LOYALIST COLLEGE
IN TORONTO

CLOD1001

Introduction to Computers and Networking

(M06 Group 1)

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# ***Reactions to Software Problems***

In today's digital landscape, a multitude of applications, operating systems, and web platforms cater to diverse needs and audiences. Users' experiences can vary widely, influenced by a plethora of factors from interface design to functionality. The level of frustration that users may experience depends on below mentioned factors.

**Criticality of Application -** This refers to the requirement level of the app for users' day-to-day activities. Transit apps like Presto and banking apps can be considered as highly required applications, while games or streaming applications fall within the lower level

**Frequency** - The frequency of the error occurrence (ex -avg 10 per day)

**Explanation/Error Handling** - Does this software or app explain what caused the error or suggest corrective actions?

The causes of the problems which lead to user frustration can be categorized as below:

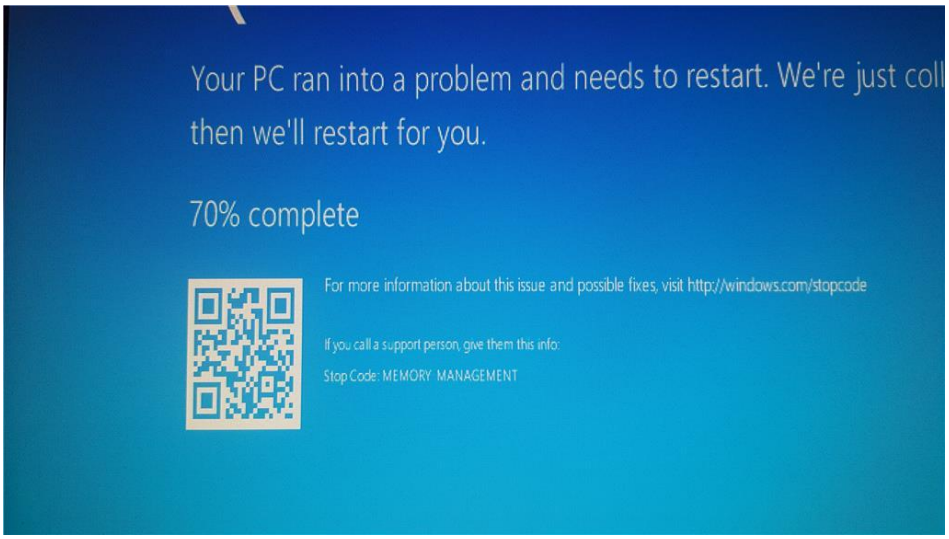
**UI/UX Design Flaws** - User interface and experience design is one of the most crucial parts of building a application; a ui bug/design flaw can easily lead users to get frustrated.

**Bugs** - Bugs are the scenarios/logic which an application does not have any function to handle. Having extensive and rigorous testing before deploying an application to production is essential to avoid bugs.

**Hardware Errors** - The errors associated with the hardware on which the application, website, or service runs.

**Network Error** - Network errors are the errors which were caused by the network that facilitates the data transfer between the app client and data centers.

One of the most common scenarios in which users get frustrated easily is the Windows blue screen issue, typically known as the blue screen of death. The frustration level in a scenario where a user experiences a Windows blue screen issue is high because the error prevents the user from accessing any application.




The image indicates a MEMORY_MANAGEMENT error, a type of BSOD. Initial troubleshooting involves checking the DIMM slot and memory status in BIOS. If no issues are found, compare the motherboard's supported memory capacity and bus speed with the installed RAM, and replace if faulty.

The majority of events why users get frustrated are not actual application bugs, but the flustered users' first step is to assume it's a bug. That's because of users' lack of understanding when dealing with applications. Having a high-level understanding of how applications work can reduce lots of stress and frustration. A perfect example of this is network-related issues. When users know firewalls in a network can block certain traffic, they can easily apply the workaround of changing the network or using mobile data without getting frustrated about why the website or application is not loading.

As mentioned in the above blue screen scenario, reading the actual error code or error message and doing research is highly effective and can help narrow down the list of root causes.

With or without any technical background, one thing anyone can do is have backups for critical servers or applications we use. For example, having two different banking applications installed on your phone, having two SIM cards, or even having two text/messaging apps can help reduce the level of frustration by a significant percentage as the probability of both not working is extremely thin.

# ***Energy Efficient***

The cost of energy is one of the major things futurists in the past got wrong. With the mechanical revolution that happened with Newtonian physics, everybody in the past predicted a future where energy is cheap and free, but instead, what became cheaper is information. What has happened, even though energy did not become cheap, is the fact that the tools which use energy became efficient. Computers and laptops are one of the tools we use which became extremely energy efficient with time.

