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Requirements to Improve the Technical Support at Umm Al-Qura University (2019) (Concept Proposal)

Eng. Reem Metlea Mohamed Alqahtani*, Eng. Reham Zahir Omar Almarghlani
Faculty of Computer Science and Engineering | Jeddah University |KSA

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* Corresponding author: toot2014tootalq@outlook.com

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Abstract: This paper aims to examine the requirements for improving technical support services at Umm Al-Qura University in 2019, focusing on all stakeholders who benefit from these services, including (faculty members, students, and administrative staff) and the technical support team. To gather insights on the challenges faced by these stakeholders, the study employed two methods: direct interviews with experts and electronic surveys.

The findings revealed several issues, including difficulties in communication between beneficiaries and technical support, a lack of documentation regarding the support team's activities, and an inability to assess beneficiary satisfaction with the provided services.

In response to these challenges, the proposed concept is the development of a mobile application designed to facilitate requests for technical support, thereby enhancing communication among all stakeholders and the technical support team. This application will provide numerous benefits, such as documenting the workflow of the support team, which will allow for the analysis of performance, productivity, and verification of user satisfaction. Additionally, the application aims to streamline the educational process and create a learning environment equipped with effective technological solutions, backed by a dedicated technical support team, The researcher recommends Implementing a user-friendly smartphone application for requesting technical support, Organizing specialized training sessions on how to use the application for technical support services and Providing internet access across the university to facilitate technical support requests when needed.

Keywords: Technical Support - Technical Assistance - Improvement – Implementation.

متطلبات تحسين الدعم الفني في الجامعة (جامعة أم القرى-2019) (تصور مقترح)

م. ريم متلع محمد القحطاني*، م. رهام زاهر عمر المرغلاني
كلية علوم وهندسة الحاسب | جامعة جدة | المملكة العربية السعودية

المستخلص: هدفت هذه الورقة إلى دراسة متطلبات تحسين خدمات الدعم الفني في جامعة أم القرى 2019؛ من خلال المستفيدين (أعضاء هيئة التدريس - الطلبة – الطاقم الإداري) وفريق الدعم الفني، وتم استخدام أداتين وهما: المقابلات المباشرة مع الخبراء والاستبانات الالكترونية؛ وتم التوصل إلى صعوبة التواصل بين المستفيد والدعم الفني وعدم توثيق عمل فريق الدعم الفني وعدم معرفة رضا المستفيد عن الخدمة المقدمة له؛ وبناءً على النتائج تم بناء تصور مقترح لتطبيق تقني في الهواتف الذكية لطلب الدعم الفني ليسهل عملية التواصل بين المستفيد وفريق الدعم الفني كما أن استخدام التطبيق سيعود بعدد من الفوائد كتوثيق سير عمل فريق الدعم و الذي سيمكن من دراسة و تحليل الأداء و الإنتاجية والتحقق من رضا المستفيد، لتسهيل العملية التعليمية وتوفير بيئة تعليمية مزودة بوسائل تقنية فعالة مدعومة بفريق خاص للدعم الفني، يوصي الباحث بضرورة تنفيذ تطبيق سهل الاستخدام على الهواتف الذكية لطلب الدعم الفني، وتنظيم دورات تدريبية متخصصة حول كيفية استخدام التطبيق لخدمات الدعم الفني، وتوفير خدمة الإنترنت في جميع أنحاء الجامعة لتسهيل طلبات الدعم الفني عند الحاجة.

الكلمات المفتاحية: الدعم الفني- الدعم التقني- التحسين- التطبيق.

1- Introduction

Technical support at universities is one of the most important services to facilitate the educational process. The universities seek to provide an educational environment equipped with effective technical means supported by a special technical support team, Providing continuous technical solutions.

The most important difficulties that is the communication way with the university technical support team and the beneficiaries. In this paper we will discuss this problem and other related problems and how they will be addressed.

Research Problem

Technical support refers to services that entities provide to users of technology products or services. In general, technical support provide help regarding specific problems with a product or service, rather than providing training, provision or customization of product, or other support services (Rubens, 2005).

The university provides technical support to facilitate the educational process. It seeks to provide an educational environment equipped with effective technical means that are supported by a special team to technical support.

Most technical support requests in university are about recurring problems such as: not knowing how to handle the smart board, how to log in to the computer in the computer lab, connecting the projector devise to the teacher's laptop, installing the printers, turning on the speakers in the classroom, connecting with outside departments by using network devises to present lectures or meeting.

