THE IMPLEMENTATION OF USER-CENTERED DESIGN IN MOBILE APPLICATION TO IMPROVE HUMAN WELL-BEING

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Project Objectives

To improve human well-being in this mobile-first world, helps people understand their digital habits and the importance of proper usage, and awaken people to invest more attention to what really precious in their life.
DIGITAL WELLBEING (TERM)

Find a balance with technology that feels right for us.

To describe the concept that when humans interact with technology, the experience should support mental and physical health in a measurable way.
There are no Stopping Cues in the way we receive information nowadays.
Stopping cues

A signal that it's time to move on, to do something new, to do something different.
THE IMPLEMENTATION OF USER-CENTERED DESIGN IN MOBILE APPLICATION TO IMPROVE HUMAN WELL-BEING
Backgrounds
The Age of Behavioral Addiction

Addictive technology is rising and there are businesses of keeping us hooked everywhere, digital experiences are engineered to create psychological effects like drugs.
The Bad Effects of Misappropriate Use of Mobile Technology

- Impulsivity/less self-control
- Extraversion
- Neuroticism
- Less self-esteem
- Loneliness

- Less conscientiousness
- Low agreeableness
- Social anxiety
- Shyness
- Less openness
- Fear of missing out
Blue light emitted from screens may have an impact on melatonin levels and thus affect sleep and wakefulness.
Sociological Peer Pressure and External Obligation

1. **Message sender** get frustrated when they did not get any response fast enough, because there is a possibility that the message receiver can respond immediately.

1. **Recipient** want to be a good and responsible character so that they **make themselves as available as possible** to keep up with external obligation,
The Shortening Human Attention Span

The attention span of smartphones users is becoming shorter, People are expecting higher quality and rapid browsing experiences

53% of mobile users abandon sites that take longer than 3 seconds to load
Related Application Tools

- Desert Island - A Digital Wellbeing Experiment
  - Google Creative Lab
  - 3.4 MB  3.7 ★

- Unlock Clock - A Digital Wellbeing Experiment
  - Google Creative Lab
  - 1.7 MB  3.2 ★

- Post Box - A Digital Wellbeing Experiment
  - Google Creative Lab
  - 4.8 MB  3.4 ★

- Morph - A Digital Wellbeing Experiment
  - Google Creative Lab
  - 9.7 MB  3.0 ★

- We Flip - A Digital Wellbeing Experiment
  - Google Creative Lab
  - 4.5 MB  3.6 ★
Smartphone Addiction in Neurological Aspect

**Neuro-association**
Underneath the happiness (satisfaction), the brain is secreted Dopamine and associates it with the trigger event, creating a bond.

Brain will be desensitized  
Start running the treadmill of dopamine
Functionality of Digital Wellbeing Tools

- Social sharing, leaderboard, unlock achievements, points...
- Record history, visualise usage, display a timer...
- Goal reminder, redirect activity...
- Feature minimisation, block, enforcement action, time limit...

**Categories:**
- Reward/punish
- Goal-advancement
- Self-tracking
- Block/removal
Project Demonstration
Conceptual Design

Open ‘Restraint’ application

Permit usage access

Main Activity: visualised usage data of applications

- Screen time
- Frequency of use
- Last time used
- Mobile data usage

Add shortcuts with timer
- Add shortcut to Home screen
- Open App with time limit
- Refresh

Settings
- Hide system apps
- Hide uninstalled apps
- Ignored apps list
- About

App details & App sessions
- App details
- App sessions
- Open this app
- Ignore this app
- More details (System App Info)

Today and Yesterday
Program Design
Interface Design
Interface Design
Interface Design

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Interface Design
Technical Contents
Software Used

Android Studio

The official integrated development environment for Google’s Android OS, built on JetBrains’ IntelliJ IDEA software

Programming Languages: Java and Kotlin, Extensible Markup Languages (XML)
UsageStatsManager

provide access to device usage history and statistics.

declare for permission within the Android Manifest
‘tools: ignore’ : to dismiss lint warnings while requesting the protected permission

```
<uses-permission
    android:name="android.permission.PACKAGE_USAGE_STATS"
    tools:ignore="ProtectedPermissions" />
```
‘ACTION_USAGE_ACCESS_SETTINGS’
shows settings to control access to usage information

```java
public void requestPermission(Context context) {
    Intent intent = new Intent(new Intent(Settings.ACTION_USAGE_ACCESS_SETTINGS));
    intent.setFlags(FLAG_ACTIVITY_NEW_TASK);
    context.startActivity(intent);
}
```
AppOpsManager

An API for interacting with application operation tracking.

Gets the App Ops Service to retrieve an AppOpsManager for tracking application operations on the device, then performs a quick check for permission of usagestats, and it returns MODE_ALLOWED.
Classes Used

**PackageManager class:**
To retrieve various kinds of information related to the installed application packages.

**Application Info class:**
To get application info which corresponds to information in the Android Manifest’s application tag.

Distinguish the **system applications** (installed in the device’s system image) and the **uninstalled applications**.
Classes Used

**System class:**
To **get the current time** in milliseconds

**Calendar class:**

getInstance method: To **return a Calendar object** whose calendar fields have been initialized with the current date and time.

set methods: **Set the calendar field values** for different situations and get by calling the getTimeInMillis method.
By writing code for calculation, developers can get a different time range, such as today, yesterday, this week and so on.

```java
private static long[] getYesterday() {
    long timeNow = System.currentTimeMillis();
    Calendar cal = Calendar.getInstance();
    cal.setTimeInMillis(timeNow - A_DAY);
    cal.set(Calendar.HOUR_OF_DAY, 0);
    cal.set(Calendar.MINUTE, 0);
    cal.set(Calendar.SECOND, 0);
    cal.set(Calendar.MILLISECOND, 0);
    long start = cal.getTimeInMillis();
    long end = start + A_DAY > timeNow ? timeNow : start + A_DAY;  // for 0:00
    return new long[]{start, end};
}
```
**queryEvents**: to query for events in the given time range and returns values to `UsageEvent` object.

