

## **Human Factors (HF); Public Internet Access Points (PIAPs)**

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Reference

DTS/HF-00075

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Keywords

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design for all, interface

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## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Human Factors (HF).

Intended readers of the present document are:

- PIAP Operators;
- terminal manufacturers;
- assistive device manufacturers;
- service providers;
- software developers;
- regulatory authorities;
- standards developers.

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## Introduction

A Public Internet Access Point (PIAP) is a public venue where people can use computers with Internet access and other technologies that help them to collect information and to communicate with other people, at the same time as they develop and maintain digital skills. For economic, availability and cultural reasons, many people will not have access to their own facilities for accessing e-Government, e-Learning, e-Health and e-Business services. For these people, and for any person currently remote from their own means of access, Public Internet Access Points (PIAPs) will be one of the few methods that allow people to make use of these, and other, services. A major motivation for public provision of PIAPs is the use of technology for social and community development, which reduces digital exclusion, creates contacts, promotes health related topics and creates economic opportunities.

The ability of all users to make effective use of PIAPs will be one of the most important factors that determines how successful PIAPs will be in extending e-Inclusion to ensure that the highest number of users are able to use, and do make use of, ICT services. Whilst there is already widespread provision throughout Europe of PIAPs, most of them do not offer ease of access to people who have disabilities and older users. The wide provision of PIAPs cannot be properly effective unless they are readily accessible to all people, including elderly and people who have disabilities.

Studies on the usage and perception of PIAPs [i.21], [i.23] have identified their potential usefulness. They have also identified some barriers to the use of PIAPs. Lack of awareness of the benefits of using the Internet to access services has been identified as one of the barriers. The means to address this problem lie outside the scope of standards and relate to initiatives such as increasing public awareness of the benefits of Internet use and studies to determine that the services being offered are relevant to the needs of the people using PIAPs. However, there are a number of areas, covered in the present document, where standards and guidelines may be the most effective way of enhancing the usage and usefulness of PIAPs. One of these studies of PIAP usage and perception [i.23] made a number of statements that clearly indicated that guidance, similar to that in the present document, is required.



- Environment:
  - "Any future programme should set out minimum requirements for the location and general environment of the (Public Internet) access point including issues of space, visibility and accessibility."
  - "The Executive should develop a good practice guide to provide hosts with advice on where to locate their (Public Internet) access points and how best to set it up."
- Support:
  - "The Executive should consider having a minimum requirement for some basic support for users."
- Getting started:
  - "The Executive should consider using software which provides a quicker and more straightforward start-up process. Many users and hosts experience problems in trying to log onto the service."

The present document provides technical requirements for how PIAPs can be provided in an effective way by following a "Design for All" approach (see [2]) that ensures that they will be accessible to people irrespective of age, disability, language, or culture (see clause 5.2).

The present document establishes and sets out guidance that should be followed to make PIAPs more readily accessible to all users. Unless such guidance is followed, many citizens could be excluded from the opportunities to effectively use PIAPs because of factors such as disability, age or cultural background. This exclusion could come from people believing that there would be no way that they could make use of a PIAP, and never trying to use one, or from people attempting to use a PIAP and suffering the embarrassment and frustration in not being able to use it effectively.

A key aim of the guidance provided in the present document is to ensure that the benefits from existing and future investment in PIAPs are able to be offered to the widest range of people making use of the widest range of services. The achievement of this aim should be significantly improved by the guidance about the design, installation and usage of PIAPs and of the key services accessed from them, that is described in the present document. The social benefits claims in the objectives of eEurope 2005 [i.18] can only be fully realised if the recommendations provided in the present document are implemented.

The present document provides:

- an analysis of which existing standards and guidelines on the design of public terminals and their operating procedures apply to PIAPs. In particular ETSI and ITU-T standards, recommendations and guidelines on public payphones and CEN standards related to public banking terminals are referenced;
- specific new normative requirements and guidelines that address accessible usage of PIAPs have been made as well as proposals about whether updates to existing standardization documents are appropriate or whether new documents should be produced. The new guidelines reflect a "Design for All" approach (see [i.2]) rather than merely identifying new disability specific guidelines;
- proposals for new or revised European and international guidelines and standards (e.g. for smart cards, user identification (UCI), user profile management, handling of language and cultural differences) that will enhance the accessible availability of services from PIAPs;
- proposals on how PIAP design can be enhanced through the use of guidelines, recommendations and standards to ensure that these PIAPs are easily accessible to the maximum range of potential users.

---

# 1 Scope

The present document will establish and set out guidance that should be followed by organizations that design or operate PIAPs. A broad definition of PIAPs has been adopted. This definition includes general purpose desktop computers on a desk, Internet/Information kiosks and public hotspots.

A "Design for All" approach has been followed to ensure that PIAPs will be more readily accessible to all people including elderly or users with disabilities and users from a range of cultural backgrounds.

The present document identifies approaches to enhancing eInclusion in the provision and use of PIAPs. The present document:

- addresses issues that have arisen from previous studies and reports on the use of PIAPs;
- identifies existing standards, recommendations and guidelines (especially from ETSI, the ITU-T and CEN) that provide useful guidance to reduce barriers to the use of PIAPs;
- proposes new normative requirements, guidelines as well as identifying the need for updates to existing standards, recommendations and guidelines to support eInclusion for PIAPs;
- identifies the need for and content of new standards, specifications and guidelines that need to be developed.

The primary focus of the present document is on issues related to PIAP customers rather than to the staff at the PIAP.

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# 2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
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  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
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## 2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

[1] WAI Guidelines: W3C Content Accessibility Guidelines (WCAG).

NOTE: Available at <http://www.w3.org/WAI/intro/wcag.php>.

[2] W3C User Agent Accessibility Guidelines (UAAG).

NOTE: Available at <http://www.w3.org/TR/UAAG10/>.

[3] W3C Recommendation (16 April 2002): "The Platform for Privacy Preferences 1.0 (P3P1.0) Specification".

NOTE: Available at <http://www.w3c.org/TR/P3P/>.

[4] "WPA™ deployment Guidelines for Public Access Wi-Fi® Networks", Wi-Fi Alliance, 2004.

NOTE: Available at [http://www.wi-fi.org/knowledge\\_center\\_overview.php?docid=4484](http://www.wi-fi.org/knowledge_center_overview.php?docid=4484).

[5] "Accessibility for the Disabled: A Design Manual for a Barrier Free Environment", United Nations (enable).

NOTE: Available at <http://www.un.org/esa/socdev/enable/designm/index.html>.

## 2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

[i.1] ETSI EG 202 421: "Human Factors (HF); Multicultural and language aspects of multimedia communications".

[i.2] ETSI EG 202 116: "Human Factors (HF); Guidelines for ICT products and services; Design for All".

[i.3] ETSI EG 202 325: "Human Factors (HF); User Profile Management".

[i.4] ETSI EG 202 534: "Human Factors (HF); Guidelines for real-time person-to-person communication services".

[i.5] ETSI EG 202 417: "Human Factors (HF); User education guidelines for mobile terminals and services".

[i.6] ETSI ETR 167: "Human Factors (HF); User instructions for public telecommunications services; Design guidelines".

[i.7] ITU-T Recommendation E.138: "Human factors aspects of public telephones to improve their usability for older people".

NOTE: Available at <http://www.itu.int/pub/T-TUT-FSTP-2006-TACL/en>.

[i.8] ITU-T Technical paper: "FSTP-TACL Telecommunications Accessibility Checklist".

[i.9] ISO/IEC Guide 71:2001: "Guidelines for standards developers to address the needs of older persons and persons with disabilities".

[i.10] CEN Workshop agreement: "Guidelines to Standardizers of ICT products and services in the CEN ICT domain", CWA 14661, February 2003, ICS 11.080.01; 35.240.99.

[i.11] CEN/ISSS Workshop on Multilingual Extensions to European Keyboard Layouts (WS/MEEK).

NOTE: Available at <http://www.cen.eu/cenorm/sectors/sectors/iss/activity/ws+meeek.asp>.

[i.12] IEC 62079: "Preparation of instructions - Structuring, content and preparation - Application to consumer products".

[i.13] W3C Cascading Style Sheets Home Page.

NOTE: Available at <http://eu-by.org/Style/CSS/>.

- [i.14] "Industry Standard: Automated Teller Machines (ATMs)", Australian Bankers' Association. .
- NOTE: Available at <http://www.bankers.asn.au/Default.aspx?ArticleID=344>.
- [i.15] "Industry Standard: Electronic Funds Transfer at Point of Sale (EFTPOS)", Australian Bankers' Association.
- NOTE: Available at <http://www.bankers.asn.au/Default.aspx?ArticleID=344>.
- [i.16] "Information/Transaction Machines Accessibility Guidelines", Version 1.1, August 1998, Trace Center.
- NOTE: Available at [http://trace.wisc.edu/world/kiosks/itms/itmguide.htm#\\_Toc421187705](http://trace.wisc.edu/world/kiosks/itms/itmguide.htm#_Toc421187705).
- [i.17] Guidelines: Cards and Smart Media.
- NOTE: Available at [http://www.tiresias.org/guidelines/cards\\_and\\_smart\\_media.htm](http://www.tiresias.org/guidelines/cards_and_smart_media.htm).
- [i.18] Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions; eEurope 2005: An information society.
- NOTE: Available at [http://ec.europa.eu/information\\_society/eeurope/2002/news\\_library/documents/eeurope2005/eeurope2005\\_en.pdf](http://ec.europa.eu/information_society/eeurope/2002/news_library/documents/eeurope2005/eeurope2005_en.pdf).
- [i.19] Decision No 1855/2006/EC of The European Parliament and of The Council of 12 December 2006: establishing the Culture Programme (2007 to 2013).
- NOTE: Available at [http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l\\_372/l\\_37220061227en00010011.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_372/l_37220061227en00010011.pdf).
- [i.20] A new Framework Strategy for Multilingualism" [COM(2005) 596].
- [i.21] eGovernment: Reaching socially excluded groups.
- NOTE: Available at [www.idea.gov.uk/publications](http://www.idea.gov.uk/publications).
- [i.22] Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines.
- NOTE: Available at <http://www.access-board.gov/ada-aba/final.pdf>.
- [i.23] "Evaluation of the Public Internet Access Point Initiative, a key strand of the Executive's Digital Inclusion Strategy"; Scottish Executive Report.
- NOTE: Available at <http://www.scotland.gov.uk/library5/finance/epiapi-00.asp>.
- [i.24] "DfES Skills for Life Survey, 2003": UK Department for Education and Skills.
- NOTE: Available at <http://www.dfes.gov.uk/research/data/uploadfiles/RR490.pdf>.
- [i.25] The PULMAN Guidelines, Second edition, February 2003.
- NOTE: Available at <http://www.pulmanweb.org/dgms/dgms.htm>.
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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**active profile, active user profile:** set of all active profile components related to a user

**assistive technology device:** device used by people with disabilities to prevent, compensate, relieve or neutralize any resultant handicap and which has the ability to interface to an ICT device

**authentication:** security mechanism allowing the verification of the provided identity

**biometrics:** technologies that measure and analyze human physical and behavioural characteristics for authentication purposes

**bluetooth:** short range wireless technology enabling secure transmissions of both voice and data

**chunking:** method of splitting content into short, easily scan able elements, especially for web audiences

**contact book:** entity that contains a number of records describing potential contacts of the user

**Design for All:** design of products to be usable by all people, to the greatest extent possible, without the need for specialized adaptation

**gross domestic product:** market value of all final goods and services produced within a country in a given period of time

**internet kiosk:** terminal that provides public Internet access

NOTE: The use of the word kiosk in the present document implies Internet kiosk unless otherwise stated.

**micropayment:** means for transferring very small amounts of money, in situations where collecting such small amounts of money with the usual payment systems is impractical, or very expensive

**modality:** path of communication between a human and a computer

EXAMPLE: Vision, hearing, touch.

**profile:** total set of user related information, preferences, rules and settings which affects the way in which a user experiences terminals, devices and services

NOTE: The use of the word profile in the present document implies user profile unless otherwise stated.

**profile storage agent:** entity that stores information about the profile data and the locations of data repositories of profile data related to users

**profile tool:** tool that enables a user to view and modify information in profiles

**profile provider:** entity (e.g. company such as a service provider, organization such as a special interest or affinity organization) that provide profiles and associated services

**public hotspot:** zone of continuous public access to IP networks owned by one or multiple operators via wireless access points

**Public Internet Access Point (PIAP):** facility provided for public use to access the Internet

**RSS:** family of Web feed formats used to publish frequently updated content such as blog entries, news headlines or podcasts

**rule:** statement that can be interpreted by the profile agent to produce or limit an action

**smartcard, Smart Card:** card that has a microprocessor and storage capability embedded in it

**timeout:** specified period of time that will be allowed to elapse in a system (e.g. inactivity) before a specified event is to take place

**user profile:** See profile.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

N                      Newton (the SI derived unit of force)

## 3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ATM                      Automated Teller Machine

NOTE:    Also called Automatic Teller Machine and Cashpoint.

CIF	Common Intermediate Format
CSS	Cascading Style Sheets
CWA	CEN Workshop Agreement
DNA	DeoxyriboNucleic Acid
EER	Equal Error Rate
EFTPOS	Electronic Funds Transfer at Point of Sale
FAR	False Accept Rate
FRR	False Reject Rate
GSM	Global System for Mobile communication
HTML	Hyper Text Markup Language
ICT	Information and Communications Technology
LAN	Local Area Network
LCD	Liquid Crystal Display
MAC	Media Access Control
NFC	Near Field Communication
PDA	Personal Digital Assistant
PIAP	Public Internet Access Point
PIN	Personal Identification Number
RDF	Resource Description Framework
RFID	Radio Frequency IDentification
RSS	RDF Site Summary (also known as "Really Simple Syndication")
SIM	Subscriber Identity Module
SME	Small to Medium Enterprise
SMS	Short Messaging Service
TFT	Thin Film Transistor
TTY	TeleTYpewriter
UCI	Universal Communications Identifier
USB	Universal Serial Bus

VoIP	Voice Over Internet Protocol
WAI	Web Accessibility Initiative
WEP	Wired Equivalent Privacy
Wi-Fi	Wireless Fidelity
WPA	Wi-Fi Protected Access
XHTML	eXtensible Hyper Text Markup Language

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## 4 What is a PIAP?

### 4.1 Various types of PIAP

#### 4.1.1 Introduction

The present document treats any publicly available facility for providing Internet access as a PIAP. Hence, any guidance provided by the present document can be widely applied to many types of PIAP, including general purpose desktop computers on a desk, Internet/Information kiosks and public hotspots.

There is no formal classification of types of PIAP and there is little purpose in creating one as PIAPs will evolve as technologies and user expectations change over time. However, existing or envisaged PIAPs that have the following features have been considered in preparing the present document:

- publicly provided for general use;
- publicly provided for government services. Some have a particular purpose such as addressing people with disabilities and are thus adapted to suit the needs of people with disabilities;
- Internet café or Cyber café;
- commercially provided - general purpose;
- commercially provided - special function (e.g. Internet kiosks for travellers or high-end computers and accessories for gaming);
- public wireless hotspots, both stationary and on the move ( e.g. provided on a train);
- at motorway service stations, with printing facilities to allow people to print maps and other information related to travelling/driving;
- PIAPs in place where people are already visiting for other reasons such as at a day care centre, an airport, or a train station.

#### 4.1.2 PIAP assistants

As well as the types of PIAPs identified in clause 4.1.1, PIAPs can be further differentiated into two categories based upon the staffing of the PIAP:

- **Manned:** In this type of PIAP, there is always an assistant. This assistant can undertake several tasks: register users, get paid by users, give the users printed papers if the PIAP offers printing services, help users who have any problem using the PIAP, help users with disabilities, do some maintenance in the PIAP (e.g. monitor that all terminals are running correctly, refill paper in the printer), etc.
- **Unmanned:** In this type of PIAP, there is no one available to assist the user. Some of the tasks above have to be done automatically; others just cannot be done (e.g. offering printing services).

For further information on PIAP assistants, see clause 7.2.

### 4.1.3 Identification of users

PIAPs can also be differentiated according to the way in which users are identified and authenticated:

- **Open systems:** Examples of open systems are information kiosks or terminals at libraries, local associations, churches, etc. These are normally stand-alone terminals, that have free access for the users, and that are usually used for information purposes. In this type of PIAPs, the identity of the user is not important. This is the reason why they do not ask the users for identification. When the terminal boots, it will automatically start a session that will be available to be used by users.
- **Anonymous user systems:** In this type of systems, the users do not have to disclose their identity. Despite this fact, the users will have to start a session to use the terminal and end a session when they have finished their tasks, regardless of whether using the terminal is free of charge or not. When users start a session, they are only allocated a temporary identity or an anonymous user account, which represents the right to start a session for a predefined length of time. There are alternative ways to associate the purchase/session with the temporary identity e.g. getting a code on a ticket, getting a code in an SMS sent to the user's mobile phone, individual payment machine attached to the terminal, etc. Although referred to as "anonymous", true user anonymity can only be achieved if any payment mechanism used is also anonymous. Cash payment using coins and bank notes that are inserted directly into a dedicated slot is the only form of payment that can be considered as truly anonymous in all circumstances.
- **Registered user systems.** In this type of systems, it is necessary to register to identify the users who are logging on to the PIAP. Once users are registered, they have a personal account in the PIAP, so that they will be able to load money into it. Some PIAP operators have a network of PIAPs in different locations that will allow users to use their personal account in every different PIAP provided by this operator. Another type of operator allows the users to subscribe to wireless broadband access wherever it is available in the form of wireless "hotspots" provided by the operator.

Further recommendations related to user identification, authentication, registration and payment can be found in clauses 12 and 13.

