Unit 12 & 13, Assignment 1

Technical Support

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Tools and Techniques

Tool or Technique	Description / Explanation
Software Diagnostic Tools	Tools that help diagnose and troubleshoot software-based issues on a user's device. For example hardware info and Windows diagnostic.
Remote Diagnostics	The ability to diagnose and troubleshoot software-based issues on a user's device remotely. This can be done through software such as TeamViewer or AnyDesk.
Questioning of Users	This is the process of asking users a set of questions about their issue to gain a better understanding. This can be used to find the cause of the issue and fix it.
Fault Records and Logs	This is a record of previous faults and solutions that have occurred within the network. This can be used to tackle repeat or similar issues.
Solutions Database	A database that contains lists of common solutions and diagnostic steps to different problems.
Hardware Test Instruments	Physical tools that can be hooked onto a device's hardware to identify physical issues such as shorts and damaged components. These devices can also test to ensure the devices meet electrical standards and are fit for use. Examples include multimeters and oscillators.
Self-Test Routines	Pre-programmed tests, typically stored onto a device's ROM, that test the core components of a device. For example, the Power On Self Test—POST—runs when an end device is first turned on, such as a phone or laptop. The tests ensures that the basic system components are connected and working properly.
Specialist technician's toolbox	These are special tools that technicians carry around whilst diagnosing systems. These tools can include cable testers, for example, an ethernet or HDMI tester. These can help rule out potential issues such as faulty cables.

Advantages and Disadvantages of Outsourcing Technical Support

In-house Support Team

Advantages

- Easily accessible and can respond quickly to physical faults.

- Has a good understanding of the business's IT needs and infrastructure and can better tailor their support.

- More control of the team and their processes.

- Can work with other departments to implement or improve their IT needs.

Disadvantages

- High maintenance cost from salaries, training and staff benefits.

- Potential lack of specialized expertise within certain areas of IT, making it harder to resolve those issues quickly.

- With a limited team with good knowledge of the business's IT system, there may be a lack of innovation and new ideas.

Local Company

Advantages

- Easily accessible within the business's office area

- Better communication than long-distance companies as they are within the same timezone and area.

- Can be more flexible and responsive than larger support centres.

Disadvantages

- May charge a higher price than larger remote support centres.

- Depending on the size of the company they may lack specialized expertise within certain areas of IT.

- May have fewer resources than larger remote support centres.

Remote / Long-distance Technical Support

Advantages

- Cheaper than a local company or in-house support.

- Typically has more staff, allowing for a broader range of specialist technicians.

- 24/7 opening hours allowing for support outside of business opening hours.

Disadvantages

- Communicating and coordinating with remote support can be more difficult causing delays in issues being fixed.

- Remote centres are often within different time zones, making it harder to schedule meetings and calls.

- Less familiar with the company's needs and infrastructure.

Mixed Solution

Advantages

A mixed solution can combine the cost-effectiveness of a remote/long-distance team with the easy accessibility and local knowledge of a local or in-house technical support team. This allows for the company to have:

- Fast, in-person responses to issues and faults from the in-house team.

- Greater flexibility and local knowledge from a local company.

- Specialist knowledge and out-of-hours support from a remote company.

Having defined roles for each team can help the efficiency of the teams and help the staff know which teams to contact to get their issues resolved quickly,

Disadvantages

Having multiple teams can make managing and coordinating between the teams more complex and difficult. Each team may have different quality of service and service levels, which can create an inconsistency in user experience. There is also the risk of miscommunication and it could be hard to schedule meetings with all the teams due to differences in time zones.

Advance in Support Systems Technology

Within recent years there have been many advances in support system technologies, especially within the chatbot sector such as virtual assistants. A notable example of an advancing virtual assistant is the PayPal Assistant. The PayPal Assistant used artificial intelligence and natural language processing to understand and assist customers with their queries.

The PayPal Assistant is available 24/7 and has the ability to help customers with topics such as payments, disputes and unauthorized transactions. The assistant uses natural language processing to understand what the user is asking and can provide accurate responses and guidance.

For customers, having a virtual assistant provides many benefits:

- Convenience: The PayPal Assistant is available 24/7 allowing customers to receive help no matter what time of day. For the business, this can reduce the cost of paying potentially multiple support centres to provide 24/7 availability.

- Accuracy: Using NLP the AI can understand exactly what the user is asking and provide links to support guides and PayPal pages such as transactions and user information.

