Evaluation of IT Service Desk: A Case Study

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ABSTRACT

Organisations rely heavily on Information Technology Services Management (ITSM) to provide efficient and quality services to all stakeholders. This research is an exploratory study conducted of the service desk operations model. The research explores simple metrics and a weighted requirement matrix for evaluating and selecting ITSM systems. Several data gathering tools which include brainstorming, interviewing, participant-observation and collaborative feedback document have been employed in this research for collecting requirements from stakeholders to ensure viability and robustness of the research. Prominent challenges to sound implementation of a suitable service desk suite have been identified and tabulated. The identified challenges, coupled with feedback from stakeholders enabled the researchers to arrive at a scaled section framework for selecting an ITSM system. A comparison of eleven state of the art service desk systems has also been completed as part of the research. This research also proposes a novel service desk process with specific emphasis on the roles played by various stakeholders in provision of an efficient service desk operation.

Keywords: IT service management, Service Desk, Help Desk, Customer Support, ITIL

1. INTRODUCTION

Information Technology Services Management (ITSM) is a set of process guidelines that organisations adopt to improve the quality of their IT operations. The overarching objective of ITSM is applying the IT function of organisation to build good relationships with its customers and users of IT services. The service desk, or helpdesk, is one of the major components of most ITSM implementation (Lema et. al., 2015). It has emerged as the most important medium for organisations to communicate with customers. It is usually supported by an automated system that ensures that requests of all stakeholders (internal and external) are received by the organisation. These requests could be in many forms such as a request for a service, the reporting of a problem, feature request, the reporting of bugs found in applications and so on. The service desk system ensures that organisations can manage these requests effectively whilst at the same time providing superior service to its clients. Customer/Technical support staff are responsible for addressing requests that are received from clients.

It is therefore important that the service desk system and the processes it support are optimum. This research was started as a result of an industry partner that wanted to assess its service desk processes and the efficacy of the extant system which is osTicket version 1.8 (released: 14/10/2013). The objectives of

this research are three-fold. First is to analyse the existing service desk system in the organisation, second is to investigate the existing service desk processes and third is to investigate alternative service desk systems that may provide a better service. It should be noted that this research uses service desk, helpdesk and customer support interchangeably and they refer to the same concept, i.e. of supporting customers and users of an organisation.

The research employed brainstorming, interviewing, participant-observation and collaborative feedback document for eliciting requirements from the organisation stakeholders. These requirements were then converted into user stories to facilitate easy communication with stakeholders. These requirements served as the criteria that was applied to evaluate eleven service desk systems. The stakeholders, on further interaction, identified some of these requirements to be more important than others which encouraged the researchers to apply a weighting to the requirements that were gathered. To identify the most suitable system which satisfied the desired user features, the weighted values was summed up to 100% and the system with the highest value was deemed the preferred system. The outcome of the research also led to revision of the service desk process for the organization, with specific emphasis on the roles played by various stakeholders.

This paper makes three contributions which are:

1. The identification of challenges in a service desk system.
2. The creation of a weighted requirement evaluation matrix for evaluation of a service desk system that is derived from stakeholders desired feature list.
3. A proposed revised service desk process tailored to the roles of a user employing the service desk process.

The rest of the paper will proceed follows. Section 2 presents details of the organisation where this research took place. Section 3 is about a broad overview of ITSM systems in general, Section 4 describes the research approach adopted, Section 5 presents the challenges identified in the extant service desk system and processes with special mention of the ones within the organization under review. Section 6 highlights the user requirements gathered as part of the research, while Section 7 presents the results and Section 8 concludes the paper.

2. THE CASE STUDY ORGANISATION

This research took place at LearningWorks which is based at Hamilton, New Zealand. LearningWorks is a learning and training solution provider with three broad classification of services. These are learning design, learning technologies and training. The learning design division provides services such as instructional design, graphic design, project management, e-learning development, assessment writing, blended learning development, resource and technical writing, storyboarding, illustration, mobile learning development and print-based resource development. Learning technologies portfolio includes the development of learning management systems (LMS). These include the development and hosting of Moodle and Totara learning management systems and WordPress sites,

reporting and analytics, e-commerce, UX and design, Zoola analytics, technical support and plugin development. LearningWorks also acts as a Private Training Establishment (PTE) where they offer training such as NZQA qualifications, online training, recognition of prior learning (RPL), recognition of current competency (RCC) and short courses.