## 4.2 Context of use

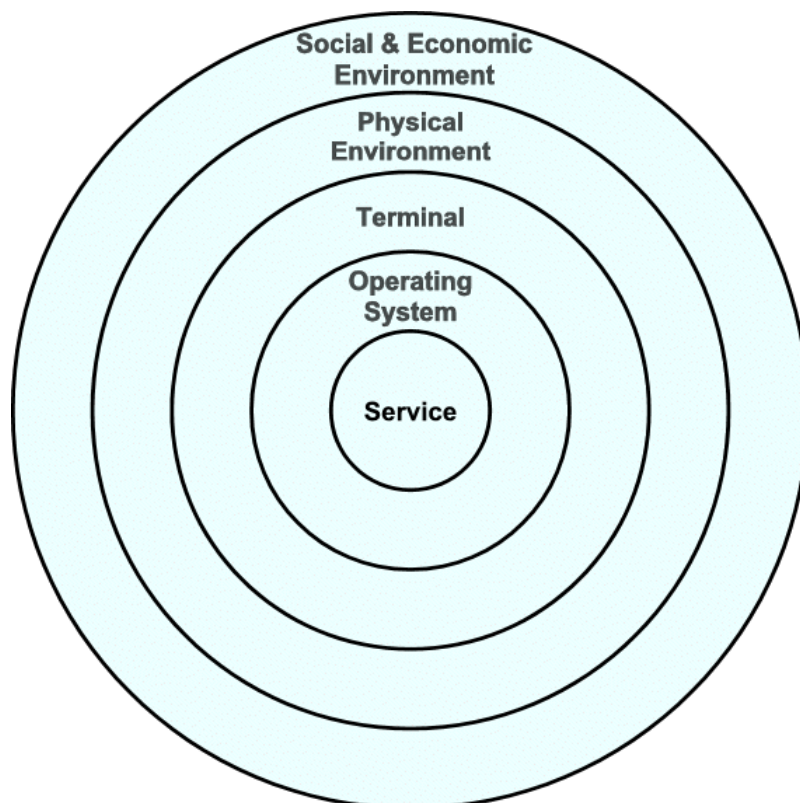


Figure 1: The context of PIAP use



Any service accessed from a PIAP needs to be considered in the context in which it is accessed. The factors that define the context are illustrated in figure 1. Each context may also serve as a potential barrier to users that prevent them from access to the eSociety.

The social and economic environment is a broad and complex domain and covers:

- categories of users defined by their social or business groupings (e.g. senior business executives, unaccompanied blind users, recent immigrant Muslim women);
- the circumstances in which the users are using the PIAP (e.g. whilst on vacation, in their local community);
- the economic circumstances associated with service access, including the business model (e.g. free service access, access as part of a paid contract or payment for time used).

A specific service and social and economic context will begin to define the requirements for all of the other aspects of a PIAP, including possible obstacles that may serve as barriers, i.e.:

- the physical environment where the PIAP terminal is located;
- the physical design of the PIAP terminal;
- the access or logon procedure, including payment methods (free of charge, cash payment, SMS payment, credit card, or ticket) and the termination procedure;
- the services offered by the PIAP provider as well as the operating system in which the PIAP services run;
- the support staff in the PIAP that may interact with the public.

## 4.3 Purpose

### 4.3.1 Providing a local resource

PIAPs, particularly those provided by local publicly funded bodies such as local government organizations and local healthcare services, could provide a valuable service to the local community and to visitors by providing easy access to information about local organizations and events. Kiosk type PIAPs might be appropriate for delivering such information. Kiosks are generally less suitable for more general Internet usage as that may often require long sessions, flexible navigation and/or significant user input, so optimizing them to deliver local information might be the most effective way of using them.

Such local information can be very beneficial to people in a local area, but it is likely to be difficult to find by browsing through the full range of information on the Internet. Any PIAP could be configured to provide easy links to suitable local information. This could provide an information service that a visitor could not easily access from their own computer and which a local user using their home computer might find hard to find. The lists of types and categories of information and of organizations to help provide the information that follow are taken from the PULMAN Guidelines on library Internet use [i.25].

The sort of information that could be provided includes:

- local events;
- local voluntary groups including organizations for various social minorities such as older people, children, people who have types of illnesses, charities, residents organizations, sports clubs, hobbyists, etc.;
- self help groups;
- sexual minorities;
- political organizations and pressure groups;
- administrative bodies;
- political representatives;

- schools and colleges, private tutors;
- tourist information;
- local newspapers;
- local government information e.g. who does what and at which office;
- transport information e.g. times of buses, trains or flights, including real-time information announcements (e.g. delayed flights). This real-time information can be shown in kiosks located in stations or airports, both when no user is using the workstation (e.g. the information could be presented on the whole screen), and when a user is using it (e.g. using a non disturbing small window on one corner of the screen or a one-line information field);
- lists of businesses though there is no point in duplicating the yellow pages.

In order to provide access to such information, it is likely that the body providing the PIAP will need to make arrangements with organizations that represent these different topics as they already have information suitable for presentation to the public or, if not, be willing to provide it.

The kinds of organizations involved may for example include:

- social services departments;
- health services;
- colleges and universities;
- citizen's advisory bodies;
- ethnic minority organizations;
- private sector organizations such as ICT and local media companies;
- grant-making organizations.

PIAPs that are designed to provide a resource for local communities (i.e. those provided in rural communities) could focus on making available a range of services not easily accessible by other means within the local area. This could be considered in seven broad categories:

- community information (e.g. local events, local voluntary groups);
- cultural information (e.g. museums, art galleries, travel guides);
- business information (e.g. directories of companies, newspaper reports on commercial and business subjects);
- legal information (e.g. national laws, local legal advice services, welfare benefits and rights);
- training (e.g. how to use computers, the Internet, digital cameras and related software);
- document editing (e.g. provision of relevant software and printing facilities);
- service delivery (e.g. specialized portals, web pages describing the building in which the PIAP is located, especially when this building may have historical significance).

Clause 5 discusses how combining PIAP facilities with services of social benefit can significantly enhance the likely success of PIAP provision.

### 4.3.2 Commercial PIAPs

Many commercial PIAPs do not attempt to deliver targeted content or services, they merely provide a platform to allow basic Internet access that will be suitable for the majority of expected users. Unless the PIAPs receive additional public funding to provide non-profitable services, the services provided will usually be chosen on their attractiveness to paying customers. Some non-profit making services may also be included with the profit making ones if their provision enhances the reputation of the organization providing the PIAPs. For example, providing a local information page that can be accessed for a limited time without payment might make the organization appear to be forward thinking or to have a social conscience.

Commercially provided PIAPs will carefully evaluate the provision of all facilities on the basis of the likely return made on the money invested. For this reason, commercial PIAPs are frequently less equipped to cater for people with disabilities, as making their PIAPs suitable may require greater space provisions around PIAP workstations (and hence less PIAPs per square metre) and the provision of additional or better quality equipment.

Commercial PIAPs will frequently combine the basic PIAP provision with other services in order to make the overall enterprise more profitable. In some cases, it is the non-PIAP facilities (e.g. café) that is the main business of the PIAP provider and the PIAP facilities are added to increase profit and to attract more customers to the non-PIAP services. In these cases, the PIAP facilities provided by the commercial PIAP provider may be at low or zero cost to the customers of the non-PIAP services. A well known example of this combination of PIAP and non-PIAP facilities is the Internet Café. These combined facilities are discussed further in clause 6.3.

## 4.4 User categories

It is misleading to talk of users belonging to simple categories that always have predictable requirements and always behave in a predictable way. In practice, most people have requirements that, in certain circumstances, will be associated with more than one of these categories. For example, a business person arriving in a city the day before a meeting may do some sightseeing. If during this day they visit a PIAP, they may try to find information related to interesting sights in their present location (as a "tourist" would do) whilst checking business e-mails to see if any relate to the meeting the following day (as a "business user" would do). However it is still helpful to identify some basic user stereotypes to help ensure that those planning to set up PIAPs address the requirements and behaviours that would be expected of people in the user categories that they wish to attract.

Some typical user segments, many of which overlap, include people who:

- regularly use the Internet from home or work;
- are unfamiliar with the Internet but who need to access information or make use of remotely provided services;
- are travelling with Internet-enabled handheld devices;
- are travelling with wireless enabled laptops;
- are in their local area and who have no Internet access at home (and no work Internet that they can use for personal usage);
- are travelling but may make use of fixed provision of PIAP facilities (e.g. in a building or from a static public wireless hotspot);
- are on a form of public transport such as a bus or train and wish to access the Internet using their own laptop or handheld device;
- are on a form of public transport such as a bus or train and wish to access the Internet using workstation or kiosk facilities provided by the transport operator;
- need special facilities provided to permit them to use the Internet (e.g. people with disabilities, elderly people or very young children);
- cannot afford to pay for use of the Internet but need to do so to avoid being excluded from accessing essential online services;
- people wishing to engage in online computer game playing.

Examples of where these simple categories are useful in determining user needs include:

- people carrying wireless enabled laptops will require public hotspots in order to meet their public internet access needs;
- public transport design may need to be enhanced to provide extra facilities such as power sockets for laptop users when wireless access is provided;
- people who wish to play highly interactive online games will require very high functionality facilities to effectively play such games (e.g. very fast Internet connections and top specification computer equipment).

Some of these user categories are discussed in more detail in clause 7.1.

## 4.5 Tasks

PIAPs may be used for a very wide range of tasks and it is impossible to list all tasks that may be undertaken now, or in the future. Nevertheless, the following are some examples of tasks performed by people using PIAPs:

- information retrieval services (e.g. Internet browsing);
- asynchronous communication services (e.g. webmail, instant messaging, SMS);
- synchronous communication services (e.g. person-to-person and conference VoIP, total conversation);
- transactional services such as banking and booking services;
- offline document viewing or editing;
- uploading and viewing photographs and videos.

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# 5 Access to the eSociety

## 5.1 Policy

The European Commission has had a strong desire to ensure that government, learning and health related services are increasingly available online as an addition to, and subsequently a replacement for the less conveniently provided services that have existed in the past. In addition, the European Union (EU) has placed significant emphasis on the importance of ensuring that all EU citizens are able to participate in the e-Society without barriers. These two priorities are not unrelated as, in addition to basic sense of fairness, the removal of barriers to inclusion is a necessity if the online provided services are to succeed and are not to be an excluding influence themselves. The European Commission has thus identified PIAPs as one way to deliver their vision of an e-Society in a world where it is currently unrealistic to assume that all citizens will have either the skills or the facilities to fully participate in the e-Society from home [i.18].

The European Commission's desire that there should be PIAP provision, especially in areas of social deprivation has been recognized by national governments and translated into a range of different national initiatives for providing Internet access to disadvantaged groups. These strategies have used a number of very different approaches, but most included publicly provided PIAPs as a significant element of the strategy.

As well as national government initiatives, there have been studies commissioned by bodies that represent a particular type of PIAP provider. One of the most notable and comprehensive is the PULMAN Guidelines [i.25] that were developed to address ICT based solutions in the library sector.

Cultural identity and cultural diversity are important themes of European cultural policies and initiatives. This is reflected in the three main objectives of the new Culture Programme (2007-2013) [i.19]:

- to promote cultural diversity and intercultural dialogue in Europe;
- to promote culture as a catalyst for creativity and innovation in the context of the Lisbon Strategy for jobs and growth. Indeed, the culture and creative sectors - television, cinema, music, performing arts, entertainment, etc. - in the EU generated €654 billion in 2003 (2,6 % of the Union's Gross Domestic Product (GDP));

- to ensure that culture becomes a key component in the EU's external relations so as to build bridges with other parts of the world.

These themes are also seen in the way in which the *eContent* programme has been formulated and also in the "A new Framework Strategy for Multilingualism" [i.20]. PIAPs provide an ideal way of making large quantities of diverse cultural material available to all members of society irrespective of their social or cultural background. Electronic delivery via PIAPs is a far more practical way of delivering a large volume of up-to-date material to a wide audience than any policy based on making the material available in a stored form (in libraries) or by delivering material to individual households. In addition, electronic delivery at PIAPs is the most effective way of delivering interactive services in a culturally diverse way.

PIAPs could provide broader support for social inclusion by focusing on multicultural and multilingual content and activities as well as services for children with disabilities. Inclusion can be enhanced where the education levels of the socially excluded groups can be raised. Although schools, colleges and universities would be the primary source of training for children and young adults, lifelong learning for a broader spectrum of people could be supported by courses carried out at PIAPs.

The provision of training facilities in PIAPs is another way in which PIAPs can be an aid to raising the levels of education as ICT based training can be provided for a range of topics, including training to raise the public's level of skill with ICT services and devices. The PIAP provider would need to be in some form of formal or informal partnership with organizations that have the necessary skills and knowledge to carry out the training for the chosen topics.

PIAPs could provide a training service even to those who have their own ICT facilities, as it would help these people to raise their overall level of competence with ICT to enable them to make best use of the facilities that they already have.

## 5.2 Design for All

The "Design for All" approach implies the following general recommendations that can be applied to any product, service or environment:

- **Fair usage:** The design should be useful to any kind of user, including elderly, people with disabilities, and very young people.
- **Flexible usage:** The design should fit to a broad range of individual preferences and abilities, so that it can be used directly, without any technical aid or modification by any people.
- **Simple and intuitive usage:** The design should be easy to use and understand, regardless of the background knowledge, experience, education and language skills of the user.
- **Perceptible information:** The design should communicate, in an efficient way, the needed information to the user, regardless of the environmental conditions and the sensorial abilities of the user.
- **Error tolerance:** The design should reduce to the minimum the risks and negative consequences of accidental or involuntary actions, or complex actions that may be difficult to undertake for certain users.
- **Physical and cognitive effort:** The design should allow the system to be used in an efficient and comfortable way, with the minimal physical, attentional and cognitive effort needed for its usage.
- **Size and space aspects:** The design should make it easy for users to approach the workstation and allow them to reach, manipulate, and use it regardless of the size, posture and mobility of the user.
- **Compatibility:** The design should be compatible with existing products and technical aids required by those who cannot directly use the system without such aids.

Detailed guidelines related to the design for all approach in ICT is covered in [i.2].

## 5.3 Addressing the needs of socially excluded groups

The report on "eGovernment: Reaching socially excluded groups?" [i.21] addresses the need of socially excluded groups, and the usage of PIAPs, kiosks and digital television. The report concludes that Internet adoption amongst socially excluded groups remains low. Furthermore, the consequence of low Internet adoption is the poor level of use of eGovernment services by socially excluded groups.

All people, also the socially excluded, must be able to use and benefit from eGovernment services. It is therefore important that PIAPs need to meet the requirements of those groups. Local authorities have made progress in improving accessibility and readability levels. However, much more needs to be done to better meet the requirements of socially excluded groups. The report [i.21] states that "if access initiatives are to be more effective, they need to target socially excluded groups more clearly, to better promote the benefits of the Internet and to better accommodate and support the literacy and ICT skills deficiencies that characterize many socially excluded groups."

The PIAP issues related to providing facilities for socially excluded groups can be found in clause 8.4.

## 5.4 Literacy - computer skills

Historically, it has been accepted that there is a correlation between literacy and computer skills: low literacy may be a predictor of low computer skills and high literacy may be a predictor of high computer skills - at least in Europe. In underdeveloped countries where technology adoption is low in general, the correlation is nonexistent. The relationship may be true except for dyslexic users who may score high on computer skills but low on literacy. Many young people today have grown up with access to ICT facilities from a young age. It is therefore not clear to what degree this correlation between low literacy and low ICT skills applies to the young generation.

According to [i.21], page 36:

- "Twenty-four per cent of people (aged 16 to 65) receiving means-tested benefit(s) lack basic literacy skills" [i.24].
- "Thirty-seven per cent of people (aged 16 to 65) with poor or very poor health lack basic literacy skills" [i.24].

From a social exclusion perspective, lack of ICT skills is a significant factor that will:

- prevent a person from accessing various online resources that could help them to gain employment;
- influence the range of employment opportunities for which the person would be qualified;
- prevent the person from gaining access to, and participating in, a wide range of eGovernment services.

For a person to develop ICT skills they will need access to both ICT facilities and to training in the use of those facilities. The provision of such facilities and training is seen by many as a possible useful role of PIAPs, especially in socially deprived areas where people can neither afford to purchase their own ICT equipment nor afford to make use of any form of commercially provided ICT training. Publicly provided PIAPs in facilities such as libraries and community centres are particularly well suited to the provision of such ICT training. These facilities would also be in a good position to provide training that would help people to enhance their basic literacy skills as well as their ICT skills.

## 5.5 Exclusion related to language and culture

PIAPs that need to offer their services to users from a variety of different countries and cultures who may speak a number of different languages will have several difficult decisions to make as to how to minimize the potential exclusion of users as a result of language and cultural mismatches. This may be particularly obvious in PIAPs located in airports or in areas with a large amount of immigrants from a range of countries. In order to make effective use of a PIAP, the PIAP user firstly needs to be able to understand what facilities are available in the PIAP and then how to use them. Although some features may be self-explanatory, many will rely on some form of written (or sometimes verbal) communication - either paper documentation or on-screen information and menus. If the information is written or spoken in a language that the PIAP user cannot understand, then that user may be unaware of or unable to understand how to use the required PIAP features and thus encounter an insurmountable barrier to using any or all of the PIAP features.

As well as language issues, there are other culturally related factors that can impede or prevent a person from using the PIAP. A notable culturally varying factor is the layout of the computer keyboard. These layouts can either be significantly different (e.g. QWERTY and AZERTY) or vary only in the position of a small set of keyboard characters (e.g. US English and UK English keyboards).

Recommendations on ways to address the language and cultural issues of PIAPs can be found in clause 14.

## 5.6 Areas where guidance is required

Those aspects of access to PIAPs that could be improved by the application of guidelines can be categorized into two broad categories: improved physical access and ease of use. Physical access further subdivides into categories such as:

- access to and comfortable usage of the PIAP terminal - including wheelchair access;
- access to the various controls and peripherals (input/output devices) - including use by blind or users who are partially sighted.

The guidance in the present document is intended to cover accessibility issues related to all forms of disability (see clauses 9.3, 11.7 and 11.8).

There are many ease of use aspects which include:

- minimum up-front effort to start usage (e.g. PIAPs that are ready for use with some service options already visible);
- simplified service logon (e.g. for services that need to clearly identify the user. The means of logon should be secure but easy to use and should consider the usage of different methods such as Smart Cards and biometrics);
- services that suit the needs and abilities of the user (e.g. content that matches the language and literacy skills (including computer literacy) of the user);
- multimodal and alternative means of access to key services (e.g. full conformance to the WAI Guidelines as a minimum requirement);
- accessibility support solutions (e.g. provision of or support for enhanced accessibility software and devices).

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# 6 Sustainability model

## 6.1 Introduction

If a PIAP is to be sustainable in the long term, there must be a clear model that provides the answers to the following questions:

- Why is a PIAP needed?
- How can its initial setup be funded?
- How can users be attracted to the PIAP?
- How can it remain popular?
- How can ongoing funding for running and maintenance of the PIAP be achieved?

