TECHNOLOGY CONSULTING
IN THE GLOBAL COMMUNITY

Final Consulting Report
Friends Eye Center

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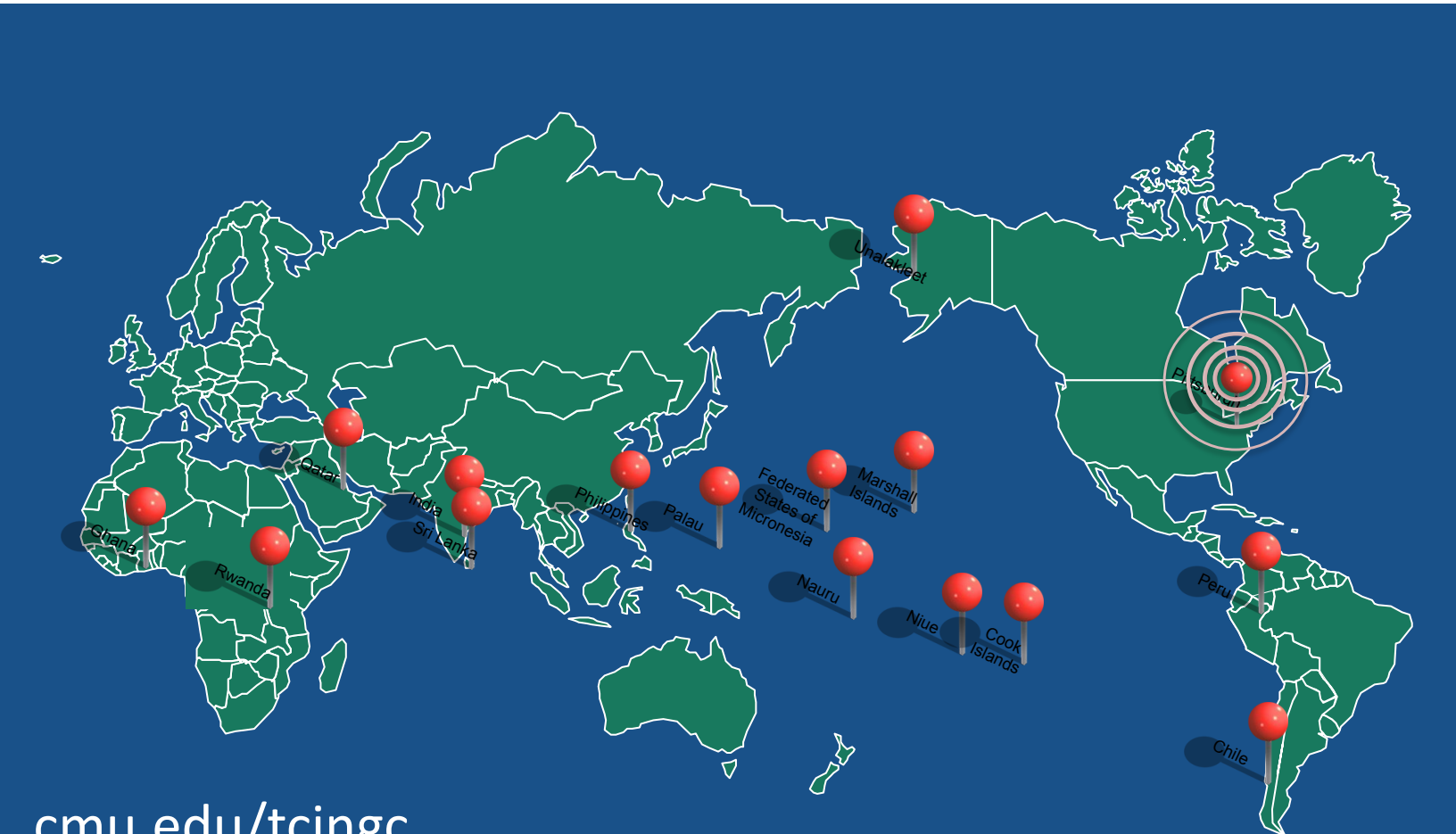
Carnegie Mellon University



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Friends Eye Center
Executive Summary

Student Consultants, Massa Coulibaly & Kekeli Tsoekewo
Community Partner, Dr. Seth Wanye

I. About the Organization

Friends Eye Center (FEC) is a dedicated clinical space located in Nkoranza, Kumasi, Ghana, with an additional branch in Tamale, situated in the northern part of Ghana. The organization is deeply committed to providing exceptional eye care services to the community, offering a comprehensive range of eye care services and products.