The present research took place at the Technical Support unit of the Learning Technologies division within LearningWorks. The Technical Support team was responsible for the service desk operation. The Technical Support team was using osTicket as the support system to handle technical issues and enquiries from clients. The service desk was responsible for addressing all issues submitted through osTicket. Support services are frequently sought for the LMS, i.e., Moodle and Totara, and their plugins which are developed for clients. Typical requests that the support desk received are bug fixes for the LMS, navigational issues within the interfaces provided, permissions, access control and password issues etc. The learning technology team also has the responsibility of developing plugins for Moodle and Totara. The team relies on Slack which is the communication tool that enable the team to internally communicate with each other when new support requests are created. Figure 1 presents the existing service desk operation as a use-case diagram.

Figure 1. *Use case diagram of service desk operation*

In Figure 1, the customer contacts the service desk by creating a Ticket, as a request, using osTicket. The ticket is assigned by the Ticket Master, the support agent reviews the assigned ticket which might become a change request, if it is deemed so, by the Business Development Manager (BDM). It is worth noting that several tickets may be about the same issue and as such upon review by the support agent, these will have to be merged as one request. The Support Agent is responsible for communicating with the customer concerning the tickets and thereafter implement the changes. The BDM, IT Team Leader

and the Support Agent have the ability to generate reports on the status of tickets. Upon submission of a request, the customer can check its progress. Support agents create knowledge base articles to help clients find information on issues that have been reported by other clients and have been resolved. The expectation is that the customers will take advantage of this facility and only create requests when they are not able to resolve their issues after searching through the knowledge base. At the time of this study, LearningWorks was using osTicket version 1.8 (released: 14/10/2013) which was outdated by three years as the current version at the time was version v1.9.14 (released: 11/06/2016). osTicket is an open source, hosted or cloud residing service desk solution.

3. LITERATURE REVIEW

There is an overwhelming literature which has been able to advocate and establish ITSM as a service within organisations and no longer considered a technology but focuses on its relationships with customers (Iden & Eikebrokk, 2013; Jäntti, 2012). ITSM is the operations of an IT function of organisations that uses processes which place emphasis on IT services and adherence to customers and service level agreements (Iden & Eikebrokk, 2013).

Most organisations implement ITSM based on the Information Technology Infrastructure Library (ITIL), however, there are other frameworks like Microsoft MOF, IBM ITPM and HP ITSM (Iden & Eikebrokk, 2013). These frameworks are usually recommended for large organisations as one of the success factors for implementing ITIL is the size of the organisations as large organisation have been known to be more successful at adopting ITIL (Iden & Eikebrokk, 2013). Businesses employ or implement IT service management as a means of improving the quality of services of IT functions that aligns with organisational business requirements (Lema et al. 2015). ITIL 4 is the current version comprising 14 general management practices, 17 service management practices and three technical management practices. Service desk, which is the theme of this research, is one of the 17 service management practices found in ITIL 4. According to ITIL 4, the service desk practice should serve as the single point of contact for service requests and the resolution of these incidents or requests for stakeholders or users of a service (AXELOS Limited, 2019). The function of the service desk is to enable service users to report issues or problems, make enquiries/queries and requests for which service providers have to acknowledge, classify, assigned ownership and provide a resolution. Lema et al. (2015) in their survey of ITIL implementation identified the incident management process as the recommended first process to be implemented for most IT service management practices. Incident management is also supported by the service desk described in this research as the case organisation has the responsibility of managing incidents reported by its customers for their use of LMS. Jäntti, Shrestha and Cater-Steel (2012) used IT service management best practices to improve the service desk operation of the Finnish Tax Administration. The present research is similar to that of Jäntti et al. (2012) as it considers both the service desk tool and the service desk processes. The monitoring of Key Performance Indicators (KPI) was used as trigger to reengineer the IT service support processes including the service desk, incident management, change management, release management and configuration management (Valverde, Saade and Talla, 2014). The present research does not use KPIs, however, it employs user requirements as a metric in improving the service desk process. Bober (2014) proposed a model based on a simulation of variables from the operation of service desk that identified processes which can be tuned or adjusted to improve the
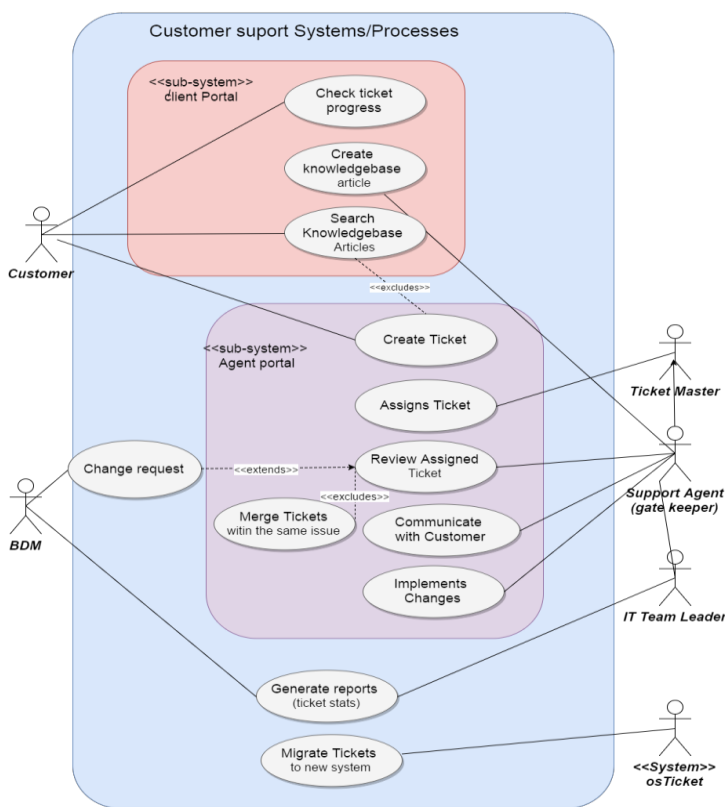
performance of the service desk operations. A major finding is that improvement in response time is highly dependent on reduction of workload. This research, thus, sought to improve the efficiency of the service desk operation for the organization for which response time to a ticket/problem was an identified concern by all stakeholders.

