform that will allow stakeholders to input, store and share information needed while maintaining convenience and smoothness of activity. To ensure a user-friendly experience, researchers design a database and accessibility in hierarchy form, ensuring the security of the data's per category, researchers create restrictions via putting users' distinction, per user, there will be a specific access and action that they may do. It is evident that the development of online based transaction will surely aid the said inconvenience, developers make it as user friendly as possible for users satisfaction, upon learning the preference of stakeholders, developers mold and design this project, wherein it can manage transaction and can notify them ahead of time, teachers and (DSWD) Department and Social Welfare and Development don't need to settle for delayed transactions any longer, also this promotes security in terms of document handling to avoid some breaches and inconvenience along the way Developers were looking forward for further improvement upon deployment, but one thing for sure that the system is user friendly and can aid the basic needs on the stakeholders in managing transactions. The project was built with a database that allows every stakeholder to connect and fetch remotely, this promotes smoother communication and aims to use data analytics for more accurate and reliable set of data.

Conclusion

Based on the results of the surveys conducted for both beneficiaries and teachers, it is clear that the current manual systems employed in the 4Ps program and DSWD operations present significant challenges for all stakeholders involved. Both groups expressed dissatisfaction with the existing processes, citing issues such as delays in notifications, loss of documents, repeated visits to banks, and difficulty in managing and submitting required information. These issues have led to inefficiencies, wasted time, and increased workloads, ultimately affecting the overall effectiveness of the program. The survey results indicate a strong preference for transitioning to an online system. Beneficiaries and teachers alike believe that digital solutions could improve accessibility, reduce errors, and streamline operations. Specifically, they see online platforms as a way to save time, reduce the potential for inaccuracies, and enhance communication between departments. Both groups also agree that moving from manual to digital processes would make their work more manageable and efficient, as it would help eliminate unnecessary steps and provide easier access to necessary information. In conclusion, the need for a digital transformation in the 4Ps program and DSWD operations is evident. The transition to an online system would not only address the current challenges of data accuracy, communication, and system performance, but it would also create a more efficient and user-friendly environment for all stakeholders involved. The results underscore the importance of adopting innovative technologies to improve the overall functioning of the program, reduce administrative burdens, and ultimately enhance the experience for beneficiaries, teachers, and other involved parties.

Recommendations

Upon learning and finding out results out of the survey, researchers, acknowledging the limitations of the platform, found out as well the things that are needed to be improved or to develop in the future:

- Transition to an Online System: Move from manual processes to a digital platform to streamline operations, reduce workload, and improve efficiency for both teachers and stakeholders.
- Improve System User-Friendliness: Ensure that the new online system is userfriendly, intuitive, and accessible to make it easier for teachers to manage updates, student performance submissions, and other administrative tasks.

- Enhance Data Accuracy: Implement features in the online system that automatically check for data inconsistencies to minimize errors and ensure the accuracy of records and notifications.
- Communication Gaps: Improve communication channels within the system to ensure timely notifications and updates to teachers, reducing delays and providing clarity on important information.
- Reduce Paperwork: Eliminate the reliance on manual paperwork by digitizing submissions and making the system more efficient for handling student records and other documentation.
- Provide Training for Teachers: Offer training sessions to familiarize teachers with the new online system, ensuring they are well-equipped to navigate and utilize it effectively.
- Implement a Feedback Mechanism: Introduce a system for continuous feedback from teachers to identify potential issues early and make necessary improvements to the online system.
- Monitor and Evaluate the Transition: Regularly assess the effectiveness of the online system after its implementation to ensure it meets the needs of teachers and improves workflow efficiency.
- Notification: Create a notification medium or system to notify and keep the stakeholders up to date announcements.

References

1. Pantawid DSWD. Behavioral and social outcomes study. 2018. https://pantawid.dswd.gov.ph/wp-content/uploads/2018/08/Behavioral-and-Social-Outcomes-Study_Full-Report.pdf.
2. Philippine Institute for Development Studies. Educational challenges in the Philippines. 2023. https://brokenchalk.org/educational-challenges-in-the-philippines/
3. Ramirez Jr JR, Purog RA. Exploring the gap between real and ideal poverty graduation: A case of graduated 4Ps household beneficiary. 2023. https://ijsshr.in/v6i7/Doc/70.pdf.
4. Balacuit, Castor. Contributing Factors in Basic Education through 4Ps (Pantawid Pamilyang Pilipino Program) Implementation. International Journal of Humanities and Social Science. 2018. 10: 79-86.
5. Pamilyang_Pilipino_Program_Implementation.
6. Melad KA, Araos NV, Orbeta AC. Giving cash to the poor: A study of Pantawid Pamilya cash grants generosity, frequency, and modality. PIDS Discussion Paper Series; 2020.
7. Owan Valentine, Bassey. Data Management Practices in Educational Research. 2019. https://www.researchgate.net/publication/337648720_Data_ Management_Practices_in_Educational_Research
8. Department of Social Welfare and Development. Administrative Order No. 2019-022: Guidelines on the Pantawid Pamilyang Pilipino Program. 2019. https://www.dswd.gov.ph/issuances/AOs/AO_2019-022.pdf
9. Hymel Nina. The power of data: How data-driven solutions benefit K-12 schools. 2023. https://factsmgt.com/blog/the-power-of-data-how-data-driven-solutions-benefit-k-12-schools/
10. Zhou X, Xu Z, Kogut A. Research data management needs assessment for social sciences graduate students: A mixed methods study. Plos one. 2023.18: e0282152.
11. Learning Portal. Using data to improve the quality of education. International Institute for Educational Planning. 2023. https://learningportal.iiep.unesco.org/en/issue-briefs/monitor-learning/using-data-to-improve-the-quality-of-education
12. Moldstud. Ensuring data accuracy in university admissions: Data architects' responsibility. 2024. https://moldstud.com/articles/p-ensuring-data-accuracy-in-university-admissions-data-architects-responsibility
13. Philippine Institute for Development Studies. PIDS study provides recommendations for a more effective, responsive 4Ps payment system. 2021. https://www.pids.gov.ph/details/pids-study-provides-recommendations-for-a-more-effective-responsive-4ps-payment-system
14. Philippine Institute for Development Studies. PIDS welcomes findings, recommendations of PIDS on 4Ps. 2021. https://www.dswd.gov.ph/dswd-welcomes-findings-recommendations-of-pids-on-4ps/
15. Uniques Data. How can data management benefit education sector? 2023. https://www.linkedin.com/pulse/how-can-data-management-benefit-education-sector-uniquesdata FACTS Management. How to improve your school's data efficiency. 2023. https://factsmgt.com/blog/how-to-improve-your-schools-data-efficiency/
16. LinkedIn. (n.d.). How can technology improve student data accuracy? https://www.linkedin.com/advice/0/how-can-technology-improve-student-data-accuracy-marfe
17. Fu P, Blackson M, Valentino M. Developing research data managementservices in a regional comprehensive university: The case of Central Washington University. 2021. https://digitalcommons.cwu.edu/cgi/viewcontent.cgi?article= 1139&context=libraryfac.

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