If the beneficiary, including a student, administrative employee, or faculty member requires technical support for this problems, either she go to the technical support office, call the technical support team leader on their own phone, or call support team by their telephone office. But the beneficiary may not finds any response from support team because they are busy with other support tasks. So, she cannot easily reach the support team which affects negatively or disrupts the educational process.

On the other hand, it is noted that the support team does not document the work that they do, since documentation is very necessary in several aspects such as knowing of the most and the least productive member in the support team and knowing the repeated requests to address them then provide ways to mitigate them.

The main question of research is:

What are the requirements for improving technical support in the university?

Research questions:

1. What is the communication way between the technical support team and the beneficiaries (faculty members - students - staff) in the university?
2. What is the method to document the work of technical support team in the university?
3. How to evaluate the quality of services provided?
4. How to know the productivity of the technical support team in the university?
5. What is the proposed model for an integrated technical support system to improve communication speed with customers, document team activities, and effectively evaluate customer satisfaction to ensure performance improvement and service quality?

Research Objectives

Technical support services in universities play a vital role in ensuring the smooth and efficient continuation of educational processes. With rapid technological advancements, enhancing technical support services has become essential to create a modern and effective educational environment. This research aims to address the challenges faced by technical support teams in universities by proposing innovative technological solutions that focus on improving performance and enhancing interaction between technical teams and their beneficiaries, including students, faculty members, and administrative staff.

The main objectives of this research are as follows:

1. Improving Communication Between Technical Support Teams and Beneficiaries: Communication challenges often hinder beneficiaries from accessing technical support in a timely manner. This research seeks to design a smart application that facilitates effective and swift communication channels between the two parties, reducing the time required to obtain support and ensuring accessibility for all.

2. Streamlining the Documentation of Technical Processes: Documenting the activities and services provided by technical support teams is crucial for performance analysis and identifying strengths and weaknesses. The research aims to integrate automated documentation tools within the proposed application to record all technical requests and their resolutions. This documentation not only improves service quality but also provides a database for statistical analysis and continuous improvement.
3. Measuring and Analyzing Technical Performance: Enhancing performance requires precise metrics to evaluate productivity and quality. This research proposes a system to assess the performance of technical support team members based on various criteria, such as response time and solution quality. The objective is to foster competitiveness within the team and motivate members to deliver their best.
4. Increasing Beneficiary Satisfaction: The research aims to design evaluation tools that allow beneficiaries to provide feedback on the quality of technical support services they receive. This feedback will enable management to understand satisfaction levels and identify areas for improvement, ultimately boosting the reputation of technical services within the university.
5. Ensuring Continuity of the Educational Process: The proposed improvements aim to minimize disruptions to the educational process caused by technical issues and ensure consistent technical support availability that meets the needs of students and faculty members.
6. Providing a Model for Wider Application: The research aims to develop a model that can be applied to other universities, fostering the exchange of experiences and best practices among educational institutions.

Literature Review

Effective technical support plays a critical role in educational institutions, ensuring smooth operation and integration of technology into academic processes. Previous studies have highlighted the challenges and strategies related to technical support in educational settings. For instance, Rubens (2005) emphasized the importance of accessible technical support services to address recurring issues such as device malfunctions and user training. His work illustrates how unresolved technical problems can disrupt workflows and hinder productivity in learning environments.

Further, Rashedul (2014) discussed the significance of structured methodologies like the Software Development Life Cycle (SDLC) for designing technical solutions tailored to user needs. The SDLC provides a framework for analyzing requirements, implementing systems, and ensuring continuous improvement, which is crucial for developing tools like mobile applications for technical support.

Gorton (2011) expanded on the importance of non-functional requirements, such as reliability, security, and user-friendliness, in technical systems. These attributes are particularly vital in applications intended for educational institutions, where data integrity and ease of use directly impact user adoption and satisfaction.

Another critical perspective is provided by Terpstra (2013), who explored the intersection of technology and privacy in educational tools. This study underscores the importance of balancing functionality with ethical considerations, such as safeguarding user data in applications designed to facilitate technical support.

The integration of feedback mechanisms into technical systems is also well-documented. Olivier and Cristina (2017) highlighted how tools like Google Forms can be used to collect user evaluations, providing valuable insights into service quality and areas for improvement.

These studies collectively provide a comprehensive foundation for understanding the current challenges and potential solutions for technical support in universities. They inform the development of innovative, user-centered applications that address communication barriers, enhance documentation, and improve overall efficiency in technical support processes.