The work presented in this research will focus on the service desk function which is a constituent of the Service Support of the ITIL service management framework (Jäntti, 2012). It is worth noting that this work is not implementing or evaluating ITIL in any form as the case organisation has no intention of implementing ITIL or any specific framework for that matter. Since ITIL has become the de-facto framework for service management across many organisations in the world, it was desirable and prudent for this research to assess how the LearningWorks service desk aligns with ITIL framework. The literature does not clearly support these framework's efficacy in small organisations which might have influenced LearningWorks decision against its adoption as it is a small firm of 41 employees. Sharif and Ward (2013) in their study of the use of benchmarking in academic helpdesk service provision proposed the tailoring of the helpdesk to fit an academic institution instead of adopting what pertains in the private sector. This tailoring, as per the authors, should be designed based on benchmarking and best practice frameworks that have proved to achieve superior service quality and performance. The research will therefore take a pragmatic approach of identifying problems with the current service process and propose ways of improving it, rather than recommending a framework for LearningWorks.

Jäntti (2012) also identified several challenges in IT service desk when the Finnish Tax Administration IT service desk processes were evaluated. The challenges include inconsistent classification of support requests, customers inability to classify support requests, difficulty in the identification of duplicate support requests, difficulty in differentiating between incident management and problem management besides the recording of multiple incidents as one and the absence of a configuration management database.

The research described in this paper is based on a case study which is known to be the predominant research type in the ITSM domain (Iden & Eikebrokk, 2013; Jäntti, 2012). The case study organization, in this case LearningWorks, decided to embark on this research because it felt the need to improve the efficiency of supporting its clients which is in alignment with some of the motives that leads organisations to embark on ITSM projects (Iden & Eikebrokk, 2013). Although this research is not about implementation of ITIL, several critical success factors for ITIL were available at LearningWorks, such as top management support, a project champion, staffs' experience, ITSM aligned culture, willingness to change and ITSM software (Iden & Eikebrokk, 2013).

4. RESEARCH APPROACH

Several approaches have been used to address achievement of the stated objectives for this research. Four different techniques to data gathering have been applied to analyse the service desk processes of the case study organisation and the assessment of service desk or helpdesk system. The researchers employed an iterative and adaptive approach during this project so that the solutions remain flexible and acceptable to the client.

Brainstorming served as the main data gathering approach in this research because the researchers had to gather requirements from a diverse user groups including the Learning Technologies team, Sales Department and the Training team. This aligns with the approach recommended by Carrizo et al (Carrizo, Dieste & Juristo, 2014; Yousuf & Asger, 2015).

Discussions took place between the researchers and the Learning Technologies team to identify the existing system capabilities and limitations (what works, what doesn't work and any functionality it currently lacks that could prove useful for the new system) and also the relevant service desk processes. From these discussions, the researchers were able to develop the functional requirements of what the desired system and processes should be. The researchers again had a brainstorming session with the Sales department including the manager. This meeting was important from a research perspective to identify the limitations based on the business users view as regards to the existing system and processes. It emerged that a major issue from the perspective of the Sales team was that it was difficult to integrate the sales team for reporting and training purposes. Follow-up brainstorming sections were between the researchers and the internal stakeholders that ensured collection of the correct requirements from the teams. This greatly contributed to the satisfactory outcome of the research and derivation of suitable results and objectives.