The prime comparison which demonstrates the importance of energy efficiency is between the Apple MacBook Pro 16 inch and the ROG Zephyrus G16.

| MacBook pro 16/16 core | ROG Zephyrus G16 (2024) |
|---|---|
| 16-core CPU<br><br>40-core GPU<br><br>32GB Unified Memory<br><br>1TB SSD Storage[1]<br><br>16-inch Liquid Retina XDR display[2]<br><br>Magic Keyboard with Touch ID | Intel® Core™ Ultra 9 Processor 185H 2.3 GHz<br><br>NVIDIA® GeForce RTX™ 4080 Laptop GPU<br><br>2.5K (2560 x 1600, WQXGA) 240Hz<br><br>16GB*2 LPDDR5X 7467 on board<br><br>2TB PCIe® 4.0 NVMe™ M.2 |
| **Battery specs --**<br><br>Up to 15 hours wireless web<br>100-watt-hour | **Battery specs --**<br><br>90WHrs,<br>6-8 hours of life |

In terms of specs, both the MacBook and Asus Zephyrus have identical hardwear. The only differences are the 10% battery capacity increase in MacBook and how the CPU/SOC is configured. Yet, the MacBook has nearly double the working hours than the Zephyrus. Why is that? This is mainly because of two fundamental differences in computer design architecture. The first one being a System on Chip (SoC) and the second being utilizing ARM architecture.

The MacBook has what the industry calls SoC (System on Chip), which is what we can usually find in tablets and mobile phones. SoC has many different components merged together including RAM, CPU, and GPU. The main advantages of using a SoC can be listed as below:

- Takes less space as SoC merges many different larger components
- Reliable - reliable because there are fewer connections
- Higher performance - because all signals can stay on one chip

The traditional laptops until the arrival of Apple M1 utilized x86 based architecture. Although x86 is extremely versatile, it's not as efficient as ARM. Compared to x86, ARM has a reduced instruction set which is part of the reason why ARM is more energy efficient, but applications need to be developed for that architecture, or we must use emulators. Since Apple MacBooks run macOS which is their own product, it makes it easier for a single company to migrate OS for arm.

If cost isn't a concern, the MacBook suits 90% of use cases. The remaining 10% includes gaming and non-ARM optimized software. However, considering value, the Asus Zephyrus, being $1000 cheaper, is the best option.

Balancing computing and thermal performance can be achieved by undervolting the CPU using tools like Intel XTU. This reduces energy spent on cooling at peak levels. Basic OS features like adjusting brightness, disabling startup apps, and GPUs also aid in energy conservation.

## ***Case Study (Amateur Sports League)***

1. **Digital Registration and Communication:**

• Set up an online registration system for players, coaches, and volunteers to efficiently collect necessary information.
• Utilize email or a messaging platform to communicate updates, schedules, and important announcements with board members, coaches, and players.

2. **League Management Software:**

• Look for league management software that can handle scheduling, team assignments, and player registrations.
• Utilize the software to create and manage game schedules, track scores, and handle administrative tasks specific to your league's needs.

3. **Website and Social Media Presence:**

- Create a league website to share information about upcoming games, player profiles, league rules, and news.
- Utilize social media platforms to engage with players, parents, and fans by posting updates, photos, and highlights from games.

4. **Mobile Apps:**

- Create a league-specific mobile app to serve as a hub for all league-related information, including schedules, standings, and news.
- Include features like push notifications for game reminders, weather updates, and urgent announcements.

5. **Video Analysis Tools:**

- Use video analysis software to review game footage for coaches to analyze player performance and provide targeted feedback.
- Share video clips with players to enhance their understanding of tactics and techniques.

6. **Financial Management Software:**

- Keep track of league finances using accounting software to manage expenses, track membership fees, and generate financial reports.

7. **Online Fundraising and Donations:**

- Set up an online donation platform to raise funds for the league and encourage supporters, parents, and local businesses to contribute.
- Consider organizing virtual fundraising events or crowdfunding campaigns to support the league.

In conclusion, through the implementation of digital registration and communication, league management software, a strong online presence, mobile apps, video analysis tools, financial management software, and online fundraising initiatives, your league can revolutionize operations, enrich communication, and secure vital financial support for continuous growth and triumph.

# ***Recommending Technology Solutions***

In the education sector there are a lot of different hardware and software that will be used. Different populations prefer dissimilar types of communication methods.

For research we had assigned team members for different investigation parts as:

1) **Hardware and software Investigator:**
   In this part the assigned personnel investigated hardware like computers, laptops tablets, educational robots and interactive whiteboards which were relevant to education.