In the present document, the model for how the above can be achieved has been termed the "sustainability model". The answer to "Why is a PIAP needed?" may have a profound effect on the sustainability model. Currently, it appears that PIAPs tend to be designed to address one of two very distinct user categories. Many PIAPs are primarily intended for use by people who are already very familiar with the Internet. These users have a need or strong desire to use the Internet when they are away from their home or office environment. They choose to use a PIAP for one of at least three reasons:

- they do not currently carry a mobile Internet capable device that they can use;
- they judge that the Internet capabilities of their mobile devices are unsuitable for their intended task due to factors such as cost, speed or the limited control and display facilities of their device;
- they belong to an online gaming group and their stationary computer as well as their home Internet connection is not adequate for playing on line games in real time where any delay may diminish the gaming experience.

The users of this type of PIAP will not typically require any further encouragement to use the Internet. They already perceive the need and will often be prepared to make their own efforts to locate a PIAP in order to meet this need. The expectation of those providing this first type of PIAP is that they will be able to make a profit from providing this potentially popular service at a cost to the users.

The second major type of PIAP is almost the exact opposite of the first. Here, an organization has decided to address people who are not currently using the Internet and who could benefit significantly from using it. There may be various reasons why people do not use the Internet yet, including:

- some might be motivated to use the Internet but they are unable to afford the necessary technology at home, or the rates charged by commercial PIAPs;
- some might be motivated to use the Internet but the infrastructure that would allow them to do so in an efficient manner (i.e. some form of broadband Internet infrastructure) does not exist;
- some with disabilities may wish to use the Internet but will be unable to do so because the available PIAPs do not meet their particular accessibility needs;
- those who do not yet see the benefits of using the Internet but who might be interested to do so if the benefits were explained to them;
- those who are aware of and interested in the benefits of the Internet but require training before they are able to start using it themselves;
- those who might be persuaded to try to use the Internet but are afraid of having the complexity of setting up and maintaining the services and equipment at home;
- those who currently show no interest in using the Internet and who have a significant resistance to being persuaded to try.

The Irish study "*eInclusion: expanding the Information Society in Ireland*" [i.26] identified that 1 700 000 Irish adults (55 % of the adult population) were "without Internet access or using it less than once a month". They identified that this low familiarity with the Internet was especially significant in certain groups of people such as "women with home duties, retired people, tradesmen/skilled workers, workers in agriculture, forestry or fishing, unemployed" that were seen as at most risk of exclusion from the information society. There will be a significant number of people in all these categories who will neither have the income nor motivation to use commercial PIAPs that usually attract people already familiar with using the Internet. Thus, these groups of people who are potentially excluded from the information society were seen by this Irish study [i.26] and by the PULMAN Guidelines [i.25] as requiring the provision of publicly funded PIAP facilities.

In order to enhance *eInclusion*, public funding could be allocated to provide PIAPs in places usually visited by people from what are locally identified as categories that are at risk of exclusion from the information society. The income of the target audience for these PIAPs is likely to be so low that it will be unreasonable to expect that they can pay the charges necessary to fund the setup and running of the PIAP. These PIAPs, that have been provided to address *eInclusion*, are frequently funded out of some budget targeted at helping socially disadvantaged groups. These PIAPs are frequently made available to users at little or no cost. There is therefore a need for significant funding from sources other than the users in order to ensure that there is a long-term funding stream to maintain and enhance these PIAPs.



## 6.2 Location of the PIAP

It may appear self evident, but locating a PIAP in a place that the target user groups already frequently visits is a most obvious way of maximizing the effectiveness of a PIAP in attracting users. What is less self evident is knowing where these frequently located places are. It is rarely adequate to merely assume knowledge of these locations and hence it will frequently be necessary to question and/or observe the target users to ascertain the places they most frequently visit.

It is also important to choose a location that is in a place that the target users will feel comfortable to attend. This will not always be 100 % correlated with the most frequently visited locations. An active criminal may frequently visit a police station, but this is rarely a voluntary visit and is unlikely to be a place where the criminal will feel comfortable to visit on a voluntary basis! A less extreme version of this difference between frequency of visits and feelings of comfort might relate to issues of the match of the location to the target user's social and economic status. Even though an affluent higher class citizen may frequently travel through a socially deprived district, they are unlikely to feel very comfortable in a PIAP in the middle of this district. The same would apply to a person from a socially deprived background who might frequently travel through an affluent high class area. This person might feel equally uncomfortable in a PIAP in this "classy" district.

Co-locating a PIAP in a facility that may already be providing services to the target user group is a potentially good way to maximize usage. Thus, locating a PIAP in a building that the target users already usually visits is a certain way of ensuring that the target users at least have the opportunity to use the PIAP. For example the following locations would be good options to examine when trying to maximize the opportunity for usage:

- locating a PIAP aimed at business travellers in a airport departure lounges or a business lounge at an airport;
- placing a PIAP aimed at people seeking employment in an employment centre;
- placing a PIAP aimed at students in a university social centre;
- providing wireless access on a train to enable users with laptops to get Internet access while travelling;
- locating a PIAP for clients of residential institutions inside the common access places within the institution (e.g. in residential care centres for elderly people, in hospitals, in prisons);
- placing any PIAP in an area that is perceived as a safe area by its target users;
- locating a PIAP in an area with appropriate transport options (e.g. parking facilities, public transport links).

The surrounding area of a PIAP may also have an influence on how well visited the PIAP will be. Many people will feel insecure in areas that give the impression that there is a potential higher risk of being robbed or becoming a victim of violence. These fears will be likely to increase at night. Also, a person carrying a laptop might fear an increased risk of being robbed in these areas. It is therefore recommended that the PIAPs are located where it is reasonably safe, such as where there are many people passing and that the surrounding area is well lit during the dark hours. The PIAP should also be accessible by different transport means. Further information on the location of PIAPs can be found in clause 9, and specific accessibility aspects of PIAP location are covered in more detail in clause 9.3.

## 6.3 Combining PIAPs with leisure facilities

The potential success of a PIAP can often be significantly increased if it offers facilities in addition to the basic function of providing Internet access. Similarly, places that already offer people a non-Internet related service can add PIAP facilities to enhance the attractiveness of what they provide. The most common examples of such multi-function establishments is the classic Internet Café (Cyber café), where eating and drinking facilities are included in a new or existing PIAP or where a new or existing eating and drinking outlet adds PIAP facilities to its operation.

**NOTE:** Sometimes the terms Internet Café or Cyber café are used even though no eating or drinking facilities are provided.

In addition to this classic Internet Café model, a wide range of other leisure activities could be mixed with PIAP usage including:

- indoor games and sports e.g. pool/snooker/billiards, darts, chess, board games;
- displays of local interest information e.g. historical artefacts, pictures of local landmarks.

A major advantage of such multi-function PIAPs is that the running costs of the building can be split between a number of different facilities and the sustainability of the whole operation is not solely dependent on the financial viability of the PIAP operation alone. Attractiveness can be further enhanced because users may wish to make simultaneous use of the different facilities provided (e.g. a user wishing to read their e-mail may also wish to drink a coffee, or someone who has visited to drink a coffee may decide to read their e-mail). People who are visiting an eating or drinking establishment on their own may be less self-conscious if they are browsing the Internet than if they are sitting alone doing nothing.

Multiple function PIAPs may be very suitable for visits by small groups of people, such as a family, as different members of the group could simultaneously enjoy different functions. So, for example, children could make use of the provided leisure facilities, one parent could take a drink and a snack and the other parent could read their e-mail.

It is also possible that different activities may be more popular at different times of the day. This flexibility could attract a wider range of people to the premises throughout a longer period of the day. For example, there may be a peak of interest in restaurant facilities at midday and during the evening whereas people may visit the premises at other times purely to use the Internet.

## 6.4 Combining PIAPs with services of social benefit

Most of the additional functions identified in clause 4.3.3 have the purpose of either being a source of additional revenue or of enhancing the leisure value of a PIAP. It is also possible to extend the range of services offered by a PIAP to include services that offer a social benefit to those attending the PIAP. These functions may be particularly relevant for PIAPs that have been provided to meet various eInclusion objectives e.g. PIAPs provided in areas of economic deprivation. PIAP operators could co-operate with external organizations as a way of broadening the range of services that they provide and therefore making the PIAP a significantly more attractive and beneficial location.

Public libraries and community centres are often suitable sites for PIAPs as they are a public building that can be found in many communities and one that is already tailored to delivering services to the public. Because they exist to provide services to the public, their opening hours are often well suited to the needs of the public and are not usually restricted to traditional office hours. Also, public libraries already represent a public face of local government and therefore they would seem an appropriate location from which to make eGovernment facilities available.

As with the facilities such as the food/beverage options that many commercial PIAPs may wish to offer, the model could be that a PIAP makes the services of other organizations available from PIAP premises or that the providers of other services make PIAP facilities available at their premises.

The range of organizations with which PIAP operators could co-operate, to provide a more socially beneficial offering, includes:

- social services departments;
- health services;
- colleges and universities;
- citizen's advisory bodies;
- ethnic minority organizations.

## 6.5 Offering enhanced PIAP capabilities

Each enhancement that is made to the capabilities of PIAP hardware, software and services can add features that will attract a range of different categories of users. In clause 18, table 3 shows a range of such enhancements and the benefits for the PIAP in terms of the types of users that might be attracted.

## 6.6 Funding sources

It may be possible to fund PIAPs in some locations, such as popular city centres, purely from the money paid by those visiting the PIAP. However, even for commercial PIAPs in popular locations, additional forms of funding may be required to make the PIAP a commercially viable enterprise. Sharing the costs of running the PIAP with some other commercial enterprise is one option that may be used. Some ideas for such multi-function PIAPs are discussed in clauses 6.3 and 6.4.

Raising additional funding from advertising materials displayed on the screens of inactive PIAP terminals, or in other places within the PIAP, is another form of additional funding that can be considered by the commercial providers of PIAP services. However, advertising may be seen as an inappropriate method to use in publicly funded PIAPs, except in special cases such as advertising for other services provided by the same public body. Creativity in the choice of funding models and very good financial management may be required to avoid the frequent experience of many organizations that have unsuccessfully tried to make a profit from providing PIAPs. This lack of success has been documented in [i.23] and has also been the experience of a number of Telcos around Europe.

As has been identified in clause 6.3, there are a number of roles for PIAPs that increase their value to society by enhancing the leisure facilities provided. However, funding for PIAPs that have been provided in order to meet some wider non-commercial goals is an altogether much more complex issue. Where PIAPs have been provided to increase inclusion for disadvantaged groups such as people with disabilities and people living in an area of multiple disadvantage it is unlikely that the customers could afford to pay sufficiently high charges, either for the use of the Internet or for the use of any other facilities offered, necessary to fully fund the running of the PIAP.

The whole concept of charging PIAP users may also be seen as inappropriate in some types of PIAP e.g. in PIAPs that are provided to people in residential institutions where the residents are unable to access any alternative means of using the Internet e.g. in care homes for elderly and people with disabilities.

Many of the various socially beneficial roles can only realistically be achieved by PIAP and service providers forming close formal or informal partnerships with groups that represent the needs of the target group of PIAP users. For commercially provided PIAPs these partnerships could be made with the organizations providing ancillary services at the PIAP or with organizations that see the potential PIAP users as a target market to which they would like to advertise their own services.

Where the primary motivation for the provision of a PIAP is to address social needs rather than to make a profit, the identification of sources of funding to both establish a PIAP and then to run it over an extended period becomes of great importance. Increasingly, this may require some form of funding from an external funding body. Accessing such funds can often be a difficult and time consuming process. It may frequently require the establishment of some form of multi-agency partnership in order to both make available the time and expertise necessary to bid for the funds and also to reassure the funding body of the viability of the project for which funds are being sought.

It can be beneficial for publicly or privately provided PIAPs to attempt to establish relationships with external organizations as a way of enhancing the viability of the services which they offer. Clause 6.4 lists some organizations which may be interested in jointly offering services to the public together with the Internet service being offered by the PIAP. In addition, organizations that could collaborate with the provider of a PIAP designed primarily for a socially beneficial purpose include:

- private sector organizations such as IT and local media companies;
- grant-making organizations.

The benefits of partnerships with the above organizations, or those listed in clause 6.4, include two particularly important elements that are likely to enhance the success of PIAPs. These are:

- access to expertise that understands the needs of the target group - thus improving the chance that the PIAP can be made attractive to that group;
- possible access to sources of public or private funding that has been made available for funding projects beneficial to the target group.

It is common that a PIAP provided for socially beneficial purposes may need to adopt at least two different funding models throughout its lifetime. It is frequently possible to access local, national or European funds to help in establishing facilities that will provide a service to the public that enhances eInclusion. However, it is rare that these sources of funding will persist into the future in order to fund the ongoing costs of maintaining or enhancing the services provided. It will thus be necessary to identify a funding model that will satisfactorily address the long-term funding needs of the PIAP. Where it is impractical or unacceptable to consider charging the users of the PIAP to the extent necessary to cover the full costs of providing the services offered, it may be necessary for the organization to develop an additional revenue generating activity that can secure the income necessary to run the PIAP.

In the UK, the Leicester Disability Information Communication Network (LDICN) has taken the skills and knowledge that it developed in order to offer sophisticated multimedia services to its client base of people with severe learning disabilities and has offered multimedia packages to other parts of Leicester Council to enable them to provide accessible information packages about the services that the various services of the council provide. The internal charging for these services within the council has provided valuable budget to the LDICN to enable them to continue to offer the excellent PIAP services that they developed for people with learning disabilities.

Other PIAPs have made use of their facilities to provide training courses to members of the public who are willing and able to pay for these courses. This secondary funding mechanism has given these PIAPs a way of generating revenue to enable them to provide PIAP facilities for the key target group of socially disadvantaged users who would be unable to make any significant financial contributions.

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## 7 Stakeholders

A number of stakeholder groups, each with specific motivation and interests with regard to PIAPs, are addressed in the present document. These groups are:

- users;
- PIAP assistants;
- PIAP operators;
- hardware manufacturers;
- software providers.

### 7.1 Users

As the main objective of the present document is to improve the accessibility and usability of PIAPs for this stakeholder group, they can be considered to be of the highest importance. However, this stakeholder group will not benefit from reading the present document, but from the enhancements of PIAPs as a result of other stakeholder groups following the present document's recommendations.

Potential PIAP users can be divided into sub-categories, each with different characteristics and specific needs. Depending on these needs, PIAPs should be adapted in a way that people from these groups can make an effective and efficient use of them. That is why the different needs of the users should drive the guidelines given in the present document, to make PIAPs accessible for the widest range of people, irrespective of age, disability, language or culture.

#### 7.1.1 Internet users who need to make use of PIAPs facilities

This group includes people who are already Internet users, and who usually have access to the Internet (at home and/or at work), but are in a situation where they have not access (e.g. when on the move). This group includes people who:

- are travelling and need to make use of a workstation in a building providing PIAP facilities (e.g. access to their e-mail or to search for information on the Internet) or need to make use of a public hotspot using a wireless enabled laptop or handheld device;
- are travelling, using public transport such as a bus or train and wish to access the Internet using their own wireless enabled laptop or handheld device;

- are on a form of public transport such as a bus, train, aeroplane or ship, and wish to access the Internet using a PIAP workstation or a kiosk facility provided by the transport operator;
- are sightseeing or on business travel, and wish to use the kiosk facilities provided by the local authorities of the place they are visiting;
- wish to engage in online computer game playing.

### 7.1.2 People with no other means of access to the Internet

This group includes people who, for different reasons, do not have Internet access at home or at work. This group includes people who:

- are socially excluded and cannot afford to have Internet access at home;
- live in digitally excluded areas where there is no Internet access available.

### 7.1.3 People with specific requirements

This group includes people who have specific requirements, and who can be excluded if their requirements are not identified and met. This group includes people who:

- do not have the computer (or general) literacy that is needed to use online services (e.g. elderly people or people from socially excluded areas);
- are unaware of the benefits of the Internet for accessing online services;
- are aware of the benefits of the Internet, but are unfamiliar with or afraid of it, and need to access information or make use of remotely provided services;
- need special facilities provided to permit them to use the Internet, including people with disabilities, elderly people or very young children.

### 7.1.4 Targeted user segments

For those PIAPs providing access to online services in the same premises as a community centre that provides some social benefits to the community (see clause 6.4), the range of PIAP users can vary greatly, and can include people from the groups described in the previous headings.

These PIAPs should be adapted to the specific needs of the type of people who are more likely to attend the community centre where the PIAP is located. Care should be taken to ensure that attempts to meet the needs of the targeted user segment do not result in design or procedural changes that have an adverse impact on other potential users of the PIAP. Particular care must be taken to ensure that any adaptation of the PIAP does not act as a barrier to the usage of the PIAP by people with disabilities.

## 7.2 PIAP assistants

This group includes the people who work in PIAPs to take care of the PIAP premises, maintain the hardware equipment and software of the PIAP, and give support to the users.

This is a very important group as they can have a large influence on the success of the PIAP. Their main task will be to help people to use the PIAP services in an effective way. Especially important will be help for those with specific needs (e.g. people with disabilities, elderly people, young children, computer illiterate people or people who feel uncomfortable, uncertain or afraid when using computers, etc.). They will also be expected to help people with specific needs, to try to ensure that they are not excluded from using the PIAP because their specific needs cannot be met.

PIAP assistants may also have specific needs (e.g. they may have some disability), so it is important that the PIAP is also adapted to their specific needs, so that they can give better support to all users of the PIAP.

For a PIAP targeting a specific user category, the PIAP assistants should have relevant skills and knowledge related to that user category. For example, in a PIAP specially targeted to people with severe cognitive impairments, they should have a good understanding of specific needs that are often associated with this kind of disability, the kinds of help that may be required, and the best ways to provide appropriate support.

The present document includes accessibility related recommendations that provide the basis for the knowledge of the most common accessibility and usability issues that can affect people who use a PIAP. This is useful information for PIAP assistants. Appropriate material could easily be extracted from the present document and presented in the form of training material for PIAP assistants.

## 7.3 Hardware manufacturers

This group includes:

- Companies that manufacture any kind of physical object that can be in the PIAP premises (e.g. doors, floor, desks, chairs).
- Companies that manufacture electronic equipment (e.g. terminals, peripherals, payment machines), including equipment or peripherals adapted for people with disabilities.