Interviews were also held with several relevant employees of LearningWorks to consolidate the findings of the brainstorming sections. Interviews are known to be the most popular elicitation technique that is used to gather requirements from users (Carrizo et al., 2014; Ferrari et al., 2016), however, according to Carrizo et al. (2014), interviews have been over used for which they proposed a framework that ensures that a more objective elicitation technique is selected based on the context of the project. This research employed interviews as a data gathering approach because interviewers with domain knowledge enrich the elicitation process by improving communication and facilitating easy understanding of the client needs (Hadar et al., 2014). Participant-observation was also employed as a data gathering approach as it has been used successfully in previous research (Jäntti et al. 2012). The fourth and fifth authors of this paper worked for LearningWorks service desk, for 450 hours each, as part of the research work. Thus, they acted as inhouse domain expert for the research team. This enabled the research team to have better clarity and greater understanding of the organisation processes and challenges within LearningWorks.

Collaborative Feedback Document was used as an ongoing source of information around the current system and processes. It took the form of a shared Google document, as indicated in Figure 2. The sheet was setup and invitations with editing privileges were sent to the Learning Technologies team.
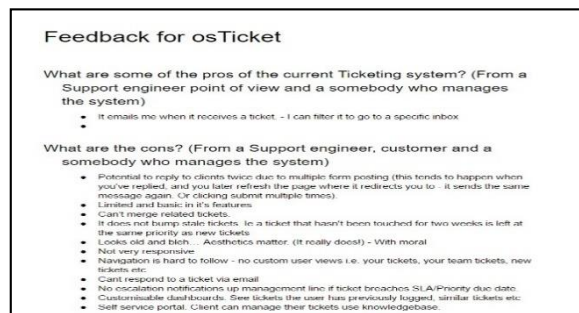
Figure 2. *Google Doc shared with user group (Learning Technologies)*

The Learning Technologies team were requested to comment upon some pre-written headings/questions to add to the collective and collaborative knowledge obtained through sharing of stakeholder concerns specific to the research. This wasn't however the main approach to requirements gathering, but it proved to be useful as it allowed an open floor for ideas.

The above approaches led the researchers to investigate other service desk systems as potential replacement for the extant system. The researchers also had phone conversations with several Service Desk system representatives to discuss the emerging business requirements for the case organization and appreciate the availability of suitable packages the service desk systems would offer or customize. The advantage of conducting this activity was that it brought clarity for all stakeholders on the requirements and assisted the researchers in shortening the number of options for service desk systems on offer. During the interactions, specific characteristics of each system were highlighted and the economic metrics of adopting each solution was incorporated into the comparison matrix.

As the research progresses, it became obvious that analysis of alternative systems would lead to a very expansive exercise involving extensive and diverse recording of characteristics each potential support system. In order to create a simple, organised workspace to separate these findings the researchers made use of 'Trello' which is a web-based project management application. This allowed users to create separate boards for each system, and compile data within them. Eleven service desks systems were eventually selected for evaluation by the research team when it was discovered that the extant system was not supporting the service desk process efficiently. These systems were evaluated based on criteria which have been captured as user stories in section 6 of this paper.

The fourth and fifth authors of this paper systematically used all these systems including the extant osTicket system in order to support the assessment of these systems against the user requirements. To review the current version of osTicket the researchers hosted a copy on a local machines and performed detailed analysis to compare it to the working version of osTicket used by LearningWorks. Trial licenses were also subscribed to for the other systems which ensured that there was an objective assessment of all the system features and processes as desired by LearningWorks.

5. CHALLENGES WITH EXISTING SERVICE DESK

As a result of the brainstorming, interviews, participant-observation and collaborative feedback document, the research identified the following challenges for an IT organization in general, and, LearningWorks in specific.

Ticket Merging

The inability for support agents to merge related tickets from clients is a major concern. This is because support agents report that clients often create multiple, related tickets. Ticket merging feature improves the service resolution process as it reduces the time support agents have to search for related issues in order to fully appreciate the context of a request. Inclusion of such a feature will also eliminate duplicates of tickets and speed up the system.

Ticket Closure

In the current system, clients were able to respond or reactivate closed tickets. This would automatically cause the system to reopen such tickets which the service desk team finds bothersome. Support Agents prefer closed tickets to remain permanently closed.