- Personalization: Using customer information and details, the AI can give personalized responses to a user's questions about their account and transactions.

- Reduced wait times: Without the reliance on human agents, the wait time can be majorly reduced as the AI can handle multiple requests at once.

The PayPal Assistant has the potential to have a huge impact on PayPal's customer experience. With the AI's ability to quickly understand a user's query and provide them with guides and solutions, users will be left with a better impression of the company and feel confident to use the assistant again.

To conclude, the PayPal Assistant is a significant advance in support system technology. With the integration of artificial intelligence and natural language processing, the assistant is able to process and provide support to users' queries faster than human assistants can with a higher level of accuracy and personalization. The assistant has the potential to improve the overall efficiency of PayPal's support system and decrease costs by funding multiple support centres to provide 24/7 support.

Impact of the Provision of Technical Support

Organisational Guidelines

Different organisational guidelines and policies can impact the delivery of technical support. This is because of the time taken to follow the correct procedure set out within the guidelines. For example, an organisation may have a long form that is required to be filled out before support can be given. However, whilst this form takes up more time it will help the support team find someone with the right knowledge and skills to fix the issue. Another example is Service Level Agreements, which could result in support not being given for over a week.

Having guidelines for usage of the internet and security can help reduce the number of requests made for support for basic issues such as changing a password or system instability caused by downloading malware from an unsafe site.

Confidentiality

Confidentiality can increase the amount of time required to provide technical support. This is because additional measures will be required to ensure that user data is private and secure. Furthermore, this adds extra steps to the support processes to ensure that no user data is breached whilst support is being given. For example, if an employee is working on sensitive information and their monitor breaks, it is important that the computer is shut down during the repair process to prevent any of the sensitive data from being leaked and seen by people who aren't meant to.

Costs of Resources

Depending on the issue, there may be a high amount of cost needed to repair it. For example, if a company's server hardware has a fault, it may take the company longer to repair it as new equipment will have to be bought to replace it. Cost can also impact the provision of support if the technical support department is underfunded. This could result in the department not having the equipment needed to perform the troubleshooting and repairs which could lead to a backlog of tickets and longer wait times.

Time

Depending on the size of the company, there may not be enough time for the support team to diagnose and repair everyone's issues which can greatly increase wait time. To combat this, Service Level Agreements can be introduced to sort through the severity of each issue and resolve the most important ones.

User Expertise

In smaller companies, their technical support team may only be small. This could lead to issues where the team doesn't have anyone who is an expert in the area where there is a fault. This can increase wait times as the team would need to research the issue and attempt to solve it themselves or hire someone to fix the issue for them.

Outsourcing Support Services

Having a third-party provide technical support can impact the provision due to the additional challenges of coordinating multiple support teams. There could be confusion related to who issues must be reported to and both teams could start overlapping each other when resolving issues. However, having an outsourced company can allow 24/7 support outside of business hours.

How Troubleshooting and Repair can be Affected

Organisational Policies

Organisational policies can affect troubleshooting and repair by providing guidelines for how faults should be reported, diagnosed, and resolved. For example, **security** guidelines could impact troubleshooting if sensitive data is stored on a user's device. This is to ensure that no data is leaked or read by someone who hasn't got permission. **Costs** can affect repair if the company cannot afford to buy new hardware and equipment to resolve any hardware faults that may arise.
System downtime guidelines can increase the speed at which repairs are completed as the organisation may have a policy that limits how much downtime is acceptable to cause as little disruption as possible.
Resource allocation and prioritisation guidelines dictate which issues are given priority for being repaired and allocating the number of resources needed to resolve the issue.
Contractual requirements will affect troubleshooting and repair as expectations will be set between the company and a third-party support team for how issues will be handled and resolved.

Internal Customer Issues

Internal customer issues can affect troubleshooting and repair by creating additional challenges for coordinating support and ensuring issues are resolved quickly and effectively.
Communication with customers can affect troubleshooting and repair as it may be difficult to understand what the customer is having issues with, making it harder to resolve the issue.
Leglisation can further affect the support provided as extra steps will have to be taken to ensure all laws, such as the Data Protection Act and the Official Secrets Act, are followed to ensure secret and private data is secured and doesn't fall into the wrong hands.
Escalation of faults can affect support by ensuring the fault is given a timely and effective response to ensure a small amount of downtime as possible for critical systems.
Service Level Agreements help dictate how important an issue is and sets out a time frame for which it will be resolved in. For example, the most critical issues would be resolved within the hour, whilst the least important issues may be resolved within the week.