FEC's mission is to deliver quality eye care with courtesy, concern, and compassion for each patient. The clinic sets out to achieve various primary goals, including providing excellent eye care, performing surgical operations, offering consultation services, and delivering personalized care with a focus on courtesy and compassion. Additionally, the center is dedicated to improving overall eye care within the community through outreach programs and community screenings, particularly in deprived areas of the country, especially in the northern regions of Ghana.

The clinic's team of eight dedicated clinical workers, led by Dr. Wanye, an experienced ophthalmologist and the founder of FEC, is the driving force behind the organization's commitment to exceptional patient care. The team comprises Mrs. Wanye, the finance manager, two optometrists, one optician, one nurse at the Dispensary, one personnel at the Diagnostic center, and a visiting auditor for financial reconciliation.

Despite the clinic's unwavering dedication to providing quality eye care, FEC faces challenges with their current technology infrastructure. The MS Access-based software used for their management system has numerous bugs and requires frequent maintenance service, which is not readily available from the software provider. This severely impacts the clinic's operations and its ability to deliver seamless eye care services to patients. As a result, FEC sometimes resorts to using physical folders for medical records, which can lead to inefficiencies in patient care.

Acknowledging the importance of technology in enhancing their services, FEC recognizes the need for a bug-free and reliable software solution that operates both online and offline. By adopting a robust software system, FEC aims to streamline their operations, improve data management, and ensure

efficient patient care. Additionally, establishing a strong online presence will enable FEC to expand outreach efforts and explore potential partnerships with international organizations to support their outreach programs in underserved areas, particularly in the northern regions of Ghana.

While FEC currently relies on face-to-face and phone communication for internal information sharing among staff members, the organization also acknowledges the significance of incorporating an internal email system for better communication efficiency within the team.

Furthermore, FEC understands the importance of transitioning fully to digital records for all patient data to ensure data integrity, accessibility, and security. By implementing a more comprehensive information management system, FEC can optimize patient care and enhance overall organizational efficiency.

II. Provide a HIMS

FEC's current Ms Access system has become a source of strain on its clinical operations due to frequent crashes, bugs, and an unreliable maintenance service from the software provider. Consequently, the relationship with the provider and Dr. Seth Wanye is deteriorating. To address these challenges, we consultants will implement an HIMS system that offers offline functionality, increased stability with fewer bugs and crashes, and robust patient data management and security practices. The new system will also have an online community for support and training for IT personnel, enabling FEC to handle software issues efficiently without disrupting clinical operations for extended periods.

III. Provide a New Website

Establishing a website is crucial for FEC to overcome its lack of online presence and gain recognition from potential partners. The website will provide detailed information about FEC's healthcare initiatives, success stories, and transparent donation utilization. Implementing search engine optimization will attract more supporters and donors. Moreover, the platform will enable patients to book appointments, reducing barriers to healthcare access. This online presence will strengthen FEC's financial sustainability, enhance its impact, and improve healthcare access for those in need.

Consulting Partner
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About the Consultant
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Friends Eye Center
Final Consulting Report

Student Consultants, Massa & Kekeli.
Community Partner, Dr. Seth Wanye

I. About the Organization

Organization

Friends Eye Center in Nkoranza, Kumasi, Ghana, is dedicated to providing excellent modern eye care services with courtesy, concern, and compassion to the community. Under the leadership of Dr. Wanye, an experienced ophthalmologist, their team of eight clinical workers conducts daily operations and monthly surgical days to ensure each patient receives the highest standard of treatment. They also conduct outreach programs to improve overall eye care within deprived communities in Ghana.