The guidance given in the present document provides beneficial guidance for hardware manufacturers, as it informs them of solutions to the many accessibility issues related to the PIAP premises, and also on the user equipment. Some of the recommendations are difficult to meet, but there are many of them that can be applied with little or no effort, and which can result in a big step forward in the accessibility or usability of PIAPs.

Companies may sometimes find it difficult to follow any guidance (e.g. from the present document or other sources) about making equipment accessible as:

- it may sometimes require high investment;
- the demand for this type of equipment may be high enough to make the required investments cost-effective.

Policies that require the provision of PIAPs where the hardware meets certain minimum accessibility requirements are one way of ensuring that there is a market for manufacturers to create appropriate solutions. Ways of ensuring that these policies will be met include the provision of financial incentives that ensure that those providing PIAPs will demand hardware that meets the appropriate accessibility requirements.

## 7.4 Software providers

This group includes companies which provide software that can be used in or accessed from a PIAP. This includes:

- **Operating system providers:** They provide the operating system that runs on the terminals, including those who provide commercial and free operating systems. Most modern operating systems provide inbuilt configuration options that allow the user environment to be adapted in a number of ways. Some of these adaptable features are specifically aimed at accessibility issues and allow the user environment to be adapted to a wide range of specific needs.
- **Providers of software intended for general purpose usage (not specifically for PIAPs):** They provide general purpose applications (e.g. web browsers, document editors, image processing applications). Many popular applications, both commercially provided and free, also have accessibility features that allow some kind of adaptation to the users' needs.
- **Providers of specific software for PIAPs:** They make the software that allows different services to be provided in PIAPs (e.g. software to log-on to the terminal, charging, showing remaining money, software for payment machines, software for the assistant terminal).
- **Online services providers:** they provide web portals that can be accessed from a PIAP to provide the users with some online service.

The two first categories normally provide software that offer some accessibility features, and whose usability is normally tested before the release of the software. However, the latter two normally refer to custom software that does not have any accessibility feature, unless specifically required by the customer - i.e. the company that pays for the custom development of the software. Where the provision of custom software that has effective inbuilt accessibility features significantly increases development costs, there may be a need to create a market that ensures that such software will be developed. As in clause 7.3, this may require policies that encourage PIAP providers to use software that has appropriate accessibility features. Also, incentives or policy requirements may be needed to encourage PIAP providers to demand accessibility features in the software they acquire from the software providers.

## 7.5 PIAP operators

This group includes the companies or administrative bodies that own or operate a PIAP or network of PIAPs. It will include categories such as:

- commercial PIAP operators (including some Telcos that run a chain of PIAPs);
- councils that have:
  - PIAPs in community centres or libraries;
  - kiosks in tourist attractions of the city.
- local administrations which provides PIAPs (e.g. information kiosks) to access eGovernment services;
- banks that have a terminal for customers use;
- commercial stores that have kiosks or public hotspots;
- airports or train / bus stations that have terminals or public hotspots;
- disability organizations that run adapted PIAPs for their members.

This is a very important group, and is the principal target category, as they specify requirements to software and hardware providers when setting up a new PIAP. The present document provides PIAP operators with guidance on how to set up an accessible PIAP or to adapt an existing PIAP, taking a "design for all" approach.

As described in clause 6, from a perspective of sustainability, a PIAP operator must take into account many aspects when setting up a new PIAP, such as the type of users to which the PIAP is targeted, the location of the PIAP, the combination of the PIAP with other types of business (e.g. leisure facilities, social services).

Providing an adapted PIAP might make it more difficult for a PIAP to be sustainable in the long term, as it requires special software and hardware (including premises and electronic equipment such as adapted terminals and peripherals). This will probably make the initial investment, and also the costs for maintaining the accessible hardware and software, more expensive. Providing an accessible PIAP is also likely to require more space at and between PIAP workstations, which will mean that fewer terminals can be accommodated in the PIAP and thus make it more difficult to be profitable or sustainable. Yet again, policies may be required to encourage PIAP operators to make the necessary provisions related to accessibility.

## 7.6 National policy makers

This is a group that will be responsible for making European policies a reality at a national level, via promotion of accessible PIAPs. As described in clauses 7.3, 7.4 and 7.5, policy makers may need to examine ways in which the implementation of accessible hardware and software, and hence the setting up of accessible PIAPs can be achieved. The achievement of such an aim will have to take into consideration not only the needs of the targeted user groups (who are extremely important), but also the sustainability and profitability requirements of the private companies or public bodies involved in all aspects of the provision and running of PIAPs (including hardware manufacturers, software providers and PIAP operators).

If a PIAP is not sustainable, or a company involved in the manufacture, provision and support of a PIAP does not make profits, the main objective (which is to give access to eSociety to all the citizens, irrespective of their age, disability, language, or culture) may not be met, as fewer accessible PIAPs might be set up, or PIAPs that are set up will be likely to cease their activities in a short period of time.

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## 8 Scenarios

### 8.1 Introduction

This clause provides scenarios which illustrate how PIAPs could enhance the eInclusion of people. The scenarios will highlight some interesting concepts and situations, but they are not intended to illustrate all alternative solutions. The scenarios illustrate how:

- the location of the PIAP can help to meet its objectives, such as profitability or social purpose;
- users can locate a PIAP adapted to their needs;
- a PIAP can be used by people with disabilities;
- a PIAP can be personalized;
- a PIAP can be used for:
  - communicating with people;
  - helping people in their everyday life;
  - leisure;
  - work;
  - for different purposes by people who are travelling;
  - accessing eSociety when not having access to a terminal / Internet at home or at work.

The ways in which different types of end user would make use of a PIAP will be shown. The scenarios will show how making the PIAP accessible can improve the user experience and how, if it is not accessible, it can be impossible for some people to use it.

At the beginning of each scenario, there is list of issues that are covered in it.

### 8.2 Teleworking

Issues addressed in this scenario include:

- locating the PIAP;
- communicating with people;
- work;
- on the move;
- looking for information and special tasks.

#### 8.2.1 Current situation

John works as a sales representative. His work is basically to visit customers spread out over a wide area, to sell new products and give them support. He also has to dedicate time to check his e-mail, to agree on new visits, to acquire new customers, and to give quick support to his customers. It takes him about one hour per day to do these tasks. Since he lives in a village located in a remote area with neither Internet access nor 3G coverage, he has to go every day to the office to do this work. It takes him about 30 minutes to get there and another 30 minutes to return home.



## 8.2.2 Future situation

Luckily, the council of his town and other towns in the rural area has recently set up PIAPs, with Internet access via satellite connection, which he can use for his work. Now, every day, he starts his workday at his local PIAP. He does all his office work in the PIAP in the mornings as it is not so busy and there are cheaper rates. Doing this saves him about 1 hour per day that he can spend with his family. After completing his office work, he goes to visit his customers.

Some of the customers he has to visit are located in rural areas some hours driving distance by car from his own town. In those cases, he normally stays in that area for one or two nights. When that happens, he has no Internet access, so he normally tries to locate a local PIAP in the area, so that he can do his daily office work. He normally searches in a PIAP directory that he has found on the Internet, which lists thousands of PIAPs with their GPS (Global Positioning System) coordinates. He normally searches for the PIAPs in the area he plans to visit, and downloads a file which he loads into his GPS Navigator which can then instruct him how to drive to the PIAP that he chooses.

The advantage of his new situation is that, with the help of PIAPs, John is able to do his office work at low cost, despite having no Internet at home and without having to go to his office. If John was not able to use PIAPs, he would have to go to his office every day (that would mean 1 hour lost every day), and when going to distant areas to visit customers, he would not be able to do his office work for one or two days, which would make him lose some opportunities, as well as accumulating the work for the next day at the office. He could also use a 3G enabled laptop, but, apart from being more expensive, it depends on the 3G coverage in the areas he visits, which is not always good (and often there is no coverage at all).

## 8.3 A masseur and stress coach with a visual impairment

Issues addressed in this scenario include:

- use by a person with a visual impairment;
- PIAP adapted to people with disabilities;
- access to eSociety;
- locating the PIAP;
- communicating with people;
- VoIP;
- everyday life;
- business;
- leisure;
- looking for information and special tasks;
- personalization.

### 8.3.1 Current situation

Frank has recently set up his own business as a masseur and stress coach. He has his own premises where he receives his customers and he also visits companies where he helps the employees. He frequently has to treat customers with back and neck pain. He also coaches employees with their career and lifestyle, with a focus on how to keep a healthy balance in life and thus maintain an efficient and low-stress working life. As his business has just recently been set up, he does not (yet) have enough customers so he is currently in a financially unstable situation. Frank has a visual impairment.

He has recently joined an association for people with disabilities, which has many associates all around the country. In the last meeting, he made some very good friends, with whom he would like to maintain a relationship.

Frank has rarely used computers, so he is not very skilled in using them. This only leaves him the options to communicate with his friends by telephone, which is expensive, or postal mail, which is not very convenient, as he has to ask someone else to read his letters.

### 8.3.2 Future situation

Frank has heard on the local news that his council has announced the setup of some PIAPs throughout his city. He goes to the social services area of his town hall to be informed of this initiative, and they upload a file into his GPS Navigator that contains the GPS coordinates of the different PIAPs. As his GPS navigator has the capability to give spoken directions he will be able to locate these PIAPs without problems.

The first time he visits a PIAP close to his home, Frank is a bit concerned. He does not feel very comfortable using computers, since he has not used a computer many times. But as soon as he gets to the PIAP, all his fears disappear. The PIAP provides 19" flat screen displays and screen magnifying software, as well as user profiles to store his preferences regarding font type, size and colour, background colour and contrast.

Peter, the PIAP assistant, is a very helpful person, and has been trained to be aware of the specific needs of people with the most common impairments. He creates a new user account for him, helps him to log on, and also to set the screen preferences by selecting a user profile template that is addressing the needs of people with visual impairments (font type, size and colour, preferred contrast and background colour) so that he feels comfortable using the terminal. Together with Frank, they just need to fine-tune minor details in the template in order to satisfy Frank's needs, and then they store all this information in his personal profile. In this way, every time he logs on, his preferences are memorized from earlier sessions so that he feels comfortable. Apart from that, the profile manager reads data in his profile and automatically creates a customized personal style sheet (see clause 15.3.3 for more details), and configures it to his preferred web browser, so that when he accesses online web pages that support style sheets, these are adapted to his font type, size and colour, contrast and background colour preferences.

Peter also helps Frank to create a new e-mail account with an online e-mail provider, and gives him basic instructions on how to use it. At last, Frank is able to send his first e-mail to one of his friends, and as she was on-line at that moment, Frank has almost immediately received an answer from her!

Peter also helps Frank to create a new VoIP account and Frank's user profile ensures that the contact details of all his friends' will be available [i.3]. They make a test conference call so that he knows the basics about how to use it. Next time when his new friends set up a VoIP conference, he will be able to join them.

Apart from the everyday life and leisure activities described, as Frank gets more confident in using the computer, he discovers a whole world of useful services on the Internet:

- **Some council's and government's services that he can use to avoid long queues in public offices:** These online eGovernment services are usually accessible, and can be adapted to his preferences since they support the use of personal style sheets (see clause 15.3.3 for more details).
- **Reading or listening to the news:** As he has a visual impairment, it is difficult for him to read the newspaper. He has always found it boring listening to a complete news program to get the news he is interested in. The PIAP has an RSS client available, and he can subscribe only to the news topics that he is interested in, and read them every day in a comfortable way. He can even subscribe to pod casts that he can listen to, which is easier for him.
- **Online shopping:** Shopping at ordinary stores is difficult for him, since the letters of the products labels and the prices tags are sometimes difficult for him to read. Also, as he cannot drive, he has to carry his heavy bags home, which is difficult. In the PIAP, he can access an online store whose website is accessible, as it supports the use of personal style sheets. The online store provides information on products, their characteristics and their price. Frank buys the products online, with the added value that the products are delivered to his home without any effort from him.
- **Booking:** (e.g. travel tickets, cinema/theatre tickets, restaurants).
- **Searching for general information on the Web:**

After learning how to use computers and the Internet, Frank has created a web page on issues related to his profession, where he also manages a forum on stress and lifestyle related content. His web page is attracting an increasing number of people and many of the web page visitors become his clients; so now his business goes very well. As Frank is often on the move, when visiting companies, he appreciates that there are several PIAPs in his town that he can visit in the spare time between visiting two companies. Frank visits those PIAPs which are adapted for people who have visual impairments or are blind.

## 8.4 Setup and use of a PIAP in a digitally deprived area

Issues addressed in this scenario include:

- access to eSociety;
- location of the PIAP;
- communicating with people;
- everyday life;
- work;
- leisure;
- looking for information and special tasks.

### 8.4.1 Current situation

Anne is the mayor of a little village where there is no Internet access. Many inhabitants of this village, especially the young ones, usually complain that their village is excluded from the eSociety. As she usually goes to the capital where she meets with other mayors in the area, she is quite aware of the benefits that Internet access would bring to her village. Since the village is quite small, it is not likely to be profitable for operators to provide landline Internet access, or for an individual or company to set up a PIAP with satellite Internet access.

### 8.4.2 Future situation

Recently, in the last county council, Anne was informed that there was a local initiative that provides funding for setting up PIAPs in the area. She applied for funding (see clause 6.6 on funding sources), got the money needed, and set up a PIAP in her village with satellite connection. Anne thinks that a manned PIAP will be much more useful so she also recruited an assistant who maintains it and gives training courses and support to users (see clause 4.1.2 on differentiating types of PIAPs depending on whether or not there is an assistant). Anne is sure that the PIAP will help all the population of the village to reduce the current digital divide (see clause 6.4 on how combining a PIAP with services of social benefit can improve its sustainability and clause 5 on access to the eSociety).

Maria lives in the same village as Anne. To earn a living, she makes craftwork, and sells it to specialized shops in several cities. That makes her life difficult, as she has to travel a lot to show her latest creations to the shop owners. That gives her less time to design and manufacture new pieces.

When the PIAP was set up, she was not aware of the benefits that the Internet could bring her, but as the council offered free training courses about the basics of using computers and about the Internet, she decided to attend (see clause 5.4 on computer literacy). This course, together with the PIAP, has changed her life:

- Maria has set up an online shop to sell her craftwork. Now, apart from the shops she knew, she has a lot of customers from all over the world. All she has to do to include a new product is to take a photo of it, and upload it to the online shop together with the price of the product. Her customers (normally shops) can take a look at the new products as soon as they are released (without having to wait for Maria to visit them), and can send online orders to her. She is able to communicate with them via e-mail, so that she can inform them when there are new products, and can solve any issues that may arise. An additional benefit is that Maria has more time to design and manufacture new products, since she does not have to travel so much.
- She is also able to pay her taxes online as a self-employed individual. Now she does not have to go to the city to do it, which saves her a lot of time. She can also contact her tax advisor through the Internet instead of going to the city.
- She is able to look for all kinds of information on the Internet (e.g. news, maps).
- She is able to communicate with other people like her that make craftwork to share new ideas, or keep in touch with relatives and friends.

- The location of the PIAP is very convenient for her, as she does not have to go to another village or city to do all the activities described (see clause 6.2 on how the location of the PIAP can affect its sustainability). That gives her the opportunity to spend more time working and being with her family.
- The PIAP gives her a single point to get local information, as the PIAP assistant has gathered a lot of local information (e.g. local events, groups or associations, schools, tourist information, local government), adding some bookmarks to the default browser installation (see clause 4.3.1 on using a PIAP as a local resource).

## 8.5 Supporting tourists

Issues addressed in this scenario include:

- personalization;
- payment machine providing information in alternative languages;
- café and restaurant information adapted to user preferences, and in alternative languages.

### 8.5.1 Current situation

The increasing number of international tourists generates new requirements for PIAP providers. There is a growing need to deal with multicultural and multilingual requests and to offer users information according to their preferences. Nevertheless, various tourist contexts have no or very little support in this sense. In restaurants, menus are normally provided in the local language or perhaps a very limited number of other languages. Thus, for tourists not understanding those languages this is a major problem as it can affect various cultural and personal requirements, e.g. halal eaters, vegetarians, Buddhist, or people allergic to certain ingredients.

### 8.5.2 Future situation

Ildiko, a 23 years old student from Hungary, visits Rome during her summer holidays. She has a user profile containing her preferences constantly available, via short range communication (e.g. Bluetooth, Infra Red, Near Field Communication), for any service at any time via her mobile phone. Her first language preference is set to Hungarian for any situation including reading, writing and spoken language, and her second preference is English.

Ildiko's user profile is accessed in her mobile phone when she uses the payment machine for purchasing a PIAP session. The language of the payment machine and PC cannot be provided in Hungarian as only Italian and English is provided. Therefore the language provided to Ildiko is English.

She wishes to read her emails and get information about what to visit in Rome, and about the public transportation in Rome and she gets all information automatically in English thanks to her language preferences in her user profile.

After a while, she gets hungry and decides to eat a light lunch at the PIAP. The PIAP menu is displayed on the PIAP information page and is provided to Ildiko in English, pointing out the vegetarian dishes, according to her particular requirements.

## 9 PIAP premises

### 9.1 Introduction

There is a hierarchy of suitable locations for PIAP installations, particularly from the accessibility viewpoint. This hierarchy relates to the siting of the environment in which PIAP terminals are placed and does not address access to the terminals within that environment. The first two items in the following list are absolute minimum requirement and the last item is a potentially foolproof choice of location. The PIAP premises should be somewhere:

- that the target user can find - if the target user cannot find the PIAP then all other merits of the PIAP premises are of no value;

- where physical access to the PIAP is possible - if it is impossible to access the environment then all other merits of the PIAP premises are of no value;
- that the target users will find to be a convenient location - if the location is inconvenient then the users are unlikely to want to frequently return;
- that the target users find to be a pleasant and comfortable location - if the target users like to be in the location they will be much more highly motivated to return;
- where the target users can carry out other activities that they wish to accomplish - this means that the users may visit the location to carry out the other activities and make use of the PIAP as a secondary activity that they might otherwise not have bothered to do (e.g. drink coffee, watch TV);
- where the target users permanently reside (e.g. in a residential institution) - this is an ideal situation, as accessing the PIAP is highly convenient and is also an additional activity that is less likely to compete with alternatives that might take place in other locations.

