Bone & Joint Clinic of San Diego: Hardware Installation Project Post-Implementation

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Abstract

The CEO of Bone & Joint Clinic of San Diego came to a rental agreement with a major hospital campus owned by LBC Healthcare. The clinic is a stand-alone business with its own space in the hospital but has become part of LBC Healthcare’s network and has access to its resources. The clinic space is brand new and had no IT infrastructure in place, which would’ve seriously hindered the performance of the clinic. The CEO wanted to prioritize the implementation of the IT infrastructure above all other tasks to set up the clinic. He hired a Project Manager to develop a solution to this problem and oversee the implementation. Because the hospital’s overall concerns took priority over the implementation of the infrastructure, creating a functional structure and limiting the use of human resources, the project focused on the hardware components while the software deliverables were the focus of a separate, concurrent project that didn’t begin until the hardware project was near completion. The Hardware Installation Project focused on the acquisition and installation of the office workstations, access points, wiring, and switches. Thanks to the deal with LBC Healthcare, the clinic’s data is stored in the hospital’s servers. Since the clinic is new, the cost and schedule were the only “metrics” used to determine the success of the project.

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# Evaluation & Post-Implementation

Bone & Joint Clinic of San Diego needed a high-level IT infrastructure to operate. The clinic was empty and new with no prior infrastructure to build from. The CEO provided the financial resources to acquire the monitors, desktops, switches, etc. The project manager collected detailed information on the necessary components to create the infrastructure and the cost of the components that make up the infrastructure.

After conducting research and cost analysis, the Project Manager sent the information to the clinic owner to accept or deny the proposed budget. The CEO approved the budget and provided the cash to acquire the assets and begin the planning and design process of the infrastructure with the human resources acquired from the hospital’s IT department.

Due to this project focusing on the installation of hardware, the costs and schedule served as the only units of measure for success. Costs could’ve fluctuated due to the price differences of the components as well as damaged or additional components needed. Also, running behind schedule could’ve increased costs as well as a delay of the clinic opening. Both scenarios were avoided during the implementation of the project.

**Quality Assurance**

The success of the clinic after opening, both financially and qualitatively, served as the initial baseline that was compared later to track performance and success. Surveys and questionnaires were passed out to office specialists, physicians, and patients to receive feedback on clinic performance. This alerted the owner to any potential issues that affected its operations. They also helped to keep track of possible upgrades that can increase overall performance.

After the clinic opened, the owner created multiple checklists to keep track of different opportunities for improvement of the clinic. These lists include hardware upgrades, best practices of serving customers, and cost recalibration to lower costs while still driving revenue for the clinic. This information has been gathered over the first 3 months of operation, which has provided the owner with enough information to develop a baseline of consistent expenses with running the clinic. Afterwards, an alternatives analysis was conducted to formally document and compare these recommendations in processes and equipment. While there is room for improvement, the owner believes it’s too soon to make any changes to the clinic. It may incur unnecessary costs too soon, leading the owner to decide to maintain the current infrastructure and only make changes when necessary.

**Formative Evaluation and QA Metrics**

During the installation phase, the project manager developed a flowchart to keep track of the tasks required to complete the project. This was done to see the flow of the deliverables of the Hardware Installation Project into the following Software Installation Project. This allowed both the project manager and the CEO to have an accurate illustration of the tasks that would be completed and brought together to establish the complete IT infrastructure of the clinic.

**Testing Methodology**

Functional testing was utilized to confirm the successful installation and integration of the clinic hardware. Unit testing was conducted on each of the individual components to ensure that they weren’t damaged during the acquisition and installation processes. Outside the scope of the project, integration testing was conducted to ensure that the software components and applications were functional and responsive to create a successful interface to be used by the clinic staff.

**Test Cases**

After the hardware components were installed, the only “testing” necessary was to ensure that all the components functioned properly. This was important since one of the risks to the project was the damage of the components, so the IT resources had to ensure that there were no shorts in the ethernet cords and that the other components were safely positioned to avoid falls, water damaged, and fire hazards. The testing of the infrastructure in its entirety took place after the completion of the Software Installation Project.