Despite their commitment, the center faces technology-related challenges, including frequent power outages disrupting computer usage, and bugs and errors in their current Ms Access software. To address these issues, the student consultants implemented a Health Information Management System (HIMS) that offers offline functionality, increased stability with fewer bugs and crashes, and robust patient data management and security practices. The new system includes an online community for support and training for IT personnel, enabling FEC to handle software issues efficiently without disrupting clinical operations for extended periods. A newly established website amplifies their online presence, attracting donors and patients alike.

Friends Eye Center has a clinic branch in Tamale with a similar operational framework using folders and papers to record patients' medical encounters. To overcome this and other challenges, implementing a comprehensive HIMS with offline capabilities, supported by an online community for IT training, assures smooth operations and improved patient care at both branches.

Facilities

Friends Eye Center's facilities in both Kumasi and Tamale are equipped with computers in various areas, including the reception, dispensary, optometrist office, visual field room, and optician space. The facilities ensure efficient operations and patient management. To enhance physical security, the centers have guard dogs and a security guard.

Power outages in the region can disrupt the operation of computers, particularly the reception computer that serves as the server system. While a power supply is in place to provide backup power during such outages, these disruptions cause inconvenience to patients and impact service delivery. Despite these challenges, the facilities maintain sufficient lighting and well-maintained furniture, creating a conducive environment for patients.

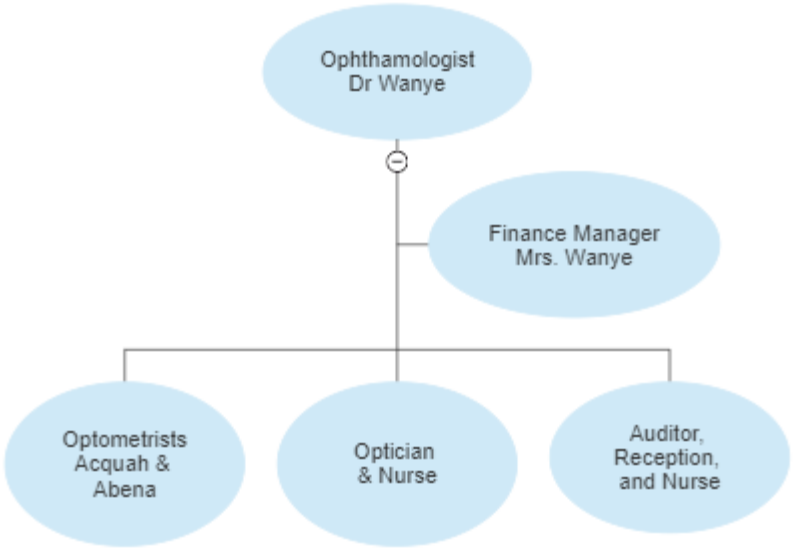
Programs

The facility offers a comprehensive range of programs, activities, and services, including surgical operations, consultation services, diagnostic procedures, and outreach programs. FEC has a product line that includes essential items like eye drops, corrective glasses frames, and glass lenses. FEC organizes monthly outreach programs to provide surgical operations for patients in underserved communities. These programs are a vital part of the organization's mission to provide quality eye care to everyone.

Staff

FEC Kumasi's staff of professionals are committed to providing quality eye care to the community. The staff includes:

- Dr. Wanye, an ophthalmologist and the founder of Friends Eye Center. Dr. Wanye is responsible for performing ophthalmological procedures and determining monthly surgical days.
- Mrs. Wanye, the finance manager. Mrs. Wanye is responsible for managing the organization's finances and accounting processes.
- Two optometrists. Optometrists Acquah and Amponsah provide consultation services and assist with surgical operations.
- One optician. Optician Kenneth offers expertise on corrective lenses, glasses, and frames.
- One nurse. Diana Pomaa is responsible for administering drugs and managing key release at the Dispensary.
- One Laboratory technician. Akwasi Adusei works at the Diagnostic center, carrying out diagnostic procedures.
- One visiting auditor. The visiting auditor conducts periodic audits to reconcile the books of accounts.
- One receptionist. Mr. Boniface, receptionist, handles client registration, payment processing, and receipt issuance.