Increasingly, some PIAPs, especially public hotspots, may be found in a moving location such as in a bus, train or aeroplane. Whilst the recommendations in clause 9 have been written from the perspective of a fixed PIAP location, many of them will be relevant when applied to PIAPs in non-stationary locations.

## 9.2 Finding a PIAP

### 9.2.1 Introduction

A PIAP should ideally be located in areas where the target users spend a significant amount of time, for instance related to other activities, where people are going anyway, or living areas. People may have one or more specific requirements about the PIAP they wish to visit and it is therefore important that a person can choose a PIAP, based on criteria such as:

- the closeness of the PIAP;
- whether the required services are offered (e.g. VoIP calls, video conferencing);
- whether the environmental conditions are appropriate to the intended tasks (e.g. ambient noise level for VoIP calls);
- PIAP provider (e.g. if the person is an existing customer of a specific PIAP provider, they may prefer to use that provider again to make use of existing personalization or credit on their accounts);
- price and payment system (e.g. whether the person has a means of payment that matches the PIAP payment system);
- opening hours;
- languages (e.g. of the software and PIAP assistants);
- accessibility appropriate to the person's abilities/disabilities;
- security and safety: The surrounding area of a PIAP may also have an influence on how well visited the PIAP will be. Many people will feel insecure in areas that give the impression that there is a potential higher risk of being robbed or becoming a victim of violence. These fears will be likely to increase at night. Also, a person carrying a laptop might fear an increased risk of being robbed in these areas. It is therefore recommended that the PIAPs are located where it is reasonably safe, such as where there are many people passing and that the surrounding area is well lit during the dark hours. The PIAP should also be accessible by different transport means.

There are a range of possible methods that can assist a person to find a PIAP such as:

- web based tools that offer maps and search functionality;
- printed leaflets;

- phone up service;
- PIAPs as a Point of Interest (POI) on GPS system maps;
- an SMS service that lists nearby PIAPs;
- signage systems (road signs/directional signs).

The information on how to find the PIAP could contain:

- search criteria such as those mentioned above (e.g. adapted for people with disabilities, language, manned/unmanned);
- address;
- description of how to find it;
- location on a map;
- a photo which makes it easier to recognize the PIAP;
- GPS coordinates (that could be input into a GPS navigation device).

## 9.2.2 Names and symbols

Choice of name and symbol is a commercial decision but the following recommendations may help to make it clear to potential users that the place indicated is a PIAP. This easy recognition should also result in a commercial benefit for the PIAP provider.

Ideally, the name and symbol of the PIAP should be well understood internationally. It can use very familiar simple terms related to Internet. Some examples are: "Web", "www", "@" symbol, "Internet", "Internet Café", "Cyber", "Cyber Café", "net", "Internet Spot", "Wi-Fi Spot", etc.

It is also recommended that the names and symbols indicate the functions provided by the PIAP. The use of a combination of words and symbols may be useful, so that it is easy for potential users to locate the PIAP, both in text and graphical form. For example, a wheelchair-adapted PIAP could have, together with the name or symbol that identifies that this is a PIAP, a symbol of a wheelchair; a PIAP that offers both stationary terminals and a public hotspot could have, together with the name or symbol that identifies that this is a PIAP, a symbol that identifies a public hotspot.

### Names and symbols

**Recommendation 9.2.2.a:** The name or symbol of the PIAP should indicate the functions provided by the PIAP. A combination of simple words and symbols identifying the functions may be useful.

**Recommendation 9.2.2.b:** The name or symbol of the PIAP should have words and symbols that can be internationally understood.

**Recommendation 9.2.2.c:** Use familiar terms related to the Internet as part of the PIAP name e.g. "Web", "www", "@" symbol, "Internet", "Internet Café", "Cyber", "Cyber Café", "net", "Internet Spot", "Wi-Fi Spot".

**Recommendation 9.2.2d:** The term PIAP is not commonly recognized by the public and should not be used as part of the name.

## 9.3 PIAP accessibility

### 9.3.1 Range of disabilities

In the context of the present document, the following broad classes of abilities are highlighted, and when impaired, they affect the use of PIAPs:

- sensory abilities such as seeing, hearing, touch, and balance;
- physical abilities such as speech, dexterity, manipulation, mobility, strength and endurance;

- cognitive abilities such as intellect and memory;
- language abilities such as speaking, reading, literacy and comprehension.

These abilities are also described in the document ISO/IEC Guide 71 [i.9] and in the ITU-T FSTP-TACL Telecommunications Accessibility Checklist [i.18], which provide guidelines for standards developers to address the needs of older people and people with disabilities.

## 9.3.2 Location related accessibility issues

In addition to the location related requirements listed in clause 9.2, there will be additional requirements to ensure that all people, including those with disabilities are able to locate PIAPs which meets their requirements and needs. The following recommendations should be implemented.

### General location related accessibility issues

**Recommendation 9.3.2.a:** There should be various means to get information on where to find a PIAP which is adapted to people with disabilities, e.g. web pages that provide search criteria on adaptation for people with disabilities, or an option to phone a disability organization or public service that could provide information on adapted PIAPs.

**Recommendation 9.3.2.b:** Electronic wayfinding and signage systems based on Bluetooth or Wi-Fi should be provided.

**Recommendation 9.3.2.c:** Public equipment should be placed in "accessible" places.

### Location related issues associated with sight impairments

**Recommendation 9.3.2.d:** Directional signs should be placed so that they are easy to locate.

**Recommendation 9.3.2.e:** Directional signs should be printed in large letters.

**Recommendation 9.3.2.f:** Directional signs should also be provided in Braille.

**Recommendation 9.3.2.g:** Directional contrasted and standardized colours should be used.

**Recommendation 9.3.2.h:** Large, contrasting, LCD screens should be used for the display of location related information.

**Recommendation 9.3.2.i:** Wayfinding and signage should be shown in contrasted large displays.

**Recommendation 9.3.2.j:** Written information should also be provided in an audio recorded form.

### Location related issues associated with hearing impairments

**Recommendation 9.3.2.k:** Signs for loop systems other forms of amplification or signage should be provided.

### Location related issues associated with dyslexia and reduced language comprehension

**Recommendation 9.3.2.l:** Standardized icons or words should be used in signage.

### Location related issues associated with cognitive impairment

**Recommendation 9.3.2.m:** Directional signs should be placed so that they are easy to spot.

**Recommendation 9.3.2.n:** Standardized icons, pictograms, or words should be used where relevant, combined with speech output.

## 9.3.3 Accessibility of the building where the PIAP is located

The building where the PIAP is located must be accessible; otherwise all the efforts made inside the PIAP would be worthless, as the first barrier would be encountered before reaching the PIAP.

The following recommendations are based on information from [i.22].

#### **Accessibility of the building**

**Recommendation 9.3.3.a:** Public transportation should be available to get to the PIAP. The path from the nearest transportation stop to the PIAP should be accessible [i.22].

**Recommendation 9.3.3.b:** A public parking area should be available near the PIAP. Some parking spaces should be reserved for people with disabilities with the appropriate space around them to be able to get out of the car in a comfortable way. The path from the nearest transportation stop or parking to the PIAP should be accessible.

**Recommendation 9.3.3.c:** There should not be level changes in the building (including the entrance). If there is any change in level greater than 13 mm, then a curb ramp, ramp, elevator, or platform lift shall be provided.

**Recommendation 9.3.3.d:** If a ramp is provided, the least possible slope should be used. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any run shall be 760 mm.

**Recommendation 9.3.3.e:** The use of automatic sliding doors is recommended. Where this cannot be done, it shall be possible to push the door open from either direction.

**Recommendation 9.3.3.f:** Doorways shall have a minimum clear opening of 815 mm with the door open 90 degrees, measured between the face of the door and the opposite stop.

**Recommendation 9.3.3.g:** Doors that invade circulation space should be avoided. When sliding doors are not provided, they should have slow automatic closing systems so that they do not remain open.

**Recommendation 9.3.3.h:** When providing glass doors, these should have some indicator that allows the users to easily identify them. It is recommended that they have a 200 mm width band that extends along all the width of the door, at a height between 1 m and 1,5 m.

**Recommendation 9.3.3.i:** Door handles or latches should be placed at a height between 850 mm and 1,2 m, and their colour should have some contrast with the door's colour.

**Recommendation 9.3.3.j:** Detection systems used for automatic door opening should not leave dead spaces, and should be effective for users of different heights, such as children or wheelchair users. Opening time should be adjusted to the time needed to cross the door by a reduced mobility person.

**Recommendation 9.3.3.k:** Automatic doors will have a security mechanism that will avoid the risk of trapping or collision.

**Recommendation 9.3.3.l:** Ideally, the PIAP should be located on the ground floor of the building. Where this cannot be done, a lift should be provided. The lift should conform to general accessibility guidelines related to lifts.

**Recommendation 9.3.3.m:** When a lift is provided, the lift's doors should be automatic and sliding, with a minimum clear width of 900 mm. The approach area in front of lifts should be free of obstacles and will be 1,5 m by 1,5 m, so that it facilitates unassisted entry, operation, and exit from them for wheelchair users or people with walking aids.

**Recommendation 9.3.3.n:** The minimum clear width of doors, ramps and corridors for single wheelchair passage shall be 815 mm at a point and 915 mm continuously. For large corridors, the minimum width for two wheelchairs to pass is 1 525 mm.

**Recommendation 9.3.3.o:** It is recommended that there is some clear space before and after a door, of about 1,2 m.

**Recommendation 9.3.3.p:** The minimum clear floor or ground space required to accommodate a single, stationary wheelchair and occupant is 760 mm by 1 220 mm. This would affect in general in any situation where a wheelchair user has to use any object (space in front of a desk, space in front of an automatic payment machine, space in a lift).

**Recommendation 9.3.3.q:** For a wheelchair user, if the clear floor space only allows forward approach to an object, the maximum high forward reach allowed shall be 1 220 mm. The minimum low forward reach is 380 mm.

**Recommendation 9.3.3.r:** For a wheelchair user, if the clear floor space only allows parallel approach to an object, the maximum high side reach allowed shall be 1 370 mm and the low side reach shall be no less than 230 mm above the floor.

**Recommendation 9.3.3.s:** Walks, halls, corridors, passageways, aisles, or other circulation spaces shall have 2 030 mm minimum clear head room.

**Recommendation 9.3.3.t:** If vertical clearance of an area adjoining an accessible route is reduced to less than 2 030 mm in (nominal dimension), a barrier to warn blind or persons who have visual impairments shall be provided.

**Recommendation 9.3.3.u:** Ground and floor surfaces along accessible routes and in accessible rooms and spaces including floors, walks, ramps, stairs, and curb ramps, shall be stable, firm and slip-resistant.

**Recommendation 9.3.3.v:** Users should be warned of potential hazards (e.g. obstacles), both temporary and permanent, so that they can use the PIAP without injury due to unperceived hazards. Clear visible and audible signs should be provided for this purpose.

**Recommendation 9.3.3.w:** It is recommended that there is some contrast between doors, walls and floor colours, so that they are easily distinguishable.



### 9.3.4 Accessibility of an individual workspace

As a general rule, all PIAPs should have a percentage of their terminals physically adapted for people with disabilities. There is no clear guidance on what is a reasonable amount of adapted terminals to provide in a PIAP. It may be reasonable to extrapolate from the figures in the Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines [i.22] that relate to the provision of public payphones that can connect with a text telephone (TTY). This proposal talks of providing one text telephone compatible public payphone in all places where there are four or more public payphones. Applying the same criterion for providing (at least) one accessible PIAP workstation in every PIAP that has four or more workstations would avoid the situation where a low-budget PIAP with a single workstation feels obliged to make the necessary adaptations to its single terminal and workspace but cannot afford to.

In addition to the recommendations given below, [5] gives some very useful guidance together with clear illustrations to accompany the guidance.

**Wheelchair access** (Adapted from material in the CEN Workshop Agreement, CWA 14661 [i.10]):

**Goal 9.3.4.a:** Provide workstations that allow easy access.

**Recommendation 9.3.4.b:** Apply standardized dimensions for public booths ( [5] clause 3) to Internet kiosks.

**Recommendation 9.3.4.c:** Knee spaces at least 685 mm high, 760 mm wide, and 485 mm deep should be provided at the workstation.

**Recommendation 9.3.4.d:** The chair should be adjustable and have an adequate backrest.

**Recommendation 9.3.4.e:** It should be possible for the chair to be moved away from the front of the desk.

**Recommendation 9.3.4.f:** There should be additional space at the workstation for a second person (e.g. friend, child, assistant or care person).

**Recommendation 9.3.4.g:** It is desirable that there is enough space at the work station for placing objects the users bring with them (e.g. walking sticks, pram, shopping bags, and suitcases).

**Recommendation 9.3.4.h:** There should be a place at the work station to put walking sticks so that it will easy to take the walking stick when leaving (e.g. the stick could be hanging or standing as it might be difficult for a person with impairments to pick it up if it is laying on the floor).

### 9.3.5 Signage inside the PIAP

For people unfamiliar with a PIAP it will be important to provide suitable signage that will assist them to easily locate and identify all of the facilities provided. The ideal that should be sought is for the signage provided to be usable by all people who may wish to use the PIAP.

#### Signage

**Recommendation 9.3.5.a:** Relevant information in the PIAP should be at least provided in a visual and audible form, although it is also recommended that it is provided in a tactile way.

**Recommendation 9.3.5.b:** Floor maps of the building should be located so that they are easily seen, positioned as close as possible to the entrance door.

**Recommendation 9.3.5.c:** The content or information shown in the signage should be concise, basic and uniform, and should avoid superfluous information.

**Recommendation 9.3.5.d:** Signs and their support should not be a danger to people with visual disabilities.

**Recommendation 9.3.5.e:** It is recommended that internal routes are displayed. This includes having direction signs at the beginning and the end of the route, and where there are changes of direction. If the route is very long, additional signs or maps (highlighting the current location) should be placed more frequently to reinforce the message. It is also recommended that directional signs are provided on the floor.

**Recommendation 9.3.5.f:** When visual signs are provided, symbol or character colours should have a high contrast with the background, and should have an appropriate size to be easily read from a reasonable distance.

**Recommendation 9.3.5.g:** When audible information is provided, it should be provided at a volume that is easy to hear, but not disturbing. The signal information should also be communicated through the use of inductive loops for people who have any severe hearing loss. When possible the information should be provided in alternative languages.

**Recommendation 9.3.5.h:** When tactile information is provided, it should be provided by means of rough textures (e.g. on the floor to signal some route), or by means of embossed Braille characters at certain points (e.g. for a handrail of a stair, ramp or lift, the information should be on the internal side of the handrail at its beginning).

## 9.4 Public hotspots

Public hotspots are a specific type of PIAP where a wireless network connection is provided to users that bring their own mobile devices (e.g. laptop, wireless enabled mobile phone, wireless enabled Tablet PC) to the PIAP. There may also be PIAPs providing terminals for some users and a wireless area (public hotspot) for those users that bring their own mobile devices.

For PIAPs providing public hotspots, the same accessibility issues related to the building or to the workspace described in clause 9.3 are applicable. In addition to these recommendations, the recommendations below need to be addressed.

### Public hotspots

**Recommendation 9.4.a:** The PIAP should provide information signs that show where a good wireless signal can be found.

**Recommendation 9.4.b:** Power sockets should be provided so that the users have a means to plug in their own mobile devices.

**Recommendation 9.4.c:** It is recommended that network sockets are provided so that users who have mobile devices without wireless access (e.g. old laptops) can connect to the Internet.

**Recommendation 9.4.d:** Power and network sockets should be provided at a suitable height so that they are easily accessible for all users, including those with disabilities.

**Recommendation 9.4.e:** It is recommended that the PIAP provide a solution so that blind people and those with vision impairments can find the power and network socket (e.g. an embossed sign on the desk just in front of the position of the power and network sockets on the wall).

**Recommendation 9.4.f:** If the wireless area is provided outdoors, appropriate socket protection against water and dirt should be provided for network and power sockets.

**Recommendation 9.4.g:** Power sockets should be protected from misuse by young children.

**Recommendation 9.4.h:** It is recommended that the PIAP provides socket adaptors for different plugs, so that they can be used with the most widely used power supply plugs.

**Recommendation 9.4.i:** Space for adaptors and for power supply should be provided. It is also recommended that the space on which a laptop can be placed should be suitable for laptops of different sizes, as well as that there is enough space to place wrist rests, so that users who bring them can use them.

## 9.5 Internet kiosks

As has been previously indicated, the majority of the recommendations in the present document apply equally to Internet kiosks as well as to the conventional PIAP workstation with a keyboard, screen and mouse on a desk. The one major area in which Internet kiosks differ from the conventional PIAP workstation is that they are:

- usually located in public spaces that are not specifically assigned to PIAP usage;
- designed to be used while in a standing position or from a wheelchair.

Internet kiosks therefore share the above characteristics with on-street bank terminals (ATMs) and with public payphones. Indeed, [i.16] introduced the concept of an Information /Transaction machine that covers both of the above and Internet kiosks.

As there are no widely available sources of design guidance for Internet kiosks (with the possible exception of [i.16]), and as specific research would be necessary to develop such guidelines, the best sources to look to for design guidance for Internet kiosks are those that have been written for ATMs and for public payphones. These sources also contain valuable design guidance related to smartcard reading facilities and payphone related guidance refers to coin payment mechanisms, both of which may be required in Internet kiosks. There are very many such sources, but the following are particularly valuable:

- for ATMs design guidance: the Australian Bankers Association industry standards on ATMs and Electronic Funds Transfer at Point of Sale (EFTPOS) [i.14], [i.15];
- for public payphone guidance: the ITU-T recommendation on human factors aspects of public telephones to improve their usability for older people [i.7], ITU-T Telecommunications Accessibility Checklist [i.8];
- sources that give guidance related to features of both of the above: the ETSI Design for All guide [i.2], ISO/IEC Guide 71 [i.9], the Information/Transaction Machines accessibility guidelines [i.16].

Additional guidance related to the presentation of instructional material for public payphones may also be applicable. Clause 16.6 gives details of the relevant sources of guidance on the presentation of instructional material.

## 9.6 PIAP assistants

### 9.6.1 Introduction

There are many staff issues, and these will vary according to the type of PIAP. Some PIAPs are manned and others are unmanned. Where PIAPs are co-located with other activities, such as café, there may be staff whose major task is to serve coffee. The secondary task of such staff is to be a visible presence and to ensure that people do not steal or damage the PIAPs. They may also be responsible for manual customer registration and charging processes.