**Acceptance Criteria**

To reiterate, the success of the project depended solely on the installation and confirmed functionality of the hardware components. After the components were installed and confirmed to not have any damage and function perfectly, the CEO signed off on the hardware deliverables and allowed the project to be closed. This marked the success of the installation project.

# Project Review

The project had an extended timeline to make up for the limited resources and to provide more than enough time for corrections, if necessary, before the clinic was scheduled to open. 18 weeks was the allotted amount of time to complete the project. Due to this open schedule in the simplicity of the project, there was no overlap of installation tasks.

Planning and design of the infrastructure took eight weeks to complete. The project followed a functional structure, so the project did not remain the top priority of the required resources. This was taken into consideration while developing the schedule, leading to a completion date of October 27th, 2021.

Installation of the infrastructure was scheduled for eight weeks for the same time concerns, leading to a completion date of December 22nd, 2021. Also, it was necessary to provide enough time to cover the possible replacement or additional purchases of equipment. This ended the installation of the equipment. The final step was to document the project after its confirmed success. This step was completed by January 5th, 2022, as scheduled; allowing the clinic to open on time.

**Assumptions**

This project's assumptions included the following: the equipment would be paid for by the CEO, the installation would be handled by the in-house resources, and equipment ordered online would arrive on time. In addition, additional financial resources for additional hardware components or replacements to the hardware would be provided by the clinic owner. These assumptions posed no problems to the project, so there was no extra effort exerted or cost incurred.

**Project Phases**

The first phase of the project was the planning phase. The clinic owner and project manager planned the project and decided what equipment was necessary for the clinic to be functional. The project manager conducted the research for the necessary components, analyzed the costs, and forwarded their analysis to the CEO who made the final decision with the required components hence the budget. After this step, the resources provided by the hospital assisted in the design phase of the project. Both respective phases were completed by October 27th, 2021, as scheduled.

These resources assisted with drawing out the best layout that satisfied the owner's needs while also creating an efficient design for the clinic. The installation ensued upon approval from the CEO. The installation process was complete by December 22nd, 2021, as scheduled.

Once the design was approved, the team resources installed the required hardware. Enough time was calculated into the plan to make up for the limited manpower. After confirming the functionality of the hardware, configuration and testing took place in a separate project. Along with approval from the CEO, this marked the end of the hardware installation project by January 5th, 2022.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | September | October | November | December | January |
| Planning  (Sept. 1 – Oct. 27, 2021) | Plan with CEO and determine resources needed. Securing funding | |  |  |  |
| Design & Acquisition  (Sept. 1 – Oct. 27, 2021) | Have team resources assist with the design of infrastructure and acquire hardware resources | |  |  |  |
| Implementation  (Oct. 27 – Dec. 22,2021) |  |  | Team resources will install hardware components. The software project will begin near completion with approval from the CEO. | |  |
| Documentation  (Dec. 22 – Jan. 5,2022) |  |  |  |  | CEO will approve hardware installation. Document and close project. |

*Table 1A*

## Timeline Deviations

The project timeline did not deviate at all during its implementation. Despite the limit placed on the team resources, they were able to plan out how much time they’d dedicate to the process on a weekly basis and stayed consistent with the infrastructure’s installation. The project followed the planned timeline to a T as a result.

## Project Dependencies

Though small, there were still dependencies for this project. First, installation of the infrastructure couldn’t begin until the materials are confirmed and acquired. Second, though a separate project entirely, the software installation and configuration project couldn’t begin until this project was complete to bring the clinic to full functionality. Lastly, documentation that the hardware was fully functional couldn’t happen until installation was complete and approved by the CEO.

## Resource Requirements

The internal IT personnel provided by the hospital took charge of the design and installation of the project. To prevent delays in the hospital’s operations, the project manager acquired two human resources to execute the installation of the hardware. This provided no problem since the project was small and more than enough time was provided for the resources to contribute to the project while still carrying out their regular daily tasks.

These same resources assisted with the installation of the necessary OS and applications that provided communication and functionality to the clinic. However, this acted like a separate project that didn’t run concurrently with the hardware installation project until it was nearly complete. This was due to the limited resources; allocating them to two separate projects from the beginning would’ve slowed down the schedule unnecessarily.