Similarly, FEC Tamale's staff includes:

- Dr. Wanye, an ophthalmologist, providing consultation services and assisting with surgical operations.
- Senior Ophthalmic Nurse, Fusheini Kwadjah, who also provides consultation services and assists with surgical operations.
- Two optometrists: Dr. Sharrif and Emmanuel, provide consultation services and assist with surgical operations.
- Optician, Raman, offering corrective lenses and frames.
- Nurse Hamdia, responsible for running clinical diagnostics, dispensing drugs, issuing receipts, and registering patients.

Technology Infrastructure

At Kumasi the technology infrastructure consists of five Windows desktop computers and one laptop all used mainly for patient consulting purposes. They have one regular printer, two large printers, and a router to establish a network connection.

Device	Operating System	Purpose	Location
Desktop Computer 1	Windows 10	Patient consulting	Reception
Desktop Computer 2	Windows 10	Patient consulting	Optician Room
Desktop Computer 3	Windows 10	Patient consulting	Visuals Room
Laptop	Windows 10	Patient consulting	Optometrist Office
Router	Windows 10	Network connection	Vitals Room
Printer	Windows 10	Printing	Reception
Printer	Windows 10	Printing	Visuals Room

The organization primarily relies on Microsoft (MS) products and used MS Access-based software to store the database for its health information management system which was implemented two years ago by one of its staff members. The system was maintained by the person who originally created it for a yearly fee. This proved problematic since the person was not always free to provide maintenance. This system proved to be more efficient than traditional paper-based methods, however, the organization faced challenges related to its technology infrastructure. Internet connectivity issues hampered their operational efficiency, particularly in the absence of an administrator with access to the database backend. Furthermore, the organization's server was based on the reception desktop where the database is stored, so any malfunctioning of the desktop caused a complete system collapse. This paralyzed the hospital because it cannot function without the system. This risked data loss since the database was stored locally. There was also a problem with poor user experience. Redundant options and windows in the software made it confusing for users. For instance, the dropdown list for a lot of fields did not give the opportunity to add ophthalmology related information when needed. This prevented the doctors from entering an accurate diagnosis into the database.

Technology Management

At the FEC, technology management is a collective responsibility shared among all members. While decisions regarding technology are made collectively, the budget allocated to technology is handled by Dr. Wayne. The organization does not have a dedicated tech team, and the optometrist and optician are responsible for managing the technology infrastructure despite having no IT background. Their knowledge in this area comes from training with the company's software and self-teaching.
When it comes to problem-solving, the optometrist and optician handle troubleshooting within their capabilities. For hardware problems or software issues unrelated to the FEC HIMS software, they rely on an external provider for maintenance and support. The FEC HIMS software itself was maintained by the creator, an external provider who charges either per fix or on an annual basis for his services (1500 cedis ~$45).
Tasks such as critical data backup, software installation and updates, and virus definition updates are handled in an ad-hoc manner. Since there is no dedicated IT support team, these tasks are likely performed by the optometrist and optician as needed, utilizing their knowledge gained from training and self-study. There is no specific plan or schedule in place for these operational tasks, which may result in occasional delays or oversights.
In situations where issues exceed their capabilities, the optometrist and optician may escalate problems to external support.

Technology Planning

At the organization, a formal technology planning process has not been established, and decisions related to technology are made collectively by all members of Friend Eye Center(FEC). There is no dedicated technology planning committee or individual responsible for planning and budgeting for their technology infrastructure. The planning process is driven by the organization's needs, with members reacting to technology requirements as they arise.
Given the organization relies on ad hoc technology planning processes, this protocol suggests that they may face various challenges across information management, communications, and overall organizational management. It is possible that other organizations in their industry have adopted technology in diverse ways that FEC has not yet explored or implemented.