The Impact of Faults on an Organisation

In the modern era, organisations rely on IT to manage and run the services they provide and administration to keep the service running smoothly. Both hardware and software faults can have a significant impact on the organisation's inner workings.

Without their IT services, the organisation could come to a screeching halt resulting in financial loss and a loss in customers. The severity of the loss depends on the type of fault: a minor fault (i.e. such as a malfunctioning printer which could disrupt workflow) or a major fault (i.e a cyber attack which could print the organisation to a halt).

Software Faults

Software faults can be caused by a wide range of issues—for example a misconfigured system or corrupted system files. These software faults can lead to a lack of internet if a router is misconfigured, or the inability to access the organisation's website if DNS is misconfigured. Another example is unable to boot into Windows if vital system files are corrupted, leading to a potential loss of data or being unable to access important data.

To prevent software faults, it is recommended to test all configuration changes, such as configuring a router, on spare hardware before pushing them to production. This ensures that the main network isn't affected which minimizes any downtime during upgrades. To ensure that the organisation's devices and systems don't experience any data corruption, it is important to teach employee's the importance of safely ejecting hardware—i.e. USB sticks—and properly shutting down a system before removing its power connection. Another solution could be the regular checking of system files by running Window's System File Checker tool daily, for example during start-up.

Hardware Faults

Hardware faults are most common in older, more used hardware. For example, AMD rates their Ryzen CPUs to have a shelf life of at least five years. The most common factor which can reduce the lifespan of electronics like the CPU is mismanaged thermals. If your system is consistently operating at a high temperature, the excess heat can quickly wear out your system's components. All devices are affected by heat, including storage, power supplies and graphics cards.

A common fault that can cause a large impact on an organisation's systems is storage failure. A hard drive's lifespan typically lasts from three to five years. As explained above, excessive heat can further reduce a hard drive's lifespan. Programs such as Crystal Disk Info can provide estimations for a drive's remaining lifespan and can show the user how many bad sectors and faults are occurring on the drive, suggesting if a failure is imminent.

To prevent hardware faults, it is important to perform regular tests on the organisation's hardware to help catch any early signs of failure. An example of a test is a hard drive's S.M.A.R.T—Self-Monitoring, Analysis, and Reporting Technology—test, which can inform the user of pending failures and arising issues. If an issue is found, action can be taken quickly to prevent any major downtime or irrevocable data loss.

Preventative Measures

Other useful preventative measures to implement within an organisation to reduce the impact of faults are:

- Regular Backups: having backups of important data taken daily or twice daily reduces the impact if a drive failure were to occur as the drive can be replaced and the data copied to the new drive. Having data backed up locally and to an off-site location can help keep data safe in the event of a natural disaster such as a fire.

- Software Updates: installing software updates regularly helps keep software bug-free and working as intended without the risk of file corruption and system instability.

- Disaster Recovery Plans: disaster recovery can often have multiple layers that contain different solutions to different problems:

  - Spare systems: if an essential server goes down a spare can be booted up to resume operation.
  - Hot-site: if the current working environment is unusable due to power outages or other disasters, another location can be fully set up and used immediately when needed.
  - Cold-site: an off-site location that can be used but would require hardware to be set up before use.

- On-site IT team: having an on-site team allows for people to be deployed quickly to diagnose and repair hardware faults as soon as they occur.

The Importance of Fault Logs

Keeping detailed fault logs is essential for an organisation's IT team. Fault logs should be recorded after an incident has occurred, keeping track of what the fault was, the time it happened and how it was resolved. This data can help IT teams recognise patterns in faults (for example see that a specific type of hard drive is failing quicker than others) and troubleshoot re-occurring faults. The fault logs can also help IT teams identify areas where more preventative measures need to be implemented.

For example, if a certain application has been crashing at a specific time of day, fault logs can be used to identify trends allowing IT teams to look into the specifics of what the application is doing at that specific time of day which is causing the crash (for example, a scheduled backup) and a fix can be implemented.

To conclude, it is crucial that a detailed and accurate fault log is kept and updated regularly to ensure the organisation's IT team can effectively manage and minimize the impact of the different faults that may arise. It is important to have a dedicated in-house IT team to respond to faults and resolve them, keeping a record of how the fault was resolved to help troubleshoot other faults in the future.