## Implementation Project Milestones

There were a few milestones for this project. First was the acquisition of the hardware resources. This was important since the CEO wanted the best, yet most cost-effective materials for this clinic, so a good amount of research was conducted before acquisition. From the start day of the project, which was September 1st, 2021, this milestone is expected to be reached no later than the end of the planning and design phase which is October 27th, 2021.

Next was the installation of the infrastructure or hardware. This allowed the configuration project to begin running concurrently towards the end of this project. Picking up from October 27th, 2021, this milestone was expected to be reached no later than December 22nd, 2021.

Lastly, the documentation was the final milestone. It marked the completion of the project. This milestone serves as a reference point for the IT department and the CEO in the future when potential issues arise. Picking up from December 22nd, 2021, this final milestone was expected to be reached no later than the project completion date of January 5th, 2022.

## Project Deliverables

The main deliverables of this project were all hardware. The ultimate deliverable was the complete installation of the hardware infrastructure. The software deliverable was the result of the configuration of the clinic OS project which ran as a concurrent project. This was where the testing process and approval of the CEO of the entire infrastructure took place.

## Documentation Deliverables

First, the project produced a project schedule. Naturally, the schedule was used to keep track of the overall progress of the project to ensure that everything was completed and implemented by the project closed dates up until September 5th, 2022. It was also used to track the individual milestones that were completed by the end of their respective phases. Next, was the project plan which highlighted all the key points that made up the project. This included the acquired assets, the hardware components necessary to complete the infrastructure, as well as the strategy of implementation. All these details and more were covered in the project plan for reference for the project manager as well as the clinic owner.

The Risk Register also served as a deliverable of the project. This helped evaluate the individual risks that came with attempting this project, their level of severity, and the contingency plans that were in place to either avoid these risks or to mitigate them to the best of our ability. Lastly was the project timeline which illustrated each task of the project, how long they took, and the final date of completion for the project overall. These all served as documentation deliverables of the hardware installation project.

Formative Evaluation Results and Revisions

As mentioned previously, the project manager developed a flowchart to keep track of the tasks required to complete the project. This was done to see the flow of the deliverables of the Hardware Installation Project into the following Software Installation Project. This allowed both the project manager and the CEO to have an accurate illustration of the tasks that would be completed and brought together to establish the complete IT infrastructure of the clinic. It also helped us make sure that that the project was progressing in accordance with the timeline.

Since the project did not deviate from the timeline, there were no revisions made to the timeline. There were also no revisions to the budget to replace damaged or stolen materials. The mitigation strategies that were in place to ensure the protection of the hardware worked flawlessly; ensuring that nobody could’ve infiltrated the clinic after-hours and tamper with the materials.

**Summative Evaluation Plan and Results**

The project manager also utilized data gathering, created a checklist to keep track of the installation process of the project. Just like the specific reports, the project manager would send an updated checklist and progress report to the owner to show how well the project was progressing in accordance with the established timeline. If the installation of the hardware components progressed timely, the clinic owner knew that the project would be successful.

# Stakeholder Communication Plan and Reports

The project manager was responsible for developing and disseminating the specific project reports. The only stakeholder to receive these reports was the clinic owner. When possible, the owner would stop by the clinic to personally check on the progress of its implementation. However, the project manager would normally send this information to the owner via email. This was a more convenient and free method of communication that allowed both parties to be flexible with when and how they’d communicate.

# Ongoing Support and Maintenance

The clinic owner has decided that repair and replacement/upgrade of the clinic hardware will be a long-term endeavor instead of short-term. As of April 5, 2022, only 3 months of operations under the belt, it’s too soon to decide to incur additional costs to acquire additional or higher-grade resources to optimize the clinic’s performance. In terms of OS/application maintenance, the IT department is a free resource that will be utilized to send out OS updates, assistance with glitchy applications, as well as assistance with hardware issues. The CEO will decide if an upgrade to the clinic is necessary after the one-year anniversary on January 5th, 2023.