Existing Ticket Data Migration

Ticket data migration only becomes an issue if LearningWorks decides to switch to a new system. The LearningWorks osTicket installation, at the time this research was conducted, hosted 2800 closed support tickets, which could potentially hold a lot of useful data and documentation for future support issues. LearningWorks wanted to bring this data to the new system. It was expected that the new system must have a method of migrating existing data so that it might be used when the need arises. An example of how this could be useful is if an issue occurs on one site which is similar to a previously resolved issue, then a resolution is available immediately.

Reporting

Reporting was one of the critical services that LearningWorks was struggling with. The existing system did not provide features for creating and sending reports to customers that highlighted services and support they have been receiving. LearningWorks wanted to know this to enable its business units to have a visual of 'Common question areas' such as 'password resets'. This may provide an opportunity for LearningWorks to identify areas that needed further training and would then be able to allocate resources to be allocated optimally to maintain project deadlines. This could also potentially provide LearningWorks and their clients a means for evaluating the services/solutions provided by LearningWorks.

Multiple Department Integration

The main stakeholder in this project was the Learning Technologies team as they dealt with day-to-day support requests and issues. However, LearningWorks also wants to eventually integrate other departments into the service desk system. The reason was the lack of a clear distinction between a support request, and a feature request. Some clients lodged a support ticket when it was actually a new feature request. LearningWorks wanted to be able to make a distinction between the two types of request so that a support member could transfer a ticket that is a feature request to the sales team so that they may scope and quote the request. In doing so they will be able to charge for creating these feature requests.

Removal of Email Trail

Email trails are a big issue in the current system as it creates redundant information and a hard to read interface. This occurs when a client has a back and forth conversation with a support agent regarding an issue and then replies the email to LearningWorks support. The current system does not cut out the email trail leaving a massive hard to follow message within a ticket.

Intuitive User Interface(UI)

osTicket layout is simple, but it is outdated according to its users. The new system needs to have a nice modern UI that is easy to navigate.

Ticket Service Level Agreements (SLA)

Clients of LearningWorks all have separate SLAs. LearningWorks wants to be able to define these separate SLAs so that certain client ticket could be viewed as higher priority than others. This is so that the team can see which tickets they should resolve first so as to adhere to the relevant SLA terms with clients and thereby improve customer satisfaction.

Agent collision prevention

Agent collision occurs where more than one agent is looking at or replying to the same ticket at the same time. This often results in more than one reply to the same question on the same ticket. LearningWorks was facing major issues with the lack of this feature.

Extended Ticket Management

LearningWorks' users have basic ticket features in the working system. However, there are some functions such as custom views, multi-tasking and automations that the LearningWorks support team believe would allow them to provide superior

customer support service. There was an urgent need felt to enhance these features to provide better service to clients.

The analysis identified Figure 3 as the customer or service desk support processes at LearningWorks. The components highlighted in purple are areas that require improvement. These are acknowledge the customer, change request process, identify feature request, transfer ticket for approval, update customer and record total time taken into work flow max(WFM).
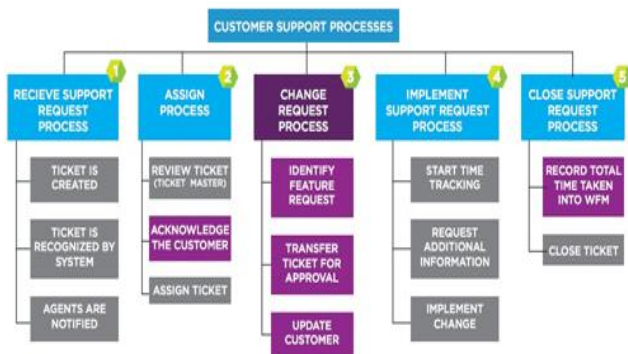

Figure 3. *Customer support processes*

6. USER REQUIREMENTS

A detailed list of requirements are presented in Table 1 based

Table 1. User Stories

As a	I want	Acceptance Criteria	Priority
Customer	to create ticket so that I can receive support	Customer will lodge tickets via email and through a portal.	Must Have
Support Agent	to record time so that I know how long each ticket/issue takes to resolve	Time to be added to related job in workflow max	Should Have
Support Agent	to view the status of each open ticket so that monitoring queues are easy to manage	Statuses should be either 'waiting for customer', 'waiting for support/agent' or 'waiting for approval' or similar	Must Have

on the requirement elicitation conducted by the research team where it discovered process issues as well as challenges with the extant system. The requirements are presented in the form of user stories since this was deduced as a preferred way for easy assimilation and consumption by clients (Bang, 2007). The acceptance criteria are indicated against each user story. The requirements were then prioritized based on the MoSCoW prioritization scheme (Pandit & Tahiliani, 2015) to demonstrate its importance to the business. Twenty-four user stories were created, however due to lack of space, this paper only shows three in Table 1. Other features find a mention in section 7. The study however created 24 different user stories and prioritized them based on user requirements.