This clause addresses PIAP assistants whose main objective is to run the PIAP and assist people to use it. Their main tasks would normally include:

- supporting the overall functioning of the PIAP, including the terminals, wireless Internet, monitoring systems and accounting systems;
- assisting users with payment, registration and logon;
- assisting users whose computer skills are very limited.

In addition, the presence of the PIAP assistants may also make the customers feel more secure against being attacked or robbed.

### 9.6.2 Competence and skills

PIAP assistants will need a wide range of knowledge and skills if they are to provide a service to any person who may wish to use the PIAP. PIAP assistants will need to be competent to run and maintain the equipment and services that the PIAP provides to the public, as well as to the PIAP support systems (e.g. terminals, monitoring systems, accounting systems). Where PIAP assistants do not have this fundamental knowledge and skills, it will be important that training is made available to them to ensure that they develop the necessary skills.

Most PIAP staff members will make direct contact with members of the public. Therefore they will need the ability to deal with many types of people in addition to being competent with the equipment and services. The skills required by PIAP assistants will vary according to the target audience of the PIAP but the following skills are likely to be needed in most PIAPs:

- the ability to understand user needs;
- determine strategies that users can use in order to meet their specific needs.

At the simplest level, PIAP assistants will need to understand how little some people will know about the underlying technology and be able to patiently explain the very basics of starting to use the terminal. PIAP assistants, particularly those in PIAPs sited in areas of social exclusion, will need to develop sensitivity to social and cultural diversity and to adopt a good level of customer care.

It is particularly important to have manned PIAPs in deprived areas. PIAP assistants in those deprived areas need to have appropriate social skills. The appearance of the PIAP assistants can also be an important factor in attracting customers. A study of a PIAP in a deprived area, that had a window onto the street, found that when the PIAP assistants switched from suits to t-shirts there was a major increase in uses overnight (see [i.27] page 7). The lesson that was learnt from this example was that the people from the local area were confident to enter the PIAP when the PIAP assistants look like "people like us".

All PIAP assistants who come into contact with the public will also need to have a good awareness of the needs of people with a wide range of disabilities. PIAP assistants need to have specific training to deal with people with disabilities, in order to talk to them in a way that is adapted to their capabilities (e.g. speak to people with hearing impairments in front of them and quite slowly to assist lip-reading, speak louder or lower, write, use sign language, use simple language). It is important to treat people with disabilities naturally, as they are aware of their disability and accept it (e.g. it is acceptable to say "can you see it" to a blind person).

**PIAP assistants**

**Goal 9.6.2.a:** Staff should treat people with disabilities naturally.

**Recommendation 9.6.2.b:** Staff should understand the overall functioning of the PIAP, including the terminals, wireless Internet, monitoring systems and accounting systems.

**Recommendation 9.6.2.c:** Staff should be able to assist users with payment, registration and logon.

**Recommendation 9.6.2.d:** Staff should match their style of interaction to the person to whom they are speaking. They should be patient and encouraging, in particular with those users with very limited computer skills and those with low self-esteem.

**Recommendation 9.6.2.e:** It is particularly important to have manned PIAPs in deprived areas.

**Recommendation 9.6.2.f:** In multicultural areas, it is very beneficial that the PIAP assistants are familiar with the cultures and languages of the potential users (using people from the same cultural background can be an advantage). An awareness of the range of social problems in the area will also be extremely beneficial.

**Recommendation 9.6.2.g:** The dress style of the PIAP assistants should not diverge significantly from what is considered normal in the area in which the PIAP will be located.

**Recommendation 9.6.2.h:** Staff will require specific training in order to learn appropriate ways to deal people with disabilities and to gain an understanding about the use of a customer's assistive devices.

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## 10 Hardware and accessories

### 10.1 Introduction

The most important hardware devices at the PIAP workspace are described in the following clauses. For each of them, there are general usability recommendations that apply to all users. There are also some specific recommendations that apply to users with disabilities, or some alternative assistive devices that can replace the default devices. It is desirable that the adapted terminals in a PIAP have some of these most widely used assistive devices.

The recommendations provided in this clause are intended to suggest options that are most beneficial for users, but account has also been taken of practical issues such as ease of maintenance and minimized risk of damage to the hardware. Most of the recommendations in clause 10 are written with respect to a traditional configuration of a screen and keyboard placed on a desk. Where there are recommendations that apply to internet kiosks or to public hotspots this will be specifically indicated.

### 10.2 Computer

There are some general issues that apply to the computer:

- It is desirable that the computer is hidden from the user (e.g. in a case under the table). This will be beneficial for the user because the computer does not occupy space on the desk. It will also be beneficial for the PIAP operator, as it is more difficult that a user can cause damage to it or disconnect and steal peripherals. Also, by hiding the computer, the On/Off button is hidden from the user.

The following recommendation applies in particular for people with hearing disabilities:

- Electronic equipment may produce electromagnetic fields that can interfere with hearing aids used by some users. The computer system and peripherals should be built in a way that avoids (or just shields) the generation of electromagnetic or radio frequency fields that can interfere with users with hearing aids.

**Computer**

**Recommendation 10.2.a:** The computer should be hidden in a case to leave space on the desk and to avoid deliberate damage or theft.

**Recommendation 10.2.b:** The computer should be electromagnetically shielded to not interfere with users with hearing aids.

## 10.3 Screen

There are some general usability issues that apply to the screen:

- The height should be adjustable in addition to any adjustments in the height of the desk, so that people with different height can feel comfortable while using the terminal. If the screen provides a mechanism for changing its position, it should be easy to handle.
- Colour and contrast setting should be adjustable in order to produce high contrast colour schemes.
- The viewing angle should be wide enough so that at least two people sitting next to each other can read the screen properly.
- If visual separation between the desks is not provided, then the screen should have a privacy filter to prevent other people from reading the screen.
- The On/Off button should be hidden, to ensure that users will not be presented with a blank screen after the previous user switched the screen off. This can be accomplished by switching the screen on and attaching a frame onto the screen frame that covers the screen button and prevents users from turning the screen off.

The following recommendation applies in particular for people with visual disabilities:

- Most of the issues related to people with visual impairments can currently be solved by using a 19" TFT display. In future it may be necessary to consider whether larger sizes would offer any significant benefits. Those people who need a larger screen, would also benefit from screen magnifying software (see clause 11.2).

### Screen

**Recommendation 10.3.a:** The screen should be adjustable in height and viewing angle. It should be possible to adjust its position using only one hand, without movements that require a force of more than 22.2 N. These operations should not require turning the wrist or the use of a pinching motion.

**Recommendation 10.3.b:** The viewing angle of the screen should be enough so that at least two people can read the screen properly when sharing the same workstation.

**Recommendation 10.3.c:** A means of preventing unwelcome viewing of the screen by other people should be provided (i.e. "shoulder surfing"). This can be achieved either by providing a visual barrier between desks, by means of special disposition of terminals (e.g. zig-zag), or by means of a privacy filter to prevent other people from reading the screen.

**Recommendation 10.3.d:** The screen should be, at least, a 19" TFT display.

**Recommendation 10.3.e:** The screen should be adjustable in colour, brightness and contrast.

**Recommendation 10.3.f:** The On/Off button on the screen should be hidden or protected, to ensure that users will not be presented with a blank screen after the previous user switched the screen off.

**Recommendation 10.3.g:** The screen surface should be protected from finger prints (e.g. by a transparent cover).

**Recommendation 10.3.h:** The screen should be designed to avoid flickering between 2 Hz and 50 Hz.

## 10.4 Keyboard

The following general usability issues apply to the keyboard:

- The choice of keyboard layout (e.g. QWERTY, AZERTY) should be made according to the recommendations in clause 14.2.
- The provision of a keyboard with a numeric keypad section is the preferred option where the available space permits its use.
- The keyboard should not be fixed to the table as some users may want to move it to one side or the other depending on the task they are undertaking (e.g. if they are using the numerical keypad or if they are only using the letter area).
- If the keyboard is fixed, it is recommended that the mid-point of the alphanumeric part is in line with the mid-point of the screen (whether the keyboard has a numeric keypad or not).

- Although the adjustment of keyboard angle and use of wrist rests may improve comfort and health when using a computer, there are no optimum values that suit all users and there is no universally agreed recommended keyboard angle that can be recommended.
- The provision of a wrist rest as a standard feature at PIAP workstations is not recommended, due to the likelihood that they will cause operational difficulties in the PIAP (e.g. they can fall on the floor and become a hazard) and that they can, if used with a wrongly adjusted keyboard be uncomfortable and possibly harmful.
- It is suggested that PIAPs could have wrist rests that they could make available to users who specifically request them.

For people with disabilities, the following recommendations apply to the keyboard:

- It is recommended that light coloured keyboards with the letters in black are provided, as they are more easily readable by people with visual impairment.
- Where dark keyboards with white letters are used, it is recommended that stickers (with white background and large, black, and bold letters) are stuck to the keys. This modification would make the keyboard usable by most people with visual impairments as it increases the contrast and possibly the size.
- Another alternative to the keyboard is to have software on the terminal that displays a virtual keyboard on the screen. This has the advantage that the symbols can be as large as necessary, and also the contrast, colours, etc. can be optimized.
- For people with hand tremor, it is desirable to have a keyboard with raised ridges between all the keys, so that the users are able to select the keys more easily without the risk of unintentionally pressing two keys.
- Keyboards with extra large keys can also be beneficial for people with hand tremor and those with poor vision.
- Having a range of different coloured keys on the same keyboard can assist users with learning disabilities to remember the location of the keys on the keyboard.
- There should be enough space in front of the screen so that the keyboard can be moved away or unplugged, and it should be possible to add alternative input devices.
- The same recommendations that apply to keyboards also apply to separate numeric keypads. It is also important that they have large keys specifically adapted to enter numeric data into applications.

**Keyboard/Keypad**

**Recommendation 10.4.a:** The choice of keyboard layout (e.g. QWERTY, AZERTY) should be made according to the recommendations of clause 14.2.

**Recommendation 10.4.b:** A keyboard with a numeric keypad section should be used where space permits.

**Recommendation 10.4.c:** The keyboard should not be fixed to the table.

**Recommendation 10.4.d:** If the keyboard is fixed, it is recommended that the mid-point of the alphanumeric part is in line with the mid-point of the screen (whether the keyboard has a numeric keypad or not).

**Recommendation 10.4.e:** It is recommended that light coloured keyboards with the letters in black are provided, as they are more easily readable by people with visual impairments;

**Recommendation 10.4.f:** Where dark keyboards with white letters are used, it is recommended that stickers (with white background and large, black, and bold letters) are stuck to the keys.

**Recommendation 10.4.g:** An alternative to the traditional keyboard is to have software on the terminal that displays a virtual keyboard on the screen. This may be more suitable for people with visual impairments, as the symbols can be as large as necessary, and also the contrast and colours can be optimized.

**Recommendation 10.4.h:** To assist people with hand tremor provide a keyboard with raised ridges between all the keys should be provided.

**Recommendation 10.4.i:** To assist people with hand tremor and those with visual impairments a keyboard with extra large keys should be provided.

**Recommendation 10.4.j:** To assist people with learning disabilities a keyboard with a range of different coloured keys on it should be provided.

**Recommendation 10.4.k:** There should be enough space in front of the screen to move away or unplug the keyboard, so that it is possible to add alternative input devices.

**Recommendation 10.4.l:** Free-standing wrist rests should only be supplied to those users who specifically request them.

**Recommendation 10.4.m:** The force needed to activate the keys of the keyboard should be 22.2 N maximum. It is also recommended that the keystroke should give a tactile and audible sensation to the user.

**Recommendation 10.4.n:** It should be possible to sense the keys in a tactile way. It also is recommended that they are not activated just by touching them, but that some pressure and/or movement is required.

**Recommendation 10.4.o:** Colour should not be the unique way to distinguish between keys e.g. for some functions it may be necessary to add tactile indications to differentiate between keys.

## 10.5 Pointing device

There are various pointing devices, but most users will be familiar with the use of the mouse so this is frequently the preferred option to use in a PIAP. Some general usability issues that apply to the mouse:

- Users may want to place the mouse on one side of the keyboard or the other depending on whether they are left-handed or right-handed. So, the length of the cable should be long enough to allow it to be moved to one side or the other, but not so long that it can fall down on the floor.
- An additional wrist rest can be provided (on request) for ergonomic reasons.
- The surface on which the mouse is intended to be used should be appropriate for the technology of the mouse used (e.g. laser mice frequently perform badly on very shiny surfaces).

For people with mobility impairments, there are two options to replace the traditional mouse:

- joystick: specifically designed for use by people with reduced arm mobility or where the user has no hands;
- trackball: also for use by people with mobility impairments (there are models for left and right handed operation).

NOTE: Trackballs may also be provided as an alternative to mice for general purpose PIAPs.

It is not possible to recommend the best option for people with disabilities as it depends very much on the specific impairment of the person that uses it. Sometimes, even people with a similar impairment find it more comfortable to use either one or the other device, so it is recommended that alternative options are available.

There are accessibility issues related to the capacity of the users to find and follow the screen pointer that they are controlling with the pointing device. These issues are described in the software accessibility clause 11.7.

**Pointing device**

**Recommendation 10.5.a:** A mouse with a scrolling wheel is recommended as a pointing device.

**Recommendation 10.5.b:** The length of the cable of the mouse should be long enough to allow it to be moved to the left or right side of the keyboard (depending on if the user is left- or right-handed), but not so long that it can fall down on the floor.

**Recommendation 10.5.c:** An additional wrist rest for the mouse should be provided (on request) for ergonomic reasons.

**Recommendation 10.5.d:** The surface on which the mouse is intended to be used should be appropriate for the technology of the mouse.

**Recommendation 10.5.e:** For people with mobility impairments, the PIAP should have alternative pointing devices available (e.g. joystick or trackball), as the best option for people with disabilities depends on the specific individual users' needs. The trackball may also be provided as an alternative to a mouse for general purpose PIAPs.

## 10.6 Connection of peripherals

PIAPs should provide the users with the option to connect their own devices, so it is recommended that PIAP provide at least the following:

- **USB ports:** These are useful for connecting various user devices (e.g. external storage devices, cameras, memory card reader). These should be easily accessible. Providing USB ports (in the front part of the terminal) will allow users to bring and easily use their own devices. It is recommended that the terminal has two or three USB ports. Most of the assistive devices in the market use a USB port to connect to a computer.
- **Audio input/output connectors:** These should be easily accessible. They will allow users to connect their own headphone, microphone or headset. This will be increasingly important if support for VoIP is provided.

If the computer is hidden in a case, the ports or connectors should be extended from the computer to the desk area, so that they are easily accessible to the users. Whether or not the computer is hidden, it is recommended that ports or connectors are facing the user, and at the height of the keyboard or higher. It is also desirable that there is a clear and visible sign that indicates their presence and that there is a tactile indicator to assist blind people or those with visual impairments to locate them.

It would also be beneficial that the PIAP provides:

- the option to connect Bluetooth or Infra Red devices;
- the option for users to obtain headphones in the PIAP. It is desirable that the headphones have built-in volume control, so that the user can adjust the volume easily. Another alternative is that the operating system offers volume control software (see clause 11.8.2). Hygiene concerns will often make the purchasing of headphones preferable to any rental or loan schemes. Alternatively, some form of disposable or washable covering for the headphones might be considered;
- the option to download/upload information from/to an external device;
- loudspeakers that could be used by users who do not have headphones. This will also allow an easy means to adjust the volume of the sound, as the majority of loudspeakers provide this feature. When providing loudspeakers, they should be directed towards the user, so that is easier to listen to them (and less disturbing to others);
- if the terminal delivers output by an audio transducer which is normally held up to the ear, there should be a means for effective wireless coupling to hearing aids.



**Connection of peripherals**

**Recommendation 10.6.a:** PIAPs should provide the users with the option to connect their own devices. The insertion and extraction of the connectors should be possible using only one hand, without movements that require a force of more than 22,2 N. These actions should not require turning the wrist or the use of a pinching motion.

**Recommendation 10.6.b:** The terminal should provide at least one (preferably two or three) easily accessible USB ports.

**Recommendation 10.6.c:** The terminal should provide easily accessible audio input/output connectors.

**Recommendation 10.6.d:** Ideally, USB ports and audio connectors should be facing the user, and at the height of the keyboard or higher. It is also desirable that there is a clear and visible sign that indicates their presence and that there is a tactile indicator to assist blind users or users with visual impairments to locate them.

**Recommendation 10.6.e:** It would be beneficial if the terminal provide the option to connect Bluetooth or Infra Red devices to the user.

**Recommendation 10.6.f:** It is recommended that headphones, if possible with built-in volume control, are provided for those who wish to use them.

**Recommendation 10.6.g:** It would be beneficial if the PIAP provides the user the option to download/upload information from/to an external device.

**Recommendation 10.6.h:** It would be beneficial if the terminal provide loudspeakers that could be used by users who do not have headphones. These should be directed towards the user.

**Recommendation 10.6.i:** If the terminal delivers output by an audio transducer which is normally held up to the ear, there should be a means for effective wireless coupling to hearing aids.

## 10.7 Printer

There are some general issues that apply to the use of a printer in a PIAP:

- If the PIAP is manned, the assistant should carry out the maintenance of the printer (e.g. refilling it with paper or replacing the ink cartridge, giving the printed papers to the users, and taking the paper out of the printer when it jams).
- If the PIAP is unmanned, there are two options:
  - maintenance activities on the provided printer are carried out on a regular schedule, additional regular checks are made and a rapid response maintenance helpline is made easily available to users;
  - no printer is provided if the above procedures cannot be met (as there would then be a high risk of the printer not working).

To address the accessibility issues, and as long as the PIAP is manned, it would be beneficial that a Braille printer is provided, so that blind people can print documents that they can read.

If a printer is provided in an unmanned PIAP, it should be located in a clearly visible and accessible place, so that it is easy for all users, including those with disabilities, to locate it and collect the printed pages.

**Printer**

**Recommendation 10.7.a:** If the PIAP is manned, the assistant should have the ability to carry out the maintenance of the printer.

**Recommendation 10.7.b:** If the PIAP is unmanned, maintenance activities on the provided printer should be carried out on a regular schedule. Additional regular checks should be made, and there should also be provided a rapid response maintenance helpline to the users.

**Recommendation 10.7.c:** To address the accessibility issues, and as long as the PIAP is manned, it would be beneficial that a Braille printer is provided.