Communication

Friends Eye Center relies on face-to-face and phone communication for internal information sharing among staff members. There is no internal email system, but external communication is conducted through the organization's email. Dr. Wanye manages email correspondence within the organization. However, not all staff members have an organization email account, and there is no website for the center. General network challenges and delays in contacting absent personnel can slow down communication. Overall, communication at FEC is primarily direct and immediate with direct phone calls and Whatsapp texting and with a centralized approach to email management but limited online presence.

Information Management

FEC Kumasi managed patient and team information through their FEC HIMS, a Microsoft Access-based system that served as a central repository for critical patient data and appointments. However, the organization still possesses hard copies of patient information, indicating a mixed

approach to information management. To ensure data integrity and security, FEC Kumasi consolidated patient information with a plan to transition paper records into the digital system over time. FEC Tamale lacked a dedicated software system and relied on a paper-based approach for medical records and patient encounters despite having computers and a networking infrastructure. Implementing HIMS in Tamale streamlined information management and improved overall operational efficiency.

Business Systems

At Friends Eye Center, Mrs. Wanye manages the organization's finances, overseeing daily book closings and accounting for cash inflows. Cash earnings are deposited into the center's bank account under her responsibility. However, there is limited information on how financing from donors is handled within the current system. Major financial decisions involve both Dr. Wanye and Mrs. Wanye. Unfortunately, the center does not use a payroll system and manages payments through daily check-ins and face-to-face transactions with suppliers. It is concerning to note that some FEC staff members engaged in unscrupulous behaviors, such as deleting drug prescriptions from day sales and reducing account balances. The new system aims to prevent staff from removing traces of a transaction and close all financial loopholes, ensuring enhanced financial transparency and accountability at Friends Eye Center.

II. Provide an Open Source HIMS (OpenEMR)

Motivation

The technology-related challenges faced by Friends Eye Center in Kumasi and Tamale, Ghana, included frequent power outages disrupting computer usage(As the old system was heavily dependent on internet) and encountering bugs and errors in their current Ms Access software, which had a poor user interface (UI). Additionally, the system was hard to maintain, leading to the team always contacting the developer of the software even to add a new drug in the system or a new service. These issues hindered the center's operational efficiency and affected their ability to provide seamless eye care services to the community.

Consequently, the mission of Friends Eye Center, dedicated to providing excellent modern eye care services with compassion, was impacted due to compromised patient care quality and continuity. Unreliable technology and software disruptions disrupted clinical operations, leading to potential delays in patient treatment and communication. The center's outreach programs were also affected, limiting their ability to improve eye care within deprived communities in Ghana.
To address these challenges, the student consultants implemented a Health Information Management System (HIMS) that offered offline functionality, increased stability with fewer bugs and crashes, and robust patient data management and security practices. Additionally, the system included an online community for support and training, enabling efficient handling of software issues without disrupting clinical operations for extended periods.

Outcomes

The process for installing and implementing OpenEMR included the following activities:
1. Conducted a comprehensive assessment of the center's technology challenges and system requirements.

2. Explored various HIMS options and selected OpenEMR based on its reliability, stability, and robust features.
3. Installed and configured OpenEMR to meet the specific needs of Friends Eye Center. This also included setting up the networking between departmental desktops in the clinic.
4. Migrated patient data from the existing Ms Access software to the new HIMS system.
5. Trained clinical workers and IT personnel on using and managing OpenEMR effectively.
6. Established an online community for continuous support and training.

