SITUATIONAL AND BEHAVIOURAL SET OF INFORMATION FOR USER CLASSIFICATION

IO1/A1: User Models Design

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1. Introduction

Over the last 15 years, Internet use has grown very quickly: in contemporary society approximately 40% of the world population is online. The Internet is an important tool for education, entertainment, communication and information-sharing (Kuss et al., 2014). The increasing popularity and frequency of Internet use has led to the emergence of clinical cases presenting abuse symptoms (Spada, 2014) and the pathway from adaptive to pathological Internet use appears to a crucial issue to further research.

Internet Addictive Behaviour (IAB) or screen abuse is defined as a behavioural pattern characterised by loss of control over Internet use, which potentially leads to isolation and neglect of social, academic, occupational and recreational activities, and personal wellbeing.

The main objective of this project is to empower adult citizens (35-55 years old) to deal effectively with situations concerning excessive preoccupation with the Internet, equipping them with the skills and the methodological and technological tools to modify Internet behavior, to promote healthy Internet use and embrace a balanced approach between online engagement and offline alternatives.

This objective will be achieved through an investigation of the extent to which Internet use varies across participating countries and the potential impact on adult individuals. The implementation of the proposed strategy/curriculum in the target population in different countries (EL, PL, CY, PT) will facilitate the investigation of potential links between **individual characteristics** and Internet use, as well as the enlightenment on why and how it differs across European countries using **background information** (i.e., demographic data, overall time spent online, time spent in each session, feelings before and after activities, performance and progress during reduction attempts, etc.). Additionally, it will improve our general understanding of the place that the Internet has in our lives and potential consequences of problematic use.

Towards that end, a complete strategy will be developed utilizing different fields of expertise (namely fields of clinical and addiction psychology, cognitive behavioural therapy, reflective learning theories and enhanced learning approaches) ,to assist adult individuals' identification and assessment of their behaviours related to Internet usage, their prior maladaptive behavioural rationalisations and other personal, social, and/or familial issues leading to problematic Internet usage. The strategy will be helped by the "Internet Addiction Pal", an interactive tool to identify, report, and suggest personalised moderation plans based on each user's needs. The plans will adapt and combine existing methodological tools, such as assessment/diagnostic tools (i.e the Problematic Internet Use Questionnaire (PIUQ), etc.), models for the development and maintenance of IAB (i.e., cognitive/behavioural model of problematic Internet use) and modification/reduction and prevention guidelines reported by clinicians working in the

field of IAB i.e., cognitive restructuring approach (Kuss,Pontes,2019). The strategy will be implemented and delivered through the learning motivational environment of the project.

User models design will contribute to identify specific demographic and behavioural information concerning Internet use, to support adults with excessive preoccupation with the Internet to implement personalised moderation plans and screen moderation strategies through a personalised learning approach. After the users having been exposed to this material, they will be asked to implement certain action plans that will help them to moderate Internet usage.

In this document the User Models Design is described as indicated in the project proposal:

A preliminary desk research was conducted while preparing this project proposal in order to have a good insight of the current literature in relation to existing methodological tools for IAB assessment, models for the development and maintenance of IAB and treatment guidelines. As soon as the project starts, it will be necessary to collate the findings in a common framework under the design of the user models for adults. Critical at this phase will be the contribution of P4-NTU and especially Dr. Daria Kuss who will provide substantial information and guidance reporting also on the results of their European study investigating Internet use among adults. The user models will comprise 2 layers of information.

In the 1st layer (Situational Layer) of personalization, demographic data will be captured (e.g., age, educational level, occupation, locality, etc.). Then, the 2nd layer is the Behavioural layer, where information concerning Internet use will be used to make an informal classification of the user and capture the "AS-IS" situation encapsulating the current usage of Internet by the user. In the early stage of prevention or modification of the user's behaviour, the focus should include taking a complete assessment of the user's current Internet use to help determine his/her Internet activities.

To validate the "AS-IS" situation and user classification profiles and the "TO-BE" situation the partners will conduct a survey among targeted adult groups to validate user profiles and see what reduction they consider as a major improvement based on situational and behavioural data, which will be associated to the elaborated User Profiles as well as their expectations in terms of training and tools to help them moderate their screen time.