**Recommendation 10.7.d:** If a printer is provided in an unmanned PIAP, it should be located in a clearly visible and accessible place, so that it is easy for all users, including those with disabilities, to locate it and collect the printed pages.

## 10.8 Camera

There are not usually many issues related to the webcam, as their resolution and the speed of most broadband connections is usually enough to communicate with other people through the Internet, and if these people have any disabilities, with sufficient quality so that deaf people can understand deaf sign languages or read lips. Guidance on the necessary real-time performance of video connections for signing and lip reading are available in [i.4]. Some important webcam issues are:

- The height of the camera should be as close as possible to that of the head of the person shown on the screen (in order to give a realistic impression of natural eye contact). To achieve this, it is desirable that the camera should be placed as close as possible to the midpoint of the upper frame of the screen and that the angle of the lens of the webcam can be adjusted by the user.
- In order to support lip reading and signing, the webcam should be pointing at the head and arms of the person.

In order to support the use of lip-reading and sign-language, [i.4] indicates that it is necessary to be able to support video that offers at least QCIF resolution and 10 fps to 14 fps frame-rate and better than 400 ms delay, with a preference for CIF resolution, a frame rate of 20 fps and a delay of less than 100 ms.

### Camera

**Recommendation 10.8.a:** The camera should be placed as close as possible to the midpoint of the upper frame of the screen.

**Recommendation 10.8.b:** The angle of the lens of the camera should be adjustable, so that users can adjust the image in order that their head (or their head and hand position in the case of users wishing to use sign language) appears correctly positioned on the screen.

**Recommendation 10.8.c:** The quality of the video should be at least QCIF resolution, 10 fps to 14 fps frame rate and with a delay of less than 400 ms to support lip-reading and sign-language usage (CIF resolution, 20 fps and less than 100 ms give good quality).

## 10.9 Buttons and switches

### Buttons and switches

**Recommendation 10.9.a:** Buttons and switches should be in a position where they are easy to locate and activate.

**Recommendation 10.9.b:** Users should be able to use a button or switch with only one hand, and its activation should not require a force of more than 22.2 N. These operations should not require turning the wrist or the use of a pinching motion.

**Recommendation 10.9.c:** Buttons should be concave, big enough, and their surface should have a non-slippery surface.

**Recommendation 10.9.d:** Buttons and switches should be easy to detect by touch alone, and they should not be activated just by touching them. It is also recommended that their state is distinguishable visually, by touch and by sound.

**Recommendation 10.9.e:** Colour should not be the only way to distinguish buttons and switches.

**Recommendation 10.9.f:** Those functionalities that can be activated or modified by means of buttons and switches should also be able to be activated or modified through software.

**Recommendation 10.9.g:** Button and switch labels should be easily readable.

## 10.10 Audio

### Audio

**Recommendation 10.10.a:** The volume of any audio device should be controlled by a physical or software control (preferably both).

**Recommendation 10.10.b:** Where a synthesized voice output is provided, a means to listen to it in a private and non disturbing way should be provided. When audio headsets are provided, these should not cause interference with hearing aids.

## 10.11 Assistive devices

There are some assistive devices, not related to the ones described in previous clauses that may be beneficial for people with disabilities if they are provided in the PIAP. These include:

- Braille line: it allows blind people to read what is shown on the screen.
- Scanner: there are commercial software applications that, together with OCR software, are able to read aloud the scanned text. This will enable a user with visual impairments to listen to the contents of printed documents. An alternative to this would be a specialized magnifying lens device that enables a printed document to be magnified when displayed on a computer screen.

The provision of an inductive loop interface at a PIAP workstation will allow a hearing aid user to receive the audio output from the PIAP terminal. This can be done by anyone using a hearing aid with a 'T' position or a loop listening headset. Each individual PIAP workstation that is adapted for use by hearing aid users requires its own individual inductive loop, separate from any loop system for the public areas of the PIAP.

### Other assistive devices

**Recommendation 10.11.a:** It is desirable that PIAPs provide one Braille line (specifically designed for blind people to read the content of the screen).

**Recommendation 10.11.b:** It is desirable that PIAPs provide a scanner and OCR software with related software applications, which makes it possible to listen to the content of a printed text.

**Recommendation 10.11.c:** Individual PIAP workstations should be fitted with an inductive loop interface connected to the audio output of the PIAP terminal. This interface can be used by the users of hearing aids with a "T" position or by users of a loop listening headset.

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## 11 Software

This clause covers many aspects related to the software of the PIAP workstations. However, the language and culture related aspects are covered in clause 14.

### 11.1 Range of applications

Usually, the number of applications in PIAPs is restricted, in order to facilitate the management of the PIAP. The PIAP software includes applications intended for:

- maintaining the PIAP;
- registration and payment (see clause 13);
- PIAP customers' activities;
- accessibility software.

Example of applications often provided at PIAPs:

- The most common application available to the PIAP users is a Web browser.
- Document creation applications such as word processing applications are also frequently provided.
- In addition, some PIAPs may provide imaging applications and photo editing applications.
- Some PIAPs provide telephony and video conference applications.
- Some PIAPs provide games (and accessories designed for gaming activities).

## 11.2 General software recommendations

### General software recommendations

**Recommendation 11.2.a:** Applications should follow common industry user interface conventions.

**Recommendation 11.2.b:** The software should be designed to minimize the number of steps that should be undertaken to activate any option or use any functionality.

**Recommendation 11.2.c:** The software should allow the users to choose the input/output devices they want to use. Hence, it should be possible to use the software effectively with any of the common input devices.

**Recommendation 11.2.d:** It is recommended that the operating system allows the possibility to install keyboard or mouse emulators by means of specialized devices (e.g. mouse control operated by eye movements).

**Recommendation 11.2.e:** The operating system should provide base accessibility features so that the software applications can use them. These should be easily activated or deactivated by the users. The system should inform the users of the accessibility features provided and the state of those features.

**Recommendation 11.2.f:** The software applications should use the accessibility features provided by the operating system when needed, and should not override the accessibility features of the operating system or other products unless this can be clearly seen to be of benefit to the user and explicitly accepted by the user.

**Recommendation 11.2.g:** Options to allow the user to undo any action should be provided. If an action cannot be undone, confirmation should be requested before undertaking it.

## 11.3 Web browser

### Web browser recommendations

**Recommendation 11.3.a:** The PIAP should use content filters to prevent access to unsuitable content when browsing the web. The scope of the content filters may be variable to suit the requirements of different categories of user (e.g. for adults or for young children).

**Recommendation 11.3.b:** The web browser should implement the W3C User Agent Accessibility Guidelines (UAAG) [2].

## 11.4 Settings

Whereas there are advantages to let users modify the settings in order to achieve better usability, in particular for people with disabilities, it is also important to recognize that there may be a need to prevent any trouble for users arriving later, and/or to prevent technical difficulties for the PIAP assistants. Currently, in some PIAPs, the system is set up in a way that prevents users from changing settings. In other PIAPs, the system does not prevent users from changing settings, but the rules of the PIAP inform users that they are not allowed to change any settings. A better solution would be to allow people to change the setting (either manually or automatically via user profiles), but let the system automatically reset the settings after each user.

Most people, and in particular people with disabilities would benefit if the following settings could be adjusted:

- text size and font;
- text colour;
- background colour;
- sound volume.

The PIAP will wish to have some control on how these settings are changed and reset to defaults to ensure that a user will not experience a bad combination of settings that were adjusted by the previous user. Manual adjustment of these settings is the least attractive option as automatic setting or re-setting is not possible using manual control methods.

Mechanisms to alter the user controlled settings can include:

- on-screen controls for the user to control each setting - with a mechanism to reset these settings at the end of each user session;
- reading the values of settings from a user profile (e.g. stored on a smartcard or read from a user's mobile phone) (see clause 15).

User profiles (see clause 15) are a particularly attractive mechanism for the control of settings as they permit the setting of a wider range of preferences than it would be reasonable to expect a user to manually set.

## 11.5 Adaptability for people with disabilities

As well as the physical adaptations made to an adapted terminal, the software that runs in it must also facilitate the use of the terminal by most people, including people with disabilities. Also, as most of the activities that can be carried out in a PIAP are online, it will be important that the software that offers the online services, mostly web sites, are accessible.

There are some software applications that can be useful for an adapted PIAP terminal:

- Web pages / screen readers: these applications are very useful as they read aloud the web pages so that blind people or people with severe visual impairments can listen to the information that is displayed on the screen. Normally, these applications cannot read any web page, the web page must be accessible. This means that it should have been designed following the WAI guidelines [1]. The most widely used of these applications is Jaws [i.28].
- Screen magnifying software that allows magnifying some part of the screen. It usually also allows font sizes, font/ background colours and colour contrast to be adjusted, so that people with visual impairments can use a computer. There are a range of applications, some of which are free.
- Voice recognition software: can be used to dictate a document to the computer, so that a person with a mobility impairment can easily write a document without using the keyboard. These applications are difficult to train, and for some individuals, for some languages, with poor quality microphones with no noise cancellation circuitry and in noisy environments their error rates can be unacceptably high.
- Spoken commands software: can be used to give spoken commands to a computer, so that a person with a mobility impairment can easily go through all the menus and options without using the mouse or keyboard. They are usually used jointly with voice recognition software.
- Software profiles: There are means of saving a PIAP user's screen preferences into a "profile" associated with that user, so that these are automatically loaded when the user logs in. The PIAP assistant could help users to setup their preferences in their first session. It is also possible that some applications such as screen readers and screen magnifying software are loaded automatically when the user logs in.

For people with disabilities, the following recommendations apply:

- The applications should provide an option that allows them to be used by means of assistive devices.
- The user should be able to perform the task effectively with any single input device.
- For users who bring their own assistive devices, the PIAP should allow installation of their drivers. The PIAP assistants would need administrative rights to install the drivers for the users. However, there may be a risk that malicious software could potentially be installed as part of a driver installation process. PIAPs would need to establish procedures to prevent or recover from any such accidental installation of malicious software.

## 11.6 Time related issues

### 11.6.1 Limited time for using the PIAP

Some PIAPs are visited by a large number of people and the PIAP may need to set time limits so that when new people arrive, they will get a chance to use the PIAP without having to wait for a very long time. Such examples of PIAPs where time limits may need to be imposed are those at libraries and Internet kiosks, where there may only be one terminal within a certain area. The session time limits may vary at different times of the day.

The session time limitation may be controlled by the PIAP assistants or controlled by the software, usually when the user has paid for a certain amount of time (see clause 12). Some PIAPs offer a certain time for free and after that time limit it will be necessary to pay.

The user should be given the option to be provided with information on how much session time is left. When the time limit is approaching, the system should warn the users so that they are able to close all their applications before the session ends, or make necessary arrangements for getting a longer session (e.g. load more money in their account or buy another ticket, see clause 12).

#### **Session time**

**Recommendation 11.6.1.a:** The user should be given the option to be provided with information on how much session time is left.

**Recommendation 11.6.1.b:** When the time limit is approaching, the system should warn the users so that they can close all their applications before the session ends, or make necessary arrangements for prolonging the session by purchasing more session time.

### 11.6.2 Timeouts of the PIAP and online services

There are frequently timeouts due to inactivity of the user. Some are in the control of the PIAP provider, but many are not, e.g. web based forms. As the user profile concept [i.3] becomes more widely used, an automatic solution providing more time could be provided, which might be particularly appreciated by people with disabilities (see also clause 15).

### 11.6.3 Specific requirements related to session time and timeouts

People with disabilities may have specific requirements related to session time and timeouts for various reasons such as:

- It might take more time for people with disabilities to use some services (due to accessibility problems), so therefore it would be more expensive for them to accomplish the same tasks as people without disabilities.
- They may need to have the key repeat delay increased to at least 2 seconds if they have significant hand tremor.
- They may need some free session time to set up their assistive devices, before they start paying the full fee.

A simple manual solution to time related issues would be that the PIAP assistants allocate additional session time for free or offer cheaper rates for those users who need it. Another solution where both session time and timeouts issues can be dealt with automatically is with user profiles (see clause 15). People who require more time could have the time preferences available in their user profile (e.g. stored in the network, on the PIAP system or on a Smart Card). The PIAP system could access that information in the user profile and automatically allocate more time to the user or more time before a time-out occurs.

## 11.7 Software accessibility recommendations related to hardware devices

### 11.7.1 Keyboard

#### Keyboard software

**Recommendation 11.7.1.a:** The users should be able to activate all the functions of the software using only the keyboard.

**Recommendation 11.7.1.b:** The operating system should allow the state of some function keys that are generally used to access different functionalities (e.g. Shift, Ctrl and Alt keys) to be blocked.

**Recommendation 11.7.1.c:** Alternatives to simultaneous keystrokes of several keys should be provided in the software.

**Recommendation 11.7.1.d:** The operating system should allow the user to configure the minimum time needed to hold down a key before it is accepted by the system.

**Recommendation 11.7.1.e:** The operating system should allow (minimum) the delay required to start the automatic repetition when a key is held down, to be adjusted to 2 seconds.

**Recommendation 11.7.1.f:** The operating system should allow the user to configure the time threshold to accept or reject consecutive keystrokes of the same key.

**Recommendation 11.7.1.g:** The software should provide key combinations that allow quick access to the main functions, and these combinations should be documented in a place that the user can easily access.

**Recommendation 11.7.1.h:** The operating system should provide a keyboard emulator that can be controlled by the pointing device (e.g. mouse).

### 11.7.2 Pointing device

The following apply to all pointing devices, including mice, trackpads, trackballs, etc.

#### Pointing device software

**Recommendation 11.7. 2.a:** It should be possible to adjust the speed and acceleration of the pointer.

**Recommendation 11.7. 2.b:** It should be possible to emulate a multiple click by means of a single button keystroke.

**Recommendation 11.7. 2.c:** The buttons on the pointing device should conform to recommendations 11.7.1.c - f.

**Recommendation 11.7. 2.d:** The operating system should provide a pointing device emulator that can be controlled by the keyboard.

**Recommendation 11.7. 2.e:** Software applications should provide alternate methods to enter information normally entered by the pointing device.

## 11.8 Software accessibility recommendations related to other aspects

### 11.8.1 Screen appearance

#### Screen appearance

**Recommendation 11.8.1.a:** Colour should not be used as the unique source of information.

**Recommendation 11.8.1.b:** It should be possible to change the appearance of the text cursor and the mouse pointer.

**Recommendation 11.8.1.c:** Elements flickering in frequencies between 2 Hz and 50 Hz should be avoided.

**Recommendation 11.8.1.d:** The icons in the graphical interface should have an associate text label. It should be possible to only show the label. It should also be possible to adjust the size of the icons and other graphical objects, and also to move or group them.

**Recommendation 11.8.1.e:** The graphical interface should adapt, in terms of contrast, size and other attributes, to the configuration defined by the users in the operating system. Pre-defined colour combinations that are suitable to specific groups of people with visual impairments should be provided.

**Recommendation 11.8.1.f:** The labels of information entry fields or form data fields should be placed as close as possible to these fields.

**Recommendation 11.8.1.g:** It should be possible to activate a window by passing the pointer over it, instead of selecting it with the mouse button.

## 11.8.2 Sounds and Multimedia

Voice output is a feature of general usefulness, but it can also be especially beneficial to people who have low or no literacy skills and people with cognitive impairments and learning difficulties. It can also be of benefit to those people who can understand a language in its spoken form but are unable to understand it in its written form e.g. when they are not familiar with the script in which the language is written.

### Sounds and Multimedia

**Recommendation 11.8.2.a:** Audio, video or picture contents should, where relevant, be offered in an alternative format (e.g. text description of pictures and sub-titling of video).

**Recommendation 11.8.2.b:** Users should be able to enable the generation of visual warnings when the system gives an audible warning.

**Recommendation 11.8.2.c:** The system should provide functions that allow any textual information to be sent to a synthetic voice output.

**Recommendation 11.8.2.d:** The user should be able to adjust the volume of sounds.

**Recommendation 11.8.2.e:** It should be possible to adjust the fundamental frequency of the audible warnings.

## 11.8.3 Notification Messages (including warning messages)

### Notification messages (including warning messages)

**Recommendation 11.8.3.a:** Notification messages should be short, simple and written in easy to understand language.

**Recommendation 11.8.3.b:** Notification messages should be easily identifiable: they should always have a common layout and be labelled in a standard way.

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# 12 User registering and payment

Depending on the type of PIAP - manned or un-manned - and in the way the system manages users - anonymous and registered user systems - there is a wide range of options regarding user registering and payment.

## 12.1 User registration

In anonymous user systems it is not necessary to register users. When customers enter a PIAP premises, they will be given, by an assistant or by an automatic payment machine, a ticket that the users will use to log on and use the PIAP for a predefined period of time (see clause 12.3). After that time, the customers will have to get another ticket.

In registered user systems the customers have the same identity every time they log on to the PIAP. That is why it is necessary that the users are registered. The way users can be registered will depend on the type of PIAP:

- If the PIAP is manned, the user will be registered in the user management system by an assistant. The assistant asks the user for a username and some general data (can be personal data or not) that could be used for customizing the services for the user.
- If the PIAP is unmanned, the user has to register by entering the information in an electronic form, often this can be done at an automatic payment machine.

Whether users are registered by an assistant or by an automatic payment machine, they will be given a ticket (see clause 12.3) with the necessary data to log on to the terminals. They will optionally be given a smartcard to log on where the PIAP supports this type of solution for authenticating users.



## 12.2 Payment

The provision of alternative payment methods greatly increases the likelihood that all PIAP users will be able to make use of a PIAP. Ideally three or four payment methods should be supported, but all PIAPs should support at least two different means of payment. Methods of payment include:

- cash payment using coins;
- card payment using internationally recognized credit cards;
- using SMS to send micropayments (usually between 2 and 3 Euros) to at least one or several domestic operators.

Payment is highly related to user registration, as it also depends on the type of PIAP and how users are managed:

- In anonymous user systems, if users have a previous ticket that is still valid, they can log on with it. If not, they will need to get another ticket.
- In registered user systems, once the users are registered, they have a permanent user personal account in the PIAP, so that they will be able to load money into their user personal account and spend it in different services in the PIAP. As the user consumes services from the PIAP (e.g. web browsing time, printing) the PIAP billing system will charge money from the user's account. When logging out, the user should be informed about the remaining amount of time and/or money they have left.
- If the PIAP is manned, users will pay an assistant to purchase the right to use the services of the PIAP. The assistant will load the money into the user account - in registered user systems - or will give the users a temporary user account - in anonymous user systems. In both cases, the assistant will give the users a ticket (see clause 12.3).
- If the PIAP is unmanned, users will use an automatic payment machine or another unmanned payment method (e.g. SMS) to purchase the right to use the services of the PIAP. The payment machine will load the money into the user account - in registered user systems - or will create another temporary user account for the user - in anonymous user systems. In both cases, the users will be given a ticket (see clause 12.3).