2- Materials and methods

The methodology to improve technical support at the university is based on the Software Development Life Cycle (SDLC) will be according to a fixed plan, ensuring a structured, systematic, and iterative approach. Each phase will be carefully followed to develop, test, and implement a technical support system that meets the university's needs. The methodology includes the following steps: (Rashedul,2014)

- **Requirement Analysis:** In this phase Business requirements are gathered. Stake holders mainly focus on this phase to determine the requirements like; Who will use the system? How will they use the system? What will be the input of the system? What will be the output of the system? These general questions are answered in this phase.
- **Design:** In this phase the System and Software Design is prepared with the help of requirement specifications which was created in the first phase. System Design helps to specify hardware and system requirements and overall system architecture. The system design specifications is created and delivered to the next phase of the model.
- **Implementation or coding:** In this phase the software engineers start working to write code according to system design specifications.
- **Testing:** In this phase unit testing against the requirements to make sure that the product is actually solving the needs gathered during the requirements phase.
- **Deployment:** In this phase the product is delivered or deployed for use after successful testing.
- **Maintenance:** In this phase the problems comes up and solved time to time. When the user starts to be using the product the actual problems comes up and need to be solved from time to time. In this way the product grows more matured.

This structured SDLC methodology will ensure the technical support system is developed and implemented in a way that meets the needs of all stakeholders, improves communication, and ensures efficient service and high customer satisfaction.

Data collection

To collect the required data to improve the university's technical support requirements and reach a solution, there are two methods were used in order to know some aspects. The first one is an interview with an expert person. The second method is the questionnaire that has been distributed to teachers who are working in the university. questionnaire details.

1. Interview

The interview was with an expert member in Technical Support at the university. The aims of the interview are to take advantage of the expertise to know some main aspects such as How to communicate with the beneficiaries, the most important services is required, and the difficulties facing the support team and their weaknesses.

2. Questionnaire

In order to improve the level of technical support work, a questionnaire was designed to measure the quality of the current performance and know the main problem to improving the work.

The questionnaire was distributed to a sample of 13 teachers, all of them using the computer labs. The questionnaire focused on a number of points:

- Teacher knowledge about using technical means in the university.
- Technical support team in terms of readiness and service.
- Computer labs in terms of availability of needs.
- Computer lab in terms of appearance and cleanliness.
- The most important problems faced by teacher in the computer lab.
- The aspirations of teacher to improve the technical support services.

Requirements

- **Functional requirements**

Functional requirements define what the application does (Vincent, 2008). Technical Support Application functional requirements are:

- Each beneficiary can register, sign in and sign out in the application.
- Each member of the support team can register, sign in and sign out in the application.
- Each member of the support team has special permissions to receive requests from the beneficiaries in the application.
- Each beneficiary can request technical support in the application.
- Each beneficiary can ask about the services.

- Each member of the technical support team should receive requests for technical support and completion them.
- Each member of the technical support team should answer the questions of the beneficiaries.
- Each beneficiary should evaluate the service of a technical support member.
- Data should be saved in a database to study the technical support team's performance.

- **Non-functional requirements**

Non-functional requirements guide and constrain the architecture (Vincent,2008). Technical Support Application Non-functional requirements are (Gorton, 2011, p.242):

- User Friendly: The application is easy to navigate and shall be easy to use.
- Security: The application provides log in function.
- Authentication: Applications should verify the identity of its users.
- Authorization: Authenticated users and applications have defined access rights to the resources of the system.
- Integrity: This ensures the contents of a message and resource are not altered in transit.
- Non-repudiation: The sender of a message has proof of delivery and the receiver is assured of the Sender's identity.
- Response time: When running the application, it must work within 2 seconds.
- Reliability: The application must be connected to a database. If there is a failure in the application of the program will not affect the data.
- Availability: The application must be available, with no more than one hour of down time per day, and no more than one outage per day.

3- Result

Summary of Results

After the interview has been conducted the following points have been clarified:

- The communication way is calling the phone or going directly to the support office.
- Beneficiaries may find it difficult to communicate with the support team, which may affect the education process.
- Most technical support requests about the projector and the smart board.
- There is no professional way to document technical support work.
- There is some overload on some technical support team members and others have poor productivity.
- Some requests of beneficiaries are impossible.
- The beneficiaries present their impressions about services but the manger dose not focus on them.

After collecting the data by using the interview and questionnaire methods, it was concluded that the beneficiaries experience great difficulty in accessing technical support and loss of working time and the progress of the educational process. The most appropriate solution is to create a special application for technical support requests on the university campus, which is installed on the beneficiaries' smart phones. Technical support is requested through it within the university.