2. Situational layer

Regarding the situational layer, which will capture the individual characteristics of the adults which are meaningful in terms of Internet usage patterns of risk, the focus will be on demographic information, such as gender, age, educational level, occupation, locality and also on the levels of personality traits that will be used to make an informal classification of the user and capture the "AS-IS" situation regarding their current usage of certain online applications and their relative risks.

For **Demographics** the users should provide self-reporting information about their age, gender, country of origin, and education level.

For **Personality Traits** users are asked to fill out the Quick Big Five questionnaire (Vermulst & Gerris, 2009) that was based on Goldberg's personality markers (1992) as indicated by Kuss et al. (2013). The Big Five Traits taxonomy was drawn from measures the big five personality traits: extraversion vs. introversion, agreeableness vs. antagonism, conscientiousness vs. lack of direction, emotional stability vs. neuroticism and openness vs. closedness to experience.

Low emotional stability, low agreeableness, and low extraversion seem convincing candidates for increasing the risk of Internet addiction as these associations are found in multiple studies. Specifically, the identification of the above mentioned characteristics demarcates frequent users who develop addiction symptoms from non-frequent users who do not need prevention and treatment (Kuss et al., 2013). We will be using this information to identify the relevant risk assessing the interaction between these variables (i.e., extraversion, agreeableness, conscientiousness, emotional stability and resourcefulness) and the level of Internet behaviour. The questionnaire includes 15 questions scored on a 7-point ordinal scale ranging from: Strongly Disagree =1, Disagree =2, Somewhat disagree=3, Neither agree nor disagree = 4, Somewhat agree = 5, Agree = 6, Strongly agree=7. More information is provided in ANNEX II.

The classification distinguishes between 6 groups of users:

Low level personality traits

1. Low agreeableness, extraversion, resourcefulness
2. Low emotional stability
3. Low conscientiousness

High level personality traits

4. High agreeableness, extraversion, resourcefulness
5. High emotional stability

6. High conscientiousness

The visualisation of the score will be a diagram, informing users about their score and a text describing in general terms each one of the 6 groups.

The following table depicts the elements of situational-sociodemographic layers in a cohesive way. More specifically, in the first column are presented the information elements that are required, the third column includes valid values that the user would choose from and the final column refers to all possible final categories that the user may be classified.

Table 1: The elements of Situational Layer

First Layer: Situational-Sociodemographic Information			
Individual data: Users are asked to self-report individual data. (ANEX I)			
Info Required		Valid Values	Classification Values
Age		35-55	-
Gender		• Male • Female • Prefer not to say	-
Country of origin		• United Kingdom • Greece • Portugal • Cyprus • Poland • Other	-
Locality		• United Kingdom • Greece • Portugal • Cyprus • Poland • Other	-
Educational Level		International Standard Classification of Education (ISCED) [1]	-
Occupation		Short answer (free text space)	-
Family/Marital Status		Standard Marital Status Classification (CSO) [2]	-
Internet Access		• Mobile phones • Laptops and desktops • Tablets • Other devices (such as gaming consoles)	-
Personality Traits: Users are asked to fill out a Quick Big Five (QBF) questionnaire. (ANNEX II)			

Extraversion vs. Introversion Agreeableness vs. Antagonism Conscientiousness vs. lack of direction Emotional stability vs. neuroticism Resourcefulness vs. closeness to experience		-Strongly disagree -Disagree -Somewhat disagree -Neither agree nor disagree -Somewhat agree -Agree -Strongly agree	1. Low agreeableness, extraversion, resourcefulness 2. Low emotional stability 3. Low conscientiousness 4. High agreeableness, extraversion, resourcefulness 5. High emotional stability 6. High conscientiousness

1 https://datatopics.worldbank.org/education/wRsc/classification

2 https://www.cso.ie/en/methods/classifications/standardmaritalstatusclassification/

3. Behavioural layer concerning Internet Use

Addiction can occur in many forms. Often, it is assumed that physical dependence characterized by withdrawal symptoms is required in order for someone to be diagnosed with an addiction disorder, but the fact is that behavioral addiction can occur with all the negative consequences in a person's life minus the physical issues faced by people who compulsively engage in drug and alcohol abuse.