Outcome	Measurement	Baseline Measurement	Result
Reduced patient waiting time by 50% through a streamlined system The outcome aimed to decrease the waiting time for patients by implementing a more efficient and streamlined system. This will be measured by conducting a patient survey, asking them directly if they perceive a reduction in waiting time.	Patient survey: "Is the waiting time reduced?"	N/A (Baseline data not available) 20-30 minutes for check-in	The patient waiting time reduced to 6min on average. This is based on an observation during 3 days at the clinic
Reduced system crashes to a maximum of once every 3 months The goal was to minimize system crashes to ensure smoother operations. The measurement for this outcome was based on the number of crashes reported by staff members over a period of three months. The baseline	Number of crashes reported by staff members every 3 months	N/A (Baseline data not available)	No crashes reported since implementation

data regarding system crashes is currently unavailable, as no previous data has been recorded.			
Increased staff members' rating of system experience to 80/100 The objective is to enhance staff members' satisfaction with the system by significantly improving their rating. The measurement for this outcome will be based on the staff members' rating of their experience with the system. The current baseline measurement indicates that the staff members rate their experience at a low 30/100, highlighting the need for improvement.	Staff rating of system experience (based on initial assessment questions and comparing to early interviews)	Current rating: 30/100 subjective	The staff members rated the system to be 90/100

Sustainability and Feasibility

One notable advantage of OpenEMR was the availability of documentation and comments within its codebase. Unlike other solutions that lacked such detailed information, the presence of documentation significantly eased the implementation process. It eliminated the need for a time-consuming and resource-intensive effort of writing code from scratch, thereby saving valuable time and allowing the FEC team to focus on other critical tasks within the remaining 7-week timeline.

Additionally, OpenEMR offered an enhanced skillset for the student consultants involved in the project. The solution provided a solid foundation and a pre-existing electronic medical record base that expedited the implementation process. This enabled the student consultants to leverage their skills more effectively and allocate ample time towards other aspects of the project, such as search engine

optimization (SEO) and website development, which further enhanced FEC's online presence and visibility.

Considering the long-term feasibility of the OpenEMR solution, FEC faced concerns due to the absence of an established IT team to maintain the system internally. However, a multi-tiered approach was implemented to address this issue. Firstly, the most technically savvy individual (Vadim) at FEC underwent an orientation and received documentation to handle common everyday problems, ensuring a degree of self-sufficiency in system logistics management. Secondly, student interns from nearby universities were engaged to assist in the configuration of new functionality and the addition of reports and analytics. Their presence added an extra layer of support and expertise to the implementation process.

Moreover, the OpenEMR community provided valuable support and resources for FEC. Both the internal "expert" and the student interns benefited from the insights, guidance, and direction offered by the open-source support community. This collective knowledge base helped address any challenges that arose during the implementation and ongoing usage of OpenEMR. Leveraging the community's expertise ensured that FEC tapped into a wealth of experience and best practices.

In scenarios where more complex issues or comprehensive support was required, FEC had the option to contract local or global resources. These contracted experts offered specialized knowledge to fix difficult problems or provide ongoing maintenance and support. Engaging such resources ensured the long-term viability and stability of the OpenEMR system, even after the initial two-month implementation period.

In summary, the combination of a well-documented codebase, the flexibility of the OpenEMR solution, the availability of support from the OpenEMR community, and the involvement of student interns provided a solid foundation for the successful installation of OpenEMR at FEC. This comprehensive approach allowed for the successful configuration, networking, and implementation of OpenEMR. It empowered FEC to streamline their operations, enhance patient care, and ensure a sustainable and efficient healthcare management system.

Recommendations

To sustain progress and continue increasing their capacity, Friends Eye Center should consider the following recommendations:
1. Regular Maintenance and Updates: Establish a maintenance schedule for OpenEMR that includes regular backups, updates, and system checks. By proactively addressing potential issues and keeping the system up to date, the center can minimize the risk of software-related problems and maintain the stability and reliability of the HIMS.

2. Encourage Staff Participation in the Online Community: Motivate and incentivize staff members to actively participate in the OpenEMR online community for continuous support and training. Regular engagement will empower them to stay updated on new features, best practices, and troubleshooting techniques, leading to more efficient utilization of OpenEMR.