6.1 Assessment of Service Desk Systems

We adopted KISMET (Keys to IT Service Management Excellence Technique) (Jäntti, 2012) as the process improvement tool. It comprises of seven phases which are to create a process improvement infrastructure, perform a process assessment, plan process improvement actions, improve/implement the process, deploy and introduce the process, evaluate process improvement and continuous process. Just as Jäntti et al.(2012), this research applied two of the phases of KISMET – process assessment and plan process improvement that aligned with the objectives of this paper. The research approach discussed in section 4 served as a means of performing the process assessment which identified the challenges of section 5 for which we derived the user stories of section 6 of this paper.

The requirements identified (see excepts in Table 1) were used as the criteria to assess all the alternative service desk systems including the latest version of osTicket at the time of this research. It is worth noting that in discussing with the stakeholders – that is customers and staff of LearningWorks, some of these requirements were assessed to be more valuable than others which led us to apply a weighting to the requirements. Thus, higher weighted requirements were assigned a higher priority and value. Using these weighted requirements, each system could then be scored on a scale of 0 – 5 against a requirement following the process outlined in Figure 4. The weighted values sum up to a total of 100% which was used to evaluate each of the systems under consideration. Users were given a set of scenarios to test against the alternative systems and were asked to give each a score based on the scoring table (Figure 4) as well as any comments they were wanting to add that may portray their experience on the particular scenario. This example was tested against osTicket with the requirement being 'ticket merging'. osTicket scored a '0' this meant that it does not have the ability to merge tickets as shown in Figure 4. Once an overall score against all requirements was calculated for all systems, the researchers were able to deduce a reliable indication of how well each system suited the requirements.
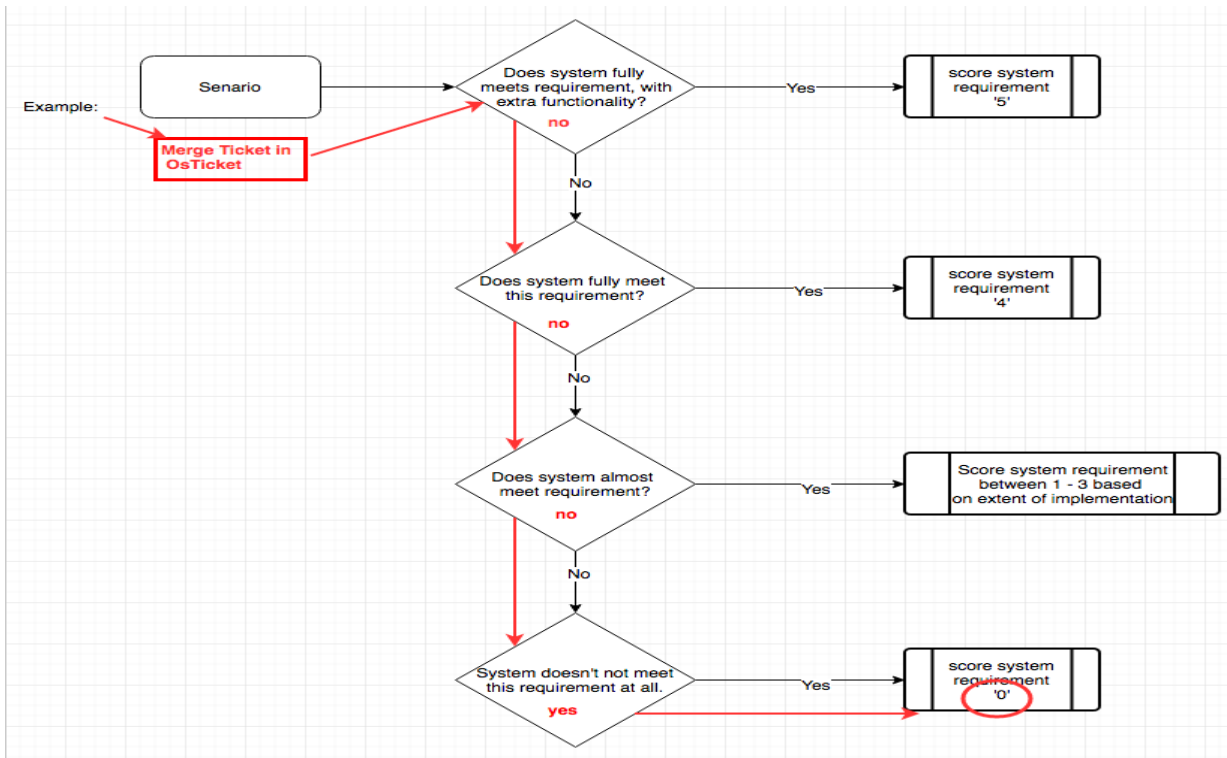
Figure 4. Example scoring chart for requirement checks