The compulsion to continually engage in an activity or behavior despite the negative impact on the person's ability to remain mentally and/or physically healthy and functional in the home and community defines behavioral addiction.

There are several types of behavioural Internet addiction including gambling, sex, love, work and shopping (Sussman, et al., 2011). There are several reasons and specific motives underpinning Internet use in general. Previous research examining why individuals use the Internet provided useful insights to help us understand the underlying psychological motivational factors for using the Internet (Kuss & Pontes, 2019). Individuals present different motives for using the Internet, including (Papacharissi & Rubin, 2000):

1. Interpersonal utility (pursuit of social contact and interaction online)
2. Passing time (use of the Internet to avoid boredom)
3. Information seeking (use of the Internet to seek information online)
4. Convenience (ease of access to the Internet to communicate with others)
5. Entertainment (use of the Internet for entertainment)

In addition to identifying specific motivational factors, previous research has defined specific typologies of Internet addiction to help us understand the extent of the problem and how it can manifest. Current views on Internet addiction define the phenomenon as an umbrella term encompassing several specific types of Internet addictions (Kuss & Pontes, 2019).

Establishing an accurate and all-encompassing typology of Internet addiction is a challenging task, as technology is rapidly evolving, making it difficult to map all potential addictive applications that have been developed. Accepting the view that the Internet is too heterogeneous eliminates the need for a typology of Internet addiction, as the term could be replaced by other terms referring to specific online behaviors (gaming, gambling, etc.), regardless of whether are performed online or offline (Kuss & Pontes, 2019).

To this end, the second level contains behavioural data that have to be collected and refer to:

1. General Internet usage in terms of frequency
2. Usage of specific online apps in terms of frequency (e.g. social networks, video streaming etc.)
3. Usage of specific online apps in terms of frequency in combination with the risk presented by the structural characteristics of them.
4. Interaction between personality traits and internet usage (behavioural and structural data)

1. General Internet usage in terms of frequency

For tracking the general use of the Internet in terms of frequency of active use (i.e., phone checking behaviours) per day, it seems appropriate to classify the users into three categories according their frequency of Internet use. For that reason, the answers that should be provided are graded on a 1-5 scale:

- Rarely: 0
- Less often: 1
- Weekly: 2
- Once a day: 3
- Several times a day: 4
- Constantly: 5

The classification categories will be the following:

1. Moderate or occasional Internet user: 0 -2
2. Frequent Internet user: 3-4
3. Excessive Internet user: 5

Furthermore, it will be useful to collect user data of actual engagement as this will allow us to provide an appropriate and accurate classification and visualization of actual use. Such information can be tracked automatically through apps that track activity, when logged on and when logged off, the type of online activity accessed (e.g., e-mail, chat, pornography sites, stock quotes, eBay, social networking, random Web surfing) and time spent on each Internet session, etc.

The reports to users could include visualisations of the score in that will inform them in which of the 3 categories they belong. The information provided to the user would not only include their scores and percentages, but how they rank relative to other users so they have comparison points.

Regarding the training/awareness material, it would be very edifying to provide infographics, short videos summarizing mean scores in different research studies in relation to daily cut-offs for moderate daily usage of the Internet, and risks related to frequent or excessive use during certain hours of the day.