To facilitate the communication process between the beneficiaries and the technical support team, a suggested idea is using a smartphone application at the university to request technical support. Technical support team and beneficiaries can access to application anywhere any time. The application provides a notification feature that is in the form of a message that appears to the support team on their smart phone .After service is completed, the support provider responds that the service has been completed in the application or not, and the beneficiary can evaluate the service directly.

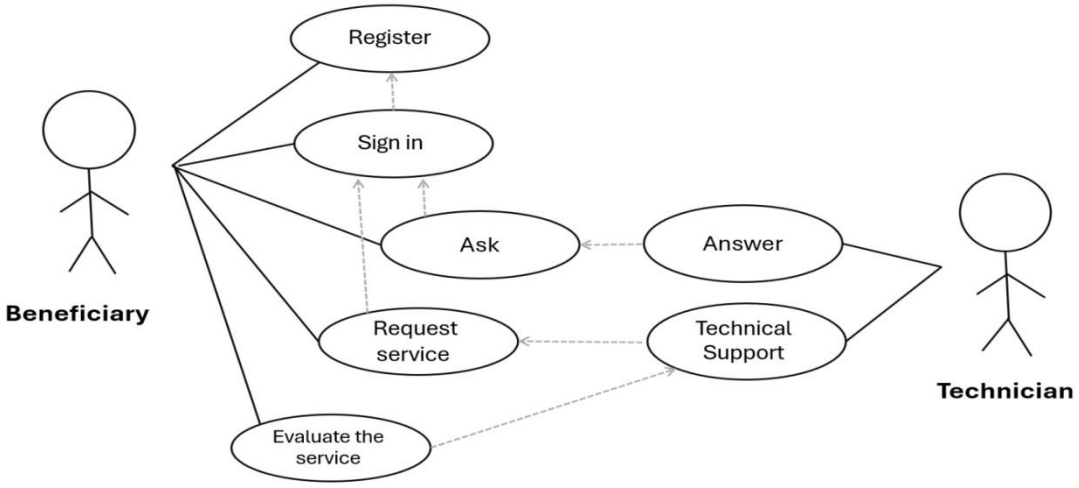
The smart phone application will provides a many numbers of benefits not just facilitate the communication process, also it will document the work of the support team, which will enable to study and analysis of performance and productivity of the team work. So, the main objectives of this solution are:

- Facilitate communication between the technical support team and the beneficiaries in university by put communication feature in the smart phones application.

- Documenting the support team work constantly to analyze the performance of work in university by put saving request feature in the smart phones.
- Enable the beneficiaries evaluate the services that was provided by support team to measure the quality of services by put evaluate feature in the smart phones application.
- Evaluation of the performance of the technical support team in the university by studying the documentation that is stored in the application and through the results of the evaluation of the beneficiaries to study the quality and productivity of the work and how to improve the work and address the weaknesses in the work periodically.

The following is a preliminary conceptual model for the user interfaces of a technical support request application for smartphones, illustrating the interaction between support services and the end-user within the system.

It outlines a system use case, demonstrating how the end-user and technical support engage with the system.



Picture (1): Use case of technical support request system at the university using smartphone

The following is a preliminary conceptual model for the user interfaces of a technical support request application for smartphones (1-7)