7. RESULTS AND ANALYSIS

The results of applying the weighted requirement approach in evaluating the service desk systems is presented in this section.

Overall this approach was applied to eleven different systems and the results of the top four system are shown in Figure 5. The top four systems were Freshdesk, Zendesk, Jira and osTicket respectively.
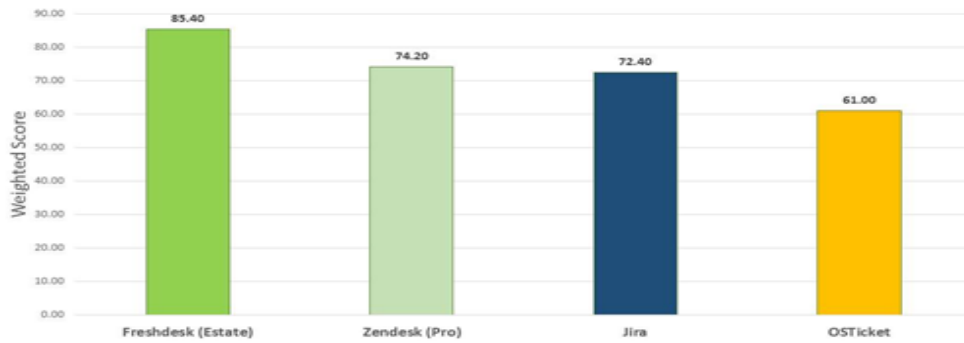

Figure 5. Result of top four service desk systems

Figure 6. Features of service desk systems

In the present case, based on the user preferences and user scoring matrix, Freshdesk scored the highest, satisfying most of the features, desired by the stakeholders. Figure 6 illustrates the extent to which these systems satisfied the requirements.

The integration (see Figure 7) of the recommended system with other systems used at LearningWorks was a major objective for LearningWorks managers. Elements of the system included:

Confluence

This is a document management system and is frequently used by the Learning Technologies team to handle important information related to projects and business processes.
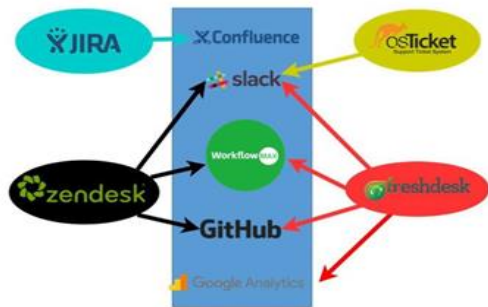
Workflowmax

This is a Job Management system that LearningWorks used to track billable and non-billable jobs for clients and is currently being incorporated with support ticket time tracking against client projects. This was one of the critical integration requirements projected by LearningWorks as it was used throughout the organization.

Slack

Slack is a Team Communication system that is used predominantly by the Learning Technologies Team to communicate in real time via group discussions or direct message and is also being adapted by other departments.