**Resources for Post-Implementation Support**

The IT department is a free resource that will be utilized to send out OS updates, assistance with glitchy applications, as well as assistance with hardware issues. While it’s not the IT department’s responsibility to help with the acquisition or replacement of the physical assets of the clinic, it is their responsibility to assist with any hardware issues that hinder the clinic’s operations. Therefore, they’ll be the main resource to be utilized when assistance is required pertaining to the clinic’s IT infrastructure.

**Short- and Long-Term Maintenance Plan**

For the short-term, the clinic owner has decided it’s too soon to incur additional costs to acquire additional or higher-grade resources to optimize the clinic’s performance. The clinic has only been operating for 3 months with mostly positive reviews from the patients and employees. While there have been some mentions of small issues pertaining to the hardware, most of the concerns that have been mentioned pertain to the practices of the clinic specialists and physicians. This is the more immediate concern that will be the focus of the clinic owner.

For the long-term, the CEO will decide if an upgrade to the clinic is necessary after the one-year anniversary on January 5th, 2023. This gives the clinic enough time to become established and develop a baseline that can be evaluated in the future to help the CEO determine what direction they should go to increase performance. Also, there will be enough cash flow for the clinic owner to measure their performance over a long period of time and determine what can be improved from a monetary standpoint.

# Post-Implementation Project Summary

To summarize the project, the clinic owner secured a space in a hospital to open their own orthopedic clinic: Bone & Joint Clinic of San Diego. The clinic required an IT infrastructure to ensure operation since the clinic was new and had no infrastructure to build up from. The clinic owner enlists a project manager to plan, oversee installation, and document the project while keeping the owner up to date on the progress of the project. A couple of assets from the hospital’s IT department were acquired to assist with the design and implementation of the acquired material resources. Upon completion of this project, the CEO signed off on it and allowed the project manager to formally close the project; allowing the IT resources to move forward to the Software Installation Project.

**Documentation Deliverables**

To reiterate, the project produced a project schedule that was used to keep track of the overall progress of the project to ensure that everything was completed and implemented by the project closed dates up until September 5th, 2022. It was also used to track the individual milestones that were completed by the end of their respective phases. Next, was the project plan which highlighted all the key points that made up the project. This included the acquired assets, the hardware components necessary to complete the infrastructure, as well as the strategy of implementation. All these details and more were covered in the project plan for reference for the project manager as well as the clinic owner.

The Risk Register also served as a deliverable of the project. This helped evaluate the individual risks that came with attempting this project, their level of severity, and the contingency plans that were in place to either avoid these risks or to mitigate them to the best of our ability. Lastly was the project timeline which illustrated each task of the project, how long they took, and the final date of completion for the project overall. These all served as documentation deliverables of the hardware installation project. The checklist that was created by the project manager also serves as an artifact of the project. It was used to show the CEO which specific tasks were completed in relation to the timeline. This allowed the CEO to see and determine whether the project was progressing behind, ahead, or right on schedule.

**Success Criteria for Each Project Outcome**

To reiterate, the success of the project depended solely on the installation and confirmed functionality of the hardware components. This was the only hardware deliverable of the project. If the individual components, and the entire physical infrastructure at large, operated properly as individual components as well as an entire infrastructure where the components interacted properly, then the project was successful.

**Justification of Proposed versus Actual Project Outcomes**

There were no deviations from the proposed project outcome and the actual outcome. The installation of the clinic hardware was half of a larger obligation that was necessary for the clinic to run properly and efficiently. Therefore, there was no other result that could be produced from the project. If there would’ve been issues with the installation, then the clinic wouldn’t have been able to successfully launch at all, or at least would’ve been delayed. Either way, the desired result of the project was absolute.

**Lessons Learned**

While the project was a success, there were a couple lessons learned from this experience. First, be open to contracting people to accomplish the project. While using the IT department personnel was a free option, we had to accommodate for their daily schedule to the point the project took an excessive amount of time. If both halves of the IT infrastructure were completed sooner, the clinic could’ve opened much sooner. Second, contact other people to see if they can provide resources for free or a lower cost. All the hardware components were purchased from major retailers. There was never a thought of reaching out to personal and professional contacts to see if they could assist with procuring these resources in bulk at a discounted price. A tactic like this is usually a saving grace when developing a budget.

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