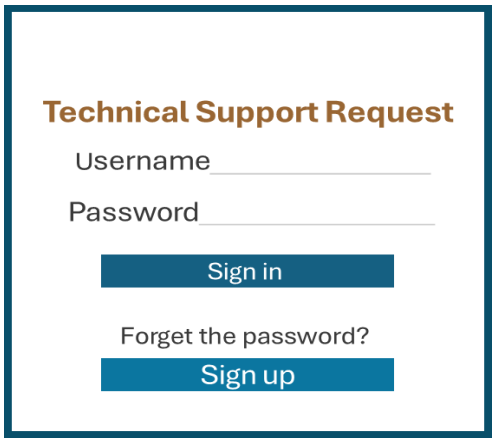


Figure1: Sign in interface

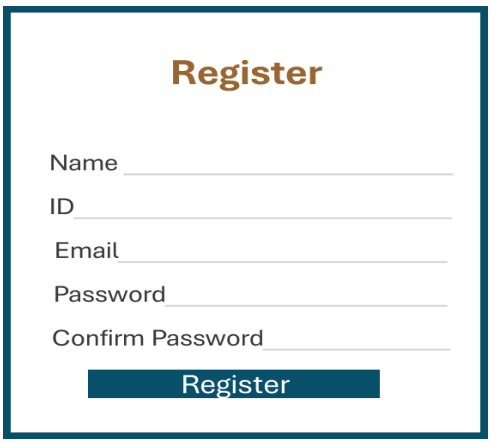


Figure 2: Register interface

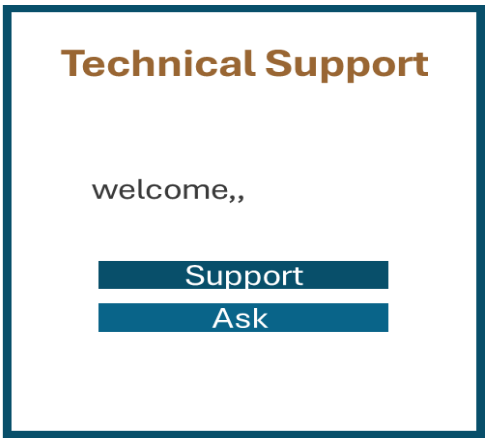


Figure 3: Technical Support options

Figure4: Evaluate the service interface

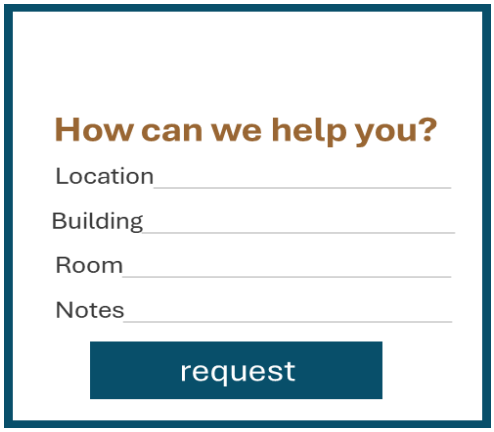


Figure 5: Technical Support Request

Figure 6: Technical Support Requests

Figure 7: Request details

4- Conclusions, Recommendations and Proposed Studies:

Conclusions

This paper addresses the importance of utilizing a smartphone application for requesting technical support at the university. The proposed application aims to address several challenges, including the difficulty of communication between beneficiaries and the technical support team. Additionally, it will aid in documenting the work of the technical support team, enabling the analysis and evaluation of performance, productivity, and user satisfaction.

Recommendations: The researcher recommends:

- Implementing a user-friendly smartphone application for requesting technical support.
- Organizing specialized training sessions on how to use the application for technical support services.
- Providing internet access across the university to facilitate technical support requests when needed.

Proposed Studies:

- Investigating the improvement of technical support and its impact on the quality of the educational process from the perspective of faculty members.
- Exploring the improvement of technical support and its impact on the quality of the educational process from the perspective of students.
- Documenting the work of technical support teams in universities and its relationship to productivity.

References

1- Doubtfire, J 2014, What is WhatsApp and why is it so popular?. Available from: http://joannedoubtfire.hubpages.com/hub/WhatsAppiPad [10 November 2018].

2- Eric C 2013, Using Google Forms. Available from: https://1.cdn.edl.io/QpKRffHMDlpTrdSwZcvE7ZVw8uiycnbY6FRqxw5oJK1aBInS.pdf [16 November 2018].

3- Gorton, L 2011, 'Software Quality Attributes' in Essential Software Architecture, xv1. 66-96. Available from: Springer E-Book. [22 November 2018].

4- Joli, B 2018, What is Microsoft Outlook?. Available from: https://www.lifewire.com/microsoft-outlook-4164620 [20 November 2018].

5- Microsoft 2018, Microsoft Outlook. Available from: https://products.office.com/en-us/outlook/email-and-calendar-software-microsoft-outlook [20 November 2018].

6- Olivier, R & Cristina, R 2017, Evaluate your learners with Google forms, PublishDrive. Available from: https://books.google.com.sa/books?id=SZg8DgAAQBAJ&dq=Evaluate+your+learners+with+Google+forms&hl=ar&source=gbs_navlinks_s [16 November 2018].

7- Rubens, P 2005, Technical support for the neighbours. Available from: http://news.bbc.co.uk/2/hi/uk_news/magazine/4387525.stm [17 November 2019].

8- Rashedul, A 2014, Software Development Life Cycle (SDLC). Available from: https://cybarlab.com/sdlc [3 October 2018].

9- Terpstra, M 2013, 'WhatsApp and privacy', BA thesis, Radound University, Nijmegen. Available from: https://www.cs.ru.nl/bachelors-theses/2013/Martijn_Terpstra___0814962___WhatsApp_and_privacy.pdf [10 November 2018].

10- Vincent, R 2008, Building a Data Warehouse, Library website, New York. Available from: SDL University Library website. [22 November 2018].