2. Usage of specific online apps in terms of frequency

In order to track the use of specific online apps, the following categorization of Internet applications could provide useful classification of users in combination with the frequency of visits:

1. Social Networking (i.e.,Facebook, Instagram, Tiktok, etc.)

2. Personal emails/Administration (e.g., banking, paying bills, booking, travel)

3. Academic/work-related surfing

4. General information search (News)

5. Streaming (e.g., Youtube, Netflix, etc.)

6. Music

7. Online gaming websites

8. Online gambling

9. Online Pornography

10. Online shopping (buying and selling)

11. Dating websites

The answers that should be provided are graded on a 1-5 scale scored in accordance with the frequency of visit:

- **Never: 1**
- **Seldom: 2**
- **Sometimes: 3**
- **Often: 4**
- **Always: 5**

For the classification of users it is useful to divide them into 3 groups based on the frequency of usage of apps:

1. Moderate or occasional user for apps per group: 1
2. Frequent user for apps per group: 2
3. Excessive user for apps per group: 3

Reporting results could involve visualisation of the 3 highest frequency used groups of apps and the training/awareness material could include a text summarizing the type of Internet use.

3. Use of specific online apps in terms of frequency in combination with the risk presented by the structural characteristics of them

The aforementioned groups of online apps can develop different level of addiction risk, depending on their structural characteristics they are presenting. Low risk group of apps are those that pose a small risk of addiction, as they are used for a specific purpose and in a targeted direction. Medium risk applications are the ones that present a moderate risk of addiction, as they are used for a specific purpose but they can distract plenty of time from the user. High risk applications are those that have a high risk of addiction, as their content is either constantly changing or is associated with mental addictions. For tracking this risk, calculating the interaction between the frequency of the use of the above extracted groups of apps and the risk related to the structural characteristics of each group of Internet apps has led to the following classification of risks:

- Low risk groups of apps: Scoring 1
- Medium risk groups of apps: Scoring 2
- High risk groups: Scoring 3

The categorisation of the group of apps according to their risk, is the following:

Low risk group of apps:

- Academic/work related surfing
- General information search (News)
- Music

Medium risk group of apps:

- Personal emails/Administration (e.g., banking, paying bills, booking, travel)
- Youtube and movie websites (Netflix, etc.)
- Online shopping (buying and selling)
- Dating websites

High risk group of apps:

- Social Networking (e.g., Facebook, Instagram, Tiktok, etc.)
- Online gaming websites
- Gambling
- Online Pornography

The classification of users into 6 groups will be based on the risk related to each group of apps in terms of frequency of usage in combination with the risk presented by each group of apps (low risk apps scoring 1, medium risk apps scoring 2, high risk apps scoring 3) :

1. Occasional user of low risk apps
2. Occasional user of high risk apps
3. Frequent user of low risk apps
4. Frequent user of high risk apps
5. Excessive user of low risk apps
6. Excessive user of high risk app

Users from Groups 3-6 will be targeted with different training material /and notifications taking into consideration the variables gender, age, education level and eventually locality (via the answers that they have given in the questionnaires). Furthermore, individual data of each specific user may be combined with their high or low engagement (6 levels of usage frequency) presented by each app to define a combination of values for the groups at this level.

Reporting results could include visualisation of the 3 highest risk apps in percentages used by each user or a text summarizing the use Internet use in relation to the risk involved in the most frequently used apps by the user.

Training/Awareness material should vary between the six groups of users:

1 **Occasional users of low risk apps** should be provided with material indicating recreational use of leisure apps and general Internet usage.
2 **Occasional users of high risk apps** should be provided with material concerning potential risks of these apps (i.e., online gaming, gambling, social networking)
3 **Frequent and Excessive users of low risk apps** should be provided with the same material as 1 + notifications about their high engagement.
4 **Frequent & Excessive of high risk apps** should be provided with the same material as group 2 + notifications for the risk presented by each app for developing problematic behaviours.

Training materials need to include references to each specific app (i.e., gaming, gambling and shopping).

4. Interaction between personality traits and Internet usage (behavioural and structural data)

A low level of personality traits may increase the risk to develop internet addiction. To measure the risk of developing Internet addiction based on the interaction between certain personality traits and the frequency of usage of specific groups of Internet apps and their risks, the focus should be placed on four (4) groups of users, which are defined as follows:

1. A general group including **frequent users of low risk apps** with a low level of personality traits.
2. A general group including **frequent users of high risk apps** with a low level of personality traits.
3. A general group including **excessive users of low risk apps** with a low level of personality traits.
4. A general group including **excessive users of high risk apps** with low level of personality traits.