2) **Programs and Apps Investigator:**
   Different learning platforms as educational apps, and digital content platforms like different websites and webpages and Different learning management platforms for e.g. BrainPOP, Khan Academy, Quizlet etc. was investigated.
3) **Communications Methods Investigator:**
   Researched about different communication technologies that are used in education sector, including Wi-Fi networks, Video Conferencing tools as ZOOM, Google Meet etc.

We created a hypothetical educational business: - Technological education solutions an educational company focusing on solution of high school students.

1) **Hardware recommendation:**
   a) Laptops and Tablets: There are different companies that give different offerings on using their products. Recommend Microsoft educations and Chromebook for their affordability, durability, and integration.
   b) Interactive Whiteboards: Smart boards which create interactive features and adjust with educational software. Attention grabbing and brighter screen with low maintenance cost.

| | Microsoft 11 SE | Chrome Books |
|---|---|---|
| CPU | Intel Celeron N4020 or N4120 series with integrated graphics. | Varies (Intel/AMD/ARM) |
| Ram | 4 GB or 8 GB | Typically 4 GB or 8 GB |
| Wi-Fi | 802.11 ac (wifi 5) | 802.11 ac or 802.11ax |
| Storage | 64 GB or 128 GB eMMC | Varies (32 GB to 256 GB) |
| Cost | 249$ | 250$-339$ |

AS we see this table we recommend to use MS laptops if you want your laptop specially for education as we compared the laptop with same specifications Chromebook is cost effective.

2) **Program and Apps investigator:**
   Different apps like LMS, other educational applications and digital content platforms like (websites and Webpages). We decided to use Moodle which is fruitful for high school students. Evernote is also useful, but it is especially for college students.

| Feature | Moodle | Talent LMS | Absorb LMS | 360 Learning |
|---|---|---|---|---|
| Deployment | Self-hosted or cloud-based | Cloud-based | Cloud-based | Cloud-based |
| Customization | Highly customizable | Limited customization | Moderate customization | Some customizations |
| Mobile Access | Mobile app | Mobile app | Mobile app | Mobile app |
| Integrations | Extensive integrations | Integrates with various platforms | Integrates with various platforms | Integrates with various platforms |
| User Management | Detailed user roles and permissions | Easy user management | Detailed user roles and permissions | Flexible user roles and permissions |
| Pricing | Free (open source) with optional paid hosting | Subscription-based pricing with various tiers | Subscription-based pricing, typically higher-end | Subscription-based pricing with enterprise options |
| Support | Community support, optional paid support | Email, phone, and chat support | 24/7 support with dedicated customer success managers | Email and chat support with dedicated customer success managers |

**3) Communication Capabilities:**

There is distinct type of communications that can be applied in an education sector, firstly we had selected a robust Wi-Fi network which can run video conferencing tools as zoom and Google meet which is evolving in today's education sector that fosters co-operation and access to resources then virtual classes which inherits the geographical barriers. This type of education gives the path of future education and success in this technological world.

| Feature | Google Meet | Zoom |
|---|---|---|
| Price | $0 to $18 per month, per user (plus custom-priced Enterprise option) | $0 to $25 per month, per user |
| Participant Capacity | Up to 1,000 | Up to 1,000 |
| Meeting Time Limits | Up to 24 hours (free plan limits group meetings to one hour) | Up to 30 hours (free plan limits group meetings to 40 minutes) |
| Screen Sharing | ✓ | ✓ |
| Virtual Backgrounds | ✓ | ✓ |
| Chat | ✓ | ✓ |
| Pin/Spotlight Participants | ✓ | ✓ |
| Whiteboard | ✓ | ✓ |
| Breakout Rooms | On paid plans | On paid plans |
| Record Meetings | On paid plans | On paid plans |
| Polls | On paid plans | On paid plans |
| Closed Captioning | ✓ | Third-party app required |
| Meeting Filters | ✓ | ✓ |
| Meeting Transcripts | Available via a Chrome extension | Available on Business and Enterprise plans |
| Cloud Storage for Recordings | 30 GB to unlimited storage per user | 5 GB to unlimited storage per user on paid plans |
| Security | Encryption in transit and at rest; two-step verification | Transport Layer Security (TLS) encryption, AES-265 encryption for real-time content; end-to-end encryption optional |
| Integrations | 200-plus | 1,000-plus |

We have chosen to use Zoom as it offers more sophisticated features and greater adaptability, making it suitable for larger organizations. However, Google Meet also provides a user-friendly experience and seamless integration with Google Workspace, making it a valuable option for educational institutions.

**By way of a side note...** In our hypothetical scenario tailored for Canadian educational Institutions, we've explored technology solutions to enhance high school students' learning experiences. However, it's important to note that these choices may vary based on resources and costs in other countries.