GitHub

GitHub is a version control system that is used by developers at LearningWorks that hold the most stable and most current versions of code available for the whole team to access. Google Analytics is a Reporting tool that tracks trends of website traffic. A few clients of LearningWorks use this tool to track their LMS traffic. Figure 7 shows how many of these five other systems that each of the service desk systems can integrate with.
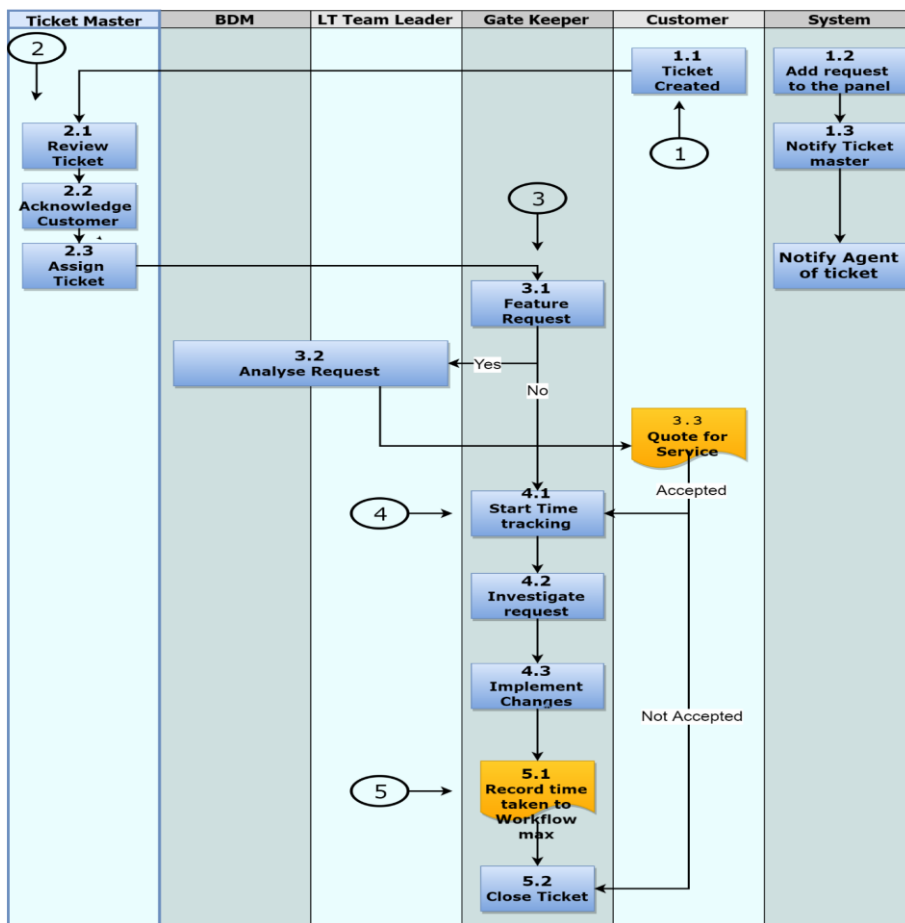

Figure 7. Integration of service desk system with other LearningWorks systems

Figure 8: *Activity diagram for the service desk process*

Freshdesk was therefore recommended and accepted by LearningWorks for which the fourth and fifth authors of this paper were contracted to implement.

In addition to the recommendation of a new system, we applied the process improvement phase of KISMET(Jäntti, 2012) in designing and proposing a new service desk process structure which is captured in the activity diagram of Figure 8. This new process satisfies most of the requirements of ITIL 4 for a service desk such as the ability for customers to report issues, make enquiries/queries and requests (step 1.1 of Figure 8). Service providers also review and/classify request (step 2.1 of Figure 8), acknowledge customer request (step 2.2), a request is owned (Ticket Master, BDM, Team Leader) at every stage of the process until it is finally assigned to a gate keeper for investigation and possible resolution. Tang and Todo (2013), in an earlier study presented how a service desk should function effectively as well as how to setup an efficient service desk. A good service desk is to have three core attributes, process, people and tool which is what has been captured with the activity diagram of Figure 8.

The activity diagram indicates how a request is initiated when a customer creates a service request, or ticket, and ends with the closure of a ticket/request. Roles responsible for each phase of the service desk process are captured in Figure 8. The purpose was to ensure that LearningWorks' customers are able to request support easily and efficiently and assist the support engineers in delivering effective and efficient customer care at the same time adding structure and clarity to the roles of each. A summary of responsibilities of roles is presented below:

[Customer] required to initiate request.
[System] to accommodate or host requests.
[Ticket Master] to review and assign requests.
[Gate Keeper] who is the primary support person for each project/customer.
[IT Team leader] to approve work and monitor agent progress and SLA Compliance.
[BDM] to approve any feature requests.

8. CONCLUSION

The service desk is an important unit within all modern organisation as in most cases they serve as the first point of contact when customers require information or faces challenges with an organisation services. In this research, we assessed the effectiveness of an organisation service desk system and its processes. We used several requirement elicitation techniques including brainstorming, interviews, participant-observation and collaboration feedback document in gathering requirements from the stakeholders. Using these requirements, we created a feature set that served as criteria applied to evaluate eleven service desk systems.

Upon evaluation, the Freshdesk service desk system was the recommended system as it satisfied most of the business needs of the case organisation. The new system has since been rolled out at LearningWorks. The research also proposed a revised service desk process which specifically structured the role and responsibilities of the system users.

In a future study, we intend to study how the new system has been able to support the business and make suitable changes to the measurement matrix to identify suitable service desk systems for organisations.

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