Reporting results for group 1 can include a text summarizing the Internet addiction risk of each user, focusing on the preventive strength of personality traits for not developing an addictive behaviour. As for groups 2,3 and 4, reporting results could include a text summarizing the behavioural state of each user, focusing on the potential risk for developing an addictive behaviour due to the risk related to low level personality traits could be very useful.

Training materials need to include infographics or short videos depicting for group 1 why and how low scores in relation to these traits are risk factors for developing addiction and for groups 2,3 and 4 why and how high scores in relation to these traits can be preventive factors for developing addiction.

5. Severity of symptoms resulting from Internet Use

Users that belong in the aforementioned four groups, as identified by the previous process, will be asked to fill in the “The Problematic Internet Use Questionnaire (PIUQ)”. At this level, information is inquired through an 17-item questionnaire which covers addictive behaviours and symptoms. The PIUQ was first published in 2006 and its psychometric properties were checked in a study by Kelly and Gruber (2010). The latter study generally confirmed the three-factor structure.

The three factors underlying the PIUQ are:

- Obsession — being obsessed with Internet activities
- Neglect — neglecting non-Internet activities
- Control disorder — unable to stop using the Internet

The possible range of scores is 6-30 for each of the three-factors, with the overall score of PIUQ ranging between 18-90. Responses are scaled in 5 frequency values:

- Never
- Rarely
- Sometimes
- Often
- Always

Combining this categorization with the above mentioned four risky types of Internet behaviour, a new classification of Internet addicted users can be formulated that will identify and measure three basic aspects of problematic Internet use: obsession (i.e., obsessive thinking about the Internet and mental withdrawal symptoms caused by the lack of Internet use), neglect (i.e., neglect of basic needs and everyday activities) and control disorder (i.e., difficulties in controlling Internet use).

Reports to users can include a text summarizing the behavioral state of each user, focusing on the severity of their symptoms. Subsequently, users will be asked to follow the action plan of the project and can be provided with information on where to ask for specialised support.

6. A total assessment

For a total assessment of the users at risk for developing IA based on the combination of the results related to:

1 the actual use of specific Internet apps,
2 followed by low scores in the personality traits' questionnaire, while some personality traits have been identified as increasing the risk for experiencing internet addiction symptoms, whereas others have been identified to increase resilience, and also
3 accompanied by an identified problematic Internet use assessment,

users will be asked to answer the "Internet Addiction Diagnostic Questionnaire" as it is presented in "Internet Addiction Test (IAT)" by Dr. Kimberly S. Young (2017).[1]

The following questionnaire conceptualised patterns associated with Internet Addiction:

1. Do you feel preoccupied with the Internet (think about previous online activity or anticipate next online session)?

2. Do you feel the need to use the Internet with increasing amounts of time in order to achieve satisfaction?

3. Have you repeatedly made unsuccessful efforts to control, cut back, or stop Internet use?

[1] https://www.stoeltingco.com/media/wysiwyg/IAT_web_sample.pdf

4. Do you feel restless, moody, depressed, or irritable when attempting to cut down or stop Internet use?

5. Do you stay online longer than originally intended?

6. Have you jeopardized or risked the loss of significant relationship, job, educational or career opportunity because of the Internet?

7. Have you lied to family members, therapist, or others to conceal the extent of involvement with the Internet?

8. Do you use the Internet as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)?

In this questionnaire, the answers that should be provided are graded on a 1-5 scale, depending on the degree to which the user agrees to each statement:

- Never
- Rarely
- Sometimes
- Often
- Always

Users were considered with behavioural/cognitive problems when endorsing five or more of the questions and at-risk for dependence when endorsing 3 – 4 questions (Durkee et al., 2012). Beard and Wolf (2001) further modified Young's diagnostic criteria, recommending that all of the first five criteria are required for diagnosis of Internet addiction, since these criteria could be met without any impairment in the person's daily functioning. It was also recommended that at least one of the last three criteria (e.g., criteria 6, 7, and 8) be required in diagnosing Internet addiction. The reason the last three were separated from the others is because these criteria impact the pathological Internet user's ability to cope and function (representing depressed, anxious, and escaping problems, respectively), and also impact interaction with others (e.g., significant relationships, jobs, being dishonest with others) (IAT, Young, 2017).