III. Provide a WEBSITE

Motivation

The problem addressed by providing a new website to Friends Eye Center (FEC) was the organization's limited online presence and outreach. FEC was facing challenges in attracting a wider audience, including patients, donors, and potential partners. With only 12-15 patients per day, the organization had untapped potential to increase its patient turnover and enhance its impact on the community. Additionally, FEC lacked an effective platform to provide up-to-date information about eye health and common eye conditions, hindering its ability to educate and engage with its target audience.

This problem impacted the mission of the organization as FEC's primary goal is to provide exceptional eye care services to the community. By not effectively reaching and connecting with a broader audience, FEC was missing opportunities to serve more patients in need and garner support from donors and partners who could contribute to its initiatives. Without a comprehensive online presence, FEC was at a disadvantage compared to other eye care centers with stronger digital outreach and awareness.

Outcomes

Our plan for implementing the new website for Friends Eye Center (FEC) using WordPress as a platform-as-a-service (PaaS) involved the following activities:

1. Researched and selected a suitable WordPress theme aligned with FEC's branding and requirements.
2. Gathered all necessary information and content from FEC, including text, images, videos, and media assets.
3. Set up the WordPress platform, including domain registration and hosting configuration.
4. Installed and customized the chosen WordPress theme to match FEC's visual identity and design preferences.
5. Configured essential plugins for SEO optimization, analytics, security, and performance optimization.
6. Created a sitemap and organized the website structure for easy user access.
7. Developed and implemented responsive web design for accessibility across different devices.
8. Built and optimized key webpages, including the home page, services page, about us page, contact page, and more.
9. Integrated social media links and sharing options to enhance online visibility and engagement.
10. Implemented a user-friendly appointment booking system for patients to schedule appointments online.
11. Developed an educational section featuring eye health information, common eye conditions, and patient testimonials.

12. Optimized website performance with image optimization, caching, and content delivery networks (CDNs).
13. Conducted thorough testing and quality assurance to ensure the website functioned properly across different devices.
14. Integrated necessary tracking tools, such as Google Analytics, to monitor website traffic and user behavior.
15. Trained FEC staff on how to update and maintain the website using the WordPress content management system (CMS).
16. Documented all website processes and provided a user guide for future reference.
17. Planned for ongoing website maintenance, including regular updates, security checks, and backups.

Outcome	Measurement	Baseline Measurement	Result
Enhance FEC marketing and have more patients per day from 12-15 to 15-20	Surveying patients, donors, or partners about how they heard FEC Count the number of patients per day.	12-15	NA
Increasing audience conversion rate through better user experience and effective call to action placements. The goal of this outcome is to enhance user interaction with FEC and increase the number of patients turnover, while attracting potential FEC donors and potential partner recognition and collaboration.	(Number of website appointment bookings per number of website traffic) / (Conversion rate before and after website launch)	Number of patients, partners, donors inflow before website launch	We could not measure this as the website launched as we were leaving

Increasing information accessibility and improving outreach and awareness by 20% The objective of this outcome is to use the website as an educational hub providing up-to date information about eye health and common eye conditions, showcasing success stories and testimonials of satisfied patients; thus enabling website visitors to make informed decisions and reducing phone enquiries by 20%	Are there website metrics that can be adopted - number of hits, etc. Once traffic to the website is considered, the baseline can be about assessing patient knowledge of eye conditions.	The baseline in this case would be zero.	NA

Feasibility and Sustainability

The implementation of the new website for FEC using WordPress as a PaaS was highly feasible due to WordPress's cost-effective solutions for website development and maintenance. The user-friendly features allowed FEC's staff, with limited coding knowledge, to easily manage and update the website independently, eliminating the need for external technical support. The focus on SEO strategies ensured a significant enhancement of FEC's online presence and visibility, attracting a wider audience, and increasing awareness of FEC's valuable eye care services.

The sustainability plan for the website revolves around subscribing to WordPress, which provides ongoing support, regular updates, and technical maintenance. FEC's staff can continue to manage and update the website independently, reducing the dependency on external providers and associated costs. By following WordPress's outlined procedures for resolving technical issues and implementing updates, FEC can ensure the website remains relevant and aligned with its evolving needs. The comprehensive user guide and documentation provided will assist FEC's staff in effectively maintaining the website, contributing to its sustainability.