**hasNextEvent()**: to detect whether or not there are more events to read. If there are more events, `getNextEvent()` function is used to read.

**Event type denotation**: ‘MOVE_TO_FOREGROUND’ and ‘MOVE_TOBACKGROUND’

When the current interaction is begun, the start time and end time are recorded.
• Hash table based implementation of the **Map interface** is used for cache variables.

• The content of the related adapter was sorted using the specified comparator.

• **Telephony Manager and Network Manager:**
  to get information about mobile usage.

• Subclass the Broadcast Receiver and start alarm service.
Alarm Manager

defer actions until a scheduled point in the future instead of interrupting a user with notifications.

An Intent had been registered to perform a broadcast by the system when the alarm goes off, it starts the target application if it is not already running.

The ‘RTC_WAKEUP alarm type was scheduled by using set function to wake up the device to execute the pending intent.
Preference Manager

used to helping create Preference hierarchies from activities or XML.

Shared Preference:
the interface for accessing and modifying preference data that all clients share.
Shortcut Manager  For build version Android Oreo and above

ShortcutInfo represents a shortcut that can be published via ShortcutManager, and Builder class was used for the ShortcutInfo objects.

to create an intent(Dialog activity) before the use of application:
Create Shortcut  Build version below Android Oreo

First creates an intent with action INSTALL_SHORTCUT which allows an application to install a shortcut in the launcher home screen.

sendBroadcast function: to broadcast the intent to all interested BroadcastReceiver.
**Canvas class** to hold the draw calls for writing into the bitmap. **Bitmap** hold the pixels.

**createBitmap()**: return mutable bitmap with the specified width and height.

**Countdown timer** was used for the splash activity to create delay.
Other Libraries

**Glide**: to fetch, decode, and display bitmaps in this application. Glide abstracts out most of the complexity in handling tasks.

**SeekArc**: A circular SeekBar which is used in the dialog activity of timer ...

**Butter Knife**: providing field and method binding for Android views.
Tap Target View

A feature discovery prompt gains user attention on a specific user interface element for the first time use of this application.
Result and Discussion
The percentage of “Often + Sometimes” feedback

- You tend to lose track of time when you are on your phone. **88.5%**
- You feel the need to check your phone right away if it vibrates or makes a sound. **88.4%**
- You get distracted by your phone when you are with friends or family. **76.9%**
- You spend more time on social media than you want. **73.1%**
- You will stay on your phone instead of going to sleep when you intend to. **88.5%**
- You feel like you're missing something important at work if you don’t check your phone. **84.6%**
- If you have a question, you reach for your phone for an immediate answer. **92.3%**
- You feel overwhelmed by the amount of unread messages or emails you have. **46.2%**
- You have a meaningful in-person social interaction on a daily basis.(rarely) **19.2%**

Which feature do you think is the most effective?
25 responses

- 92% Goal advancement (goal reminder, redirect activity...)
- 8% Reward and punishment (social sharing, leaderboard, unlock achievements, points...)
- Block or removal (feature minimisation, block, forcing, time limit...)
- Self tracking (record history, visualise usage, display a timer...)

Which feature do you think is the most essential?
25 responses

- 84% Goal advancement (goal reminder, redirect activity...)
- 16% Reward and punishment (social sharing, leaderboard, unlock achievements, points...)
- Block or removal (feature minimisation, block, enforcement action, time limit...)
- Self tracking (record history, visualise usage, display a timer...)

Do you think the implementation of stopping cues feature is helpful or necessary in the way we receive information on mobile devices nowadays?

25 responses
The Definition of Digital Wellbeing

**Narrow:** The extent to which people consider their digital device use to be consistent with their longterm goals, applications are often designed to capture attention for certain purposes.

**Broad:** It is including the domains of psychological wellbeing, also known as life satisfaction, such as health, education, career, community and environment, social safety and security.
Subjective well-being: a person’s cognitive and affective evaluations of their life as well as life satisfaction, it is commonly being affected by digital wellbeing.

The aspects of digital wellbeing are widely discussed, from the physical and mental health to the self-development, from the narrow to the broad.
The Fundamental Values for Digital Wellbeing

find a balance between lives and technology,
between the costs and advantages of using digital technologies.

**Wisdom and knowledge shall be the stability of thy times:**
control yourself wisely before you can make the best use of technology.

People sometimes lost wisdom in knowledge and lost knowledge in the information. Knowledge is simply having clarity of facts and truths, while wisdom is the actual ability to always make good decisions at the right time.
Conclusion
Conclusion

- Researchers, developers, and designers should elucidate their use of the term of digital well-being.

- We must take responsibility to promote the practice of digital wellbeing.

- Technologies practice digital wellbeing and respect for psychological health generally will become a consumer expectation and digital right.

- Iterate collectively toward an upcoming future in which all technologies are designed to support digital wellbeing, psychological health and appreciate users.
Future Work: Artificial intelligence

- much smaller, more adaptable and less need for screen interaction.
- absorbing data and learning from it, even making decisions
- An AI phone that pretends to be the owner. Many inventions of artificial intelligence features may emerge.
Abramovich (2018) citing experts, the internet of things, virtual reality, artificial intelligence, and voice have huge potential to breathe new life into the mobile space.

Mobile smart devices are just like the soil ground, technologies are fertilizer enriching it and applications are units of land planning (grid arrangement).
THE END