Diagnosing Internet addiction is often complex. Unlike chemical dependency and substance abuse, the Internet offers several direct benefits, as a technological advancement, to our society, not only as a device to be criticized as addictive. With so many practical uses of the Internet, signs of addiction can easily be masked or justified (IAT, Young, 2017).

5. Annexes

ANNEX I - Individual data

Age:
35-40
41-45
46-50
51-55
No Answer

Gender :
Male
Female
Prefer not to say

Country of origin:
United Kingdom
Greece
Portugal
Cyprus
Poland
Other

Locality:
United Kingdom
Greece
Portugal
Cyprus
Poland
Other

Education level (https://datatopics.worldbank.org/education/wRsc/classification)
ISCED 0 = Early childhood education
ISCED 1 = Primary Education
ISCED 2 = Lower Secondary Education
ISCED 3 = Upper Secondary Education
ISCED 4 = Post-secondary non-Tertiary Education

ISCED 5 = Short-cycle tertiary education
ISCED 6 = Bachelor's degree or equivalent tertiary education level
ISCED 7 = Master's degree or equivalent tertiary education level
ISCED 8 = Doctoral degree or equivalent tertiary education level

Family – Marital Status: (https://www.cso.ie/en/methods/classifications/standardmaritalstatusclassification/)
1. Single - never married
2. Married
3. Widowed
4. Divorced
5. Legally separated

Your access to Internet is mainly through:
1. Mobile phone
2. Laptop / Desktop
3. Tablet
4. Other devices (such as gaming consoles)

ANNEX II – Quick Big Five Traits questionnaire

Here are a number of characteristics that may or may not apply to you. Please choose how much you agree with the following statements.

(source: https://www.psytoolkit.org/cgi-bin/psy2.4.1/survey?s=hgHBk)

I see Myself as Someone who...	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1. ..worries a lot							
2. ..gets nervous easily							
3. ..remains calm in tense situations							
4. ..is talkative							
5. ..is outgoing, sociable							
6. ..Is reserved							
7. ..is original, comes up with new ideas							
8. ..values artistic, aesthetic experiences							
9. ..has an active imagination							
10. ..is sometimes rude to others							
11. ..has a forgiving nature							
12. ..is considerate and kind to almost everyone							

13. ..works thoroughly.							
14. ..tends to be lazy							
15. ..does things efficiently							

ANNEX III – Problematic Internet Use Questionnaire (PIUQ)

(Source: https://www.psytoolkit.org/cgi-bin/psy2.4.1/survey?s=Xbzs4)

In the following you will read statements about your Internet use. Please indicate how much these statements characterize you.

Questions	Never	Rarely	Sometimes	Often	Always
1. How often do you feel tense, irritated, or stressed if you cannot use the Internet for as long as you want to?					
2. How often do you fantasize about the Internet, or think about what it would be like to be online when you are not on the Internet?					
3. How often do you feel tense, irritated, or stressed if you cannot use the Internet for several days?					
4. How often does it happen to you that you wish to decrease the amount of time spent online but you do not succeed?					
5. How often do you feel that your Internet usage causes problems for you?					
6. How often do you dream about visiting specific platforms or websites on the internet?					
7. How often do you realize saying when you are online, “just a couple of more minutes and I will stop”?					
8. How often do you feel that you should decrease the amount of time spent online?					
9. How often do people in your life complain about spending too much					

time online?					
10. How often does it happen to you that you feel depressed, moody, or nervous when you are not on the Internet and these feelings stop once you are back online?					
11. How often do you choose the Internet rather than going out?					
12. How often do you try to conceal the amount of time spent online?					
13. How often do you think that you should ask for help in relation to your Internet use?					
14. How often does the use of Internet impair your work or your efficacy?					
15. How often do you neglect household chores to spend more time online?					
16. How often do you choose the Internet rather than being with your partner?					
17. How often do you spend time online when you'd rather sleep?					

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