Recommendations

To sustain the progress achieved and further increase FEC's capacity, the following recommendations are offered:

1. Regular Content Updates: FEC should continue to update website content regularly, adding new success stories, testimonials, and eye health information to keep the website engaging and informative. This will enhance audience engagement and encourage return visits.
2. Analyze Website Metrics: Regularly analyzing website metrics will provide valuable insights into audience behavior and marketing effectiveness. FEC should use tools like Google Analytics to identify areas for improvement and track progress toward goals.
3. Engaging with Users: FEC should actively engage with website users through features like contact forms or chat support. Promptly responding to inquiries and feedback will foster trust and improve user satisfaction, potentially leading to more patients and donors.
4. Digital Marketing: Implement targeted digital marketing campaigns, such as social media advertising and email newsletters, to further promote FEC's services and initiatives. This will attract new patients and potential partners and expand FEC's impact.

Implementation Steps:

1. Designate a website content manager within FEC's staff to oversee regular content updates and engagement with users.
2. Schedule regular meetings to review website metrics and use the data to inform marketing strategies and content updates.
3. Implement chat support or a contact form on the website to facilitate communication with website visitors.
4. Develop a digital marketing plan outlining targeted campaigns across various platforms, including social media and email.

Resources:

1. WordPress's comprehensive content management system, which enables easy website updates and maintenance.
2. Google Analytics and other tracking tools for monitoring website traffic and user behavior.
3. Digital marketing platforms for implementing targeted campaigns and measuring their effectiveness.

IV. Additional Recommendations (if any)

Future TCinGC students should learn PHP

It is recommended that future TCinGC (Technoloy Consulting in Global Communities) students learn PHP as a primary language for the configuration of OpenEMR from the backend. This will enable them to perform high-level configuration of the system for future partners, ensuring a seamless and efficient implementation of OpenEMR.

Why Should They Implement This Recommendation?

Implementing this recommendation is crucial for several reasons. Firstly, learning PHP will empower future TCinGC students with the necessary skills to configure and customize OpenEMR effectively.

PHP is the primary language used in OpenEMR's codebase, and having proficiency in PHP will allow students to understand the system's architecture, making it easier to tailor the software to meet specific partner needs.

Secondly, by learning PHP, future students can save time and resources during the implementation process. Instead of relying on external developers or consultants, TCinGC students will be self-sufficient in configuring the system, reducing implementation costs and ensuring greater control over the customization process.

Additionally, with PHP expertise, students can better align the system with the mission and goals of their partner organizations. They can tailor OpenEMR to cater to specific workflows and data management requirements, ultimately enhancing patient care and efficiency in healthcare operations.

Steps to Implement the Recommendation:

1. Curriculum Integration: TCinGC should include PHP training in the curriculum for future students. This training should cover basic to advanced PHP concepts, including its application in web development and specifically within OpenEMR.

2. Hands-on Projects: Encourage students to participate in hands-on projects related to OpenEMR and PHP. Assign tasks that involve configuring and customizing OpenEMR features using PHP code.

3. Collaboration with IT Faculty: Collaborate with IT faculty or instructors experienced in PHP to provide mentorship and guidance to students. Guest lectures or workshops from PHP experts can be organized to enhance students' learning experience.

Resources to Implement the Recommendation:

1. Online PHP Resources: Provide students with access to online tutorials, documentation, and resources that cover PHP fundamentals and advanced topics. Websites like PHP.net and various online learning platforms can be utilized.

2. OpenEMR Community: Encourage students to engage with the OpenEMR community for support, guidance, and insights into PHP coding within the software. The community forums and developer documentation can serve as valuable resources.

3. Code Repositories: Provide access to OpenEMR's code repositories, where students can study existing PHP code and learn from real-world examples.

About the Consultant

Massa is a Senior Information System student at Carnegie Mellon University in Qatar with a concentration in data science.

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Appendix A.
All the documentation files are in the Google drive