Once users have started a session, it is recommended that the billing system warns them, in a non-intrusive way, when the money they have available is running out. It should inform the users that they have to load more money into their user account or buy another ticket. In registered user systems, the billing system will automatically detect that the users have loaded more money into their account and will allow them to continue with the session. In anonymous user systems, the system will allow them to enter a new code so that they can continue with the session. Even if users run out of money, the system should block the session, but not close it completely. Users should be given some time to load more money into their account or buy a new ticket, and then unblock the session, so that they do not lose any work they have been doing.

### **Running out of money in a session**

**Recommendation 12.2.a:** When the users are having a session on a terminal, and the money they have available is running out, the billing system should warn them in a non-intrusive way, so that they are able to end their tasks and close all their applications before the session ends, or to load more money in their account or buy another ticket.

**Recommendation 12.2.b:** When the user's money runs out, the system should block the session but not close it completely. It should also give the users some time to load more money into their account or buy another ticket.

**Recommendation 12.2.c:** If the system has blocked the session because the money has run out, and user has loaded more money into their account or bought another ticket, the system should provide a mechanism to recognize this and allow the user to unblock the session - either by entering their username and password, or by entering the username and access code on the ticket.

## 12.3 Ticket

When users register and/or pay, they will be given a ticket that they will be able to use to log on to the terminal (by an assistant in manned PIAPs or by an automatic payment machine in an unmanned PIAP). This ticket will have the following information:

- the username that the user has to enter into the terminal to log on;
- the password or access code that the user has to enter into the terminal to log on;
- for anonymous user systems, the predefined period of time during which the user will be able to log on to the terminal. After that time, the user will have to get another ticket;
- for registered user systems, the amount of money that the user has loaded into their account;
- for registered user systems, a clear indication of the period of validity of the ticket (e.g. the amount of online time that can be used or an expiry date).

The information on the ticket should be easy to read, and the username and password or access code should be easy to enter in the PIAP system to log on.

The codes on the ticket (username/password/access code) can be long and therefore difficult to enter correctly to gain access to the PIAP system. If a longer code is used, it is recommended that the code is presented in chunks of three or four characters - to help the user to enter the number. The PIAP system should provide proper affordances or assist the user when dealing with the spaces (or linefeeds) between the chunks of characters. This can be done by providing sub-fields that match the chunks of characters in the code on the ticket with the cursor automatically jumping to the next sub-field when a sub-field is completed. Alternatively, the system could ignore any spaces entered in a single field by the user. From a usability viewpoint, it is easier for the user if the password is not case sensitive.

Recommendations on how to ensure easy to read and easy to enter user names and passwords are given in clause 13.2.3.2.

## 12.4 Smartcard

The use of smartcards to a user offers an easy way of separating the process of logging into the terminal and the process to pay for PIAP usage. PIAPs can provide users with a range of alternative payment options, including both self service and assistant controlled methods. This flexibility of payment can be provided without the need to implement an equivalent range of alternative logon methods, as the logon procedure would only require a single mechanism to read the smartcards.

When payment is considered, smartcards are used in very similar ways to those described in clause 12.3 in relation to the use of tickets. The major difference with a smartcard is that the username and password related information is likely to be permanently stored in the smartcard and the methods of payment (e.g. direct payment from a financial account associated with the smartcard or payment from an independent credit card account that is referenced by the smartcard) will also be permanent. In addition, Smartcards can also store preferences that can be used for personalization purposes. For further information on the storage of preferences on smartcards, see clauses 13.2.5 and 15.3.1.

## 12.5 Payment methods

There may be different payment methods in a PIAP, but all should be accessible for all people, irrespective of their age, disability, language and cultural background.

## 12.5.1 Payment machines

There are two distinct types of payment machines:

- **centralized payment machines:** Payment machines can be used, in unmanned PIAPs, to register users and to pay, to get another ticket in anonymous users systems, or to load money in the user personal account in registered user systems.
- **individual payment machines:** These machines are associated with individual workstations and can be used as part of a combined payment and logon procedure (further aspects of individual payment machines are described in clause 12.5.2).

The registering/payment machine should be adapted to all kinds of people, including elderly, those with disabilities and people from other countries:

- The height of the machine should be adapted so that it is usable by wheelchair users. The position of the coin and note slots and the return money box should be adapted in height so that they can be accessed by wheelchair users.
- The force required to insert coins into the coin slot should be low enough that it can be easily used by adults with low muscle strength and by younger children.
- Visitors from outside the local currency zone will often arrive at the PIAP with a very restricted range of local currency. They will frequently only have large denomination bank notes and they may have a very limited selection of coins. They will therefore often not have the precise amount of money required to pay for the PIAP service. It will therefore be necessary for registering/payment machines to accept a wide range of notes and coins and give change to the user when the amount they pay is greater than the cost of the PIAP service. The ability to accept a wide range of notes and coins and to give change will also be of great benefit to local currency users, as they too may frequently not have precisely the amount required for the PIAP service.
- Instructions should be:
  - brief and easy to understand so that it is easy for older people and people with cognitive impairments to register, and give information about which currency is used and which coins and notes the machine accepts;
  - available in a selectable choice of languages (see clause 14);
  - adaptable in appearance (e.g. size and colour of font, background colour) (see clause 15);
  - available in spoken mode for blind people (see clause 15).

### Accessibility of registering/payment machines

**Goal 12.5.1.a:** Registering / payment machines should be accessible to all, including elderly, those with disabilities and people from other countries.

**Goal 12.4.1.b:** All users, including those with disabilities, should be able to identify the location of the registering/payment machine as soon as they enter the PIAP. Methods to assist any user, regardless of disability, to locate the registering/payment machine from the entrance should be provided. These methods should include making the machine visible from the entrance.

**Recommendation 12.5.1.c:** The height of registering / payment machines should be adapted so that it can be usable by wheelchair users.

**Recommendation 12.5.1.d:** The position of the coin and note slots and the return money box should be adapted in height so that they can be accessed by wheelchair users.

**Recommendation 12.5.1.e:** Registering/payment machines should accept a wide range of notes and coins and give change to the user. This is particularly important for PIAPs that expect visitors from outside the local currency zone,

**Recommendation 12.5.1.f:** Instructions should be brief and easy to understand so that it is easy for older people and people with cognitive impairments to register, and will give information about which currency is used and which coins and notes the machine accepts.

**Recommendation 12.5.1.g:** Instructions/interactions should be available in a selectable choice of languages.

**Recommendation 12.5.1.h:** Instructions should be adaptable in appearance (e.g. size and colour of font, background colour).

**Recommendation 12.5.1.i:** Instructions/interactions should be available in alternative modes (written text and spoken).

## 12.5.2 Individual payment machines

When an individual payment facility is attached to or associated with each PIAP terminal and the user pays with a credit card or with coins, there is no need to enter any access codes upon starting the Internet session. To start a session, the users will only have to enter money in the payment machine. When this money is spent, the session will finish automatically. In some implementations, if the users log off before the money has been spent; they will not recover the rest of their money. In other systems, if the user wishes to terminate the session in advance, it is possible to write down the temporary access code displayed at the screen or use the mobile phone diary to enter it for use at a later occasion.

One problem with integrated interfaces containing both the payment module and the PIAP terminal is to provide an easily understandable access procedure for the novice user.

The accessibility recommendations for payment machines are given in clause 12.5.1.

## 12.5.3 SMS

One way to pay for a session using a device that the user carries is by sending an SMS message from a mobile phone to a predefined number. The micropayments are charged to the user's mobile phone bill or pre-paid SIM card and the user gains access to the PIAP terminal for a fixed period. In return, the user receives an SMS with a username and a password that is valid for a fixed period when logging into the PIAP terminal.

Some current implementations only permit such payments by people subscribed to a single mobile phone operator from the host country. To be a universally useful means of payment, it should be possible to pay using a mobile phone from all mobile telephony operators in the host country and also from the largest mobile phone operators in Europe.

If the user sends the SMS message using a pre-pay SIM card, only the pre-paid card will be charged. There is no way to know the true identity of the owner of the SIM card. In this way the user may stay completely anonymous in spite of the fact that the mobile phone pre-paid SIM card is charged.

If the user's mobile phone payment model is a monthly subscription, the micropayment is charged to the phone bill of the SIM card and it is possible to link the user to a certain Internet session by the users' mobile telephone account that is connected to the SIM card telephone number.

## 12.5.4 Local communication with a user's device

Payments from a user's mobile phone by means of SMS can be quite secure as they rely on the inherent security of the mobile telephone networks and do not rely on direct communication between the user's mobile phone and the payment system in the PIAP. Any payment mechanism that relies on direct communication between a device that a user carries (e.g. a mobile phone or a Personal Digital Assistant (PDA)) and a payment system within the PIAP will have to use a highly effective security mechanisms to ensure that valuable personal and financial data cannot be stolen or manipulated by another person in the PIAP.

There may eventually be a large number of alternative technologies that will be used to carry the communication between the user's device and the payment system. Three systems that are likely to be used are:

- **Bluetooth:** A major benefit of the use of Bluetooth is the very high proportion of devices (e.g. mobile phones, PDAs and laptops) that have Bluetooth support as a basic feature. However, as "listening" to and hijacking of data transmitted over Bluetooth connections is possible it will be extremely important to ensure that the security mechanisms employed to protect the communication between the user's device and the payment system are designed to the highest standard.  
One factor that increases the risk of using Bluetooth for PIAP payments is the very wide area (within a radius of approximately 10 metres) over which the Bluetooth transmissions between the user and the payment system can be picked up by other people within the PIAP.
- **Near Field Communication (NFC) :** An emerging short-range radio technology that could be particularly appropriate for PIAP payment is Near Field Communication (NFC). Although it is still important to use highly secure mechanisms for the transmission of data between the user's device (e.g. mobile telephone or PDA) and the payment system, NFC systems operate over a much shorter-range. Typically it will be necessary to place the user's device within a distance of 4 cm to 10 cm from the payment system device in order to transmit data. In practice, users frequently physically touch a part of the payment system with their personal device.

- **RFID:** RFID technology might also be a candidate technology to initiate a payment transaction between a user's device and a PIAP payment system.

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## 13 User identification and security

### 13.1 Introduction

User identification/authentication is very important in the context of PIAPs, for the following reasons:

- privacy issues: people are getting increasingly aware of privacy issues as the use of Internet is becoming a larger part of their lives when managing their banking services, personal relations, private and professional activities;
- issues related to charging the users for the usage of the PIAP;
- issues related with service customization depending on the user's preferences or needs.

Regarding privacy, it is important that PIAPs support user's personal privacy requirements in order to attract customers. This includes the whole procedure from:

- logging on, e.g. passwords that are strong enough but still usable;
- various PIAP activities, including software issues and preventing other people from looking at the screen (shoulder surfing);
- logging out, preventing people arriving later from getting access to information related to previous users.

If other people get access to the user's data, then the user will lose confidence in the PIAP provider who allowed that data to be misused. This is even more important in wireless public hotspots because:

- people may be using their own portable devices (e.g. PDAs, laptops) that contain important and sensitive information that they wish to keep safe;
- the connection provided by a public hotspot is relatively invisible and therefore the user may not easily be able to distinguish between a secure and a less secure public hotspot.

However, too restricted privacy policy should be avoided, as it may reduce the usability of the PIAP and the number of available services.

Privacy requirements of stored or transmitted data vary among different users, companies, countries, services used and PIAPs. For example, transaction services (e.g. banking) have stronger requirements than information services (e.g. for finding hotels). It is therefore impossible to define a set of privacy guidelines that meet the needs of all users while still providing usable PIAP services. However, careful application of the recommendations in the following clauses can help to ensure the correct balance between privacy and functionality.

The need for protection of users' data may depend on one of the following two usage categories:

- (almost) unlimited personal use, which usually requires their customers to log on to a personal session with username and password. In this case, the requirements for data protection is usually very high. Personal and company related data such as username, password(s), emails, documents, credit card and bank information should be protected from misuse during sessions. It is also critical that the user's personal data does not remain available on the PC or in the network after the user has left/logged out;
- limited, non-personal use, e.g. just surfing the web for tourist information, searching for books in a library, checking flights in an airport. Protection of personal data is usually not an issue when the usage is limited to non-personal activities.

This clause will primarily focus on PIAPs providing (almost) unlimited personal use.

## 13.2 Access control

### 13.2.1 Introduction

In order to log on, users may need to provide a username and password that identify themselves. Attempts to improve security by requesting that the user inputs a long alphanumeric (strong) password may be undermined by the inability of people to memorize and recall such an unmemorable string. If users cannot memorize passwords they will adopt strategies that enable them to correctly enter the requested password. The strategies adopted include:

- incorporating very memorable and possibly predictable words as part of the alphanumeric string (e.g. their name, the name of the town in which they live);
- writing the password down on a piece of paper and keeping it somewhere where it can always be found (e.g. having the password written on a note attached to their computer or having a simple entry in a "Notes" section of their diary);
- using the same password for a large number of different applications in order to minimize cognitive load;
- using the same password as the username.

All of the above techniques greatly increase the risk that an unauthorized person can discover, predict, or more easily decode the correct password to be used. Thus, the theoretical increase of security that a long alphanumeric password will create can be completely destroyed by the strategy that the user has adopted to help recall it.

A solution that uses two-factor authentication will frequently be a preferable option to a system that only relies on a single lengthy alphanumeric password. The universally recognized factor for authenticating individuals is something the users:

- know, such as typing a password, PIN (Personal Identity Number);
- has brought with them, such as using a mobile phone, a credit card or a hardware security token;
- have permanently, e.g. using biometric techniques such as fingerprint recognition, retinal scan, or other biometric (see clause 13.2.4).

A two-factor solution is usually considered to enhance the level of security provided. Also, any password used in a two-factor solution does not need be as long as that used in a single password solution to achieve similar or better security.

### 13.2.2 Anonymity and identification

Many information kiosks or PIAPs provided at sites such as libraries, local associations and churches are open systems. These PIAPs are usually manned and free of charge. They often do not require the user to go through any form of identification or authentication process, which implies that users are anonymous when using them. However, since the sites are frequently supervised, the user may be recognized by the staff working at the premises.

The issue of anonymity is closely associated with the means of payment (see clause 12). Clause 4.1.3 identifies a class of PIAP called an "anonymous system". Anonymous systems are those in which the user is not asked to positively identify their true identity in any way. Users can create alias identities that may be unrelated to the user's true identity. However, where payment for the PIAP service is required, users may potentially be identified by associating their temporary PIAP identity with the identification data associated with their means of payment (e.g. a credit card). Payment mechanisms that may be subject to this indirect means of identifying the user include the use of credit cards and SMS messages sent from a mobile phone to pay for the Internet session where the user has a monthly contract. Payment methods that guarantee anonymity are coins and bank notes.

Many ordinary users may feel more comfortable when they have total anonymity when using PIAPs. However, full anonymity may also be preferred by people who undertake activities that could be illegal or undesirable in other ways.

For those types of PIAPs where user must be identified before starting an Internet session, there are two principal purposes for that identification:

- **Associating the session with a user account:** The identification allows the money the users load into it to be allocated to the session when they want to use the services of the PIAP. This will be applicable to both anonymous and registered user systems (see clause 4.1.3). In anonymous user systems, the user account will be temporary, and the users will only have the right to use it until they have no money left. In registered user systems the users will keep their user account.
- **For service customizing purposes:** As long as the user has an associated user account (temporary or permanent), they may have selected their profile or preferences when creating it, so that the service is automatically adapted to them when starting the Internet session. This can be very useful for accessibility issues as the service can rely on the user profile linked to a particular user, irrespective of age, language, cultural level and disability.

The identification of the user should be reliable and secure. The system will implement the necessary security mechanisms so that it is not possible for a user to acquire the identity of other users.

The system should have the capability to provide different service customizations to the users depending on their preferences or user profile.

Another possibility is that the users may have different user accounts for different services and PIAPs, so that they can have different customizations for different services. This option may be tedious and possibly costly for users, as they would need to memorize lots of different usernames and passwords, and would have to have different amounts of money on each account (more costly and difficult to remember). This is why it is recommended that each user has one single personal user account that is available from a range of PIAPs.

#### Secure authentication

**Goal 13.2.2.a:** The identification of the user should be reliable and secure. The system will implement the necessary security mechanisms so that it is not possible for a user to acquire the identity of another user.

#### Customized services

**Goal 13.2.2.b:** Based on the authenticated users and their preferences (e.g. stored in a user profile), the system should have the capability to provide different customizations to the users depending on the service they are using.

### 13.2.3 Username / password identification

This clause relates to usernames, passwords and access codes generated by PIAP system or provided by the PIAP assistants.

#### 13.2.3.1 Logging on to wireless networks

For users bringing their own laptop, they may wish to use the PIAP's wireless network. Many Wi-Fi network operators impose the entry of a WEP or WPA keys as part of a user logon procedure. However, it is inconvenient and cumbersome to have a user logon procedure that requires users to enter these keys each time they use one of the network provider's wireless networks. WEP and WPA keys were primarily intended to be used in the initial configuration of a permanent Wi-Fi network. But prompting users to enter WEP/WPA keys can cause problems as it is difficult to remember and enter 10-character-long passwords, which are often presented to the users on a piece of paper. This is not very secure as users may leave the paper somewhere where other people can find it and use it. It is therefore recommended that operators do not prompt users to enter WEP or WPA keys as part of their logon procedures as they are difficult to use, and users may therefore adopt security threatening strategies (e.g. carrying a piece of paper with the WEP/WPA key on it). WEP/WPA keys are neither personal to individual users nor do they change over time - so once an unauthorized person has discovered the key; it can be passed on to others to use.

For usability reasons of PIAPs with Wi-Fi networks, it is recommended [4]:

- to have an unencrypted (open) access to the Wi-Fi network, so that the users do not have to enter any long alphanumeric keys to access the network;
- to prompt users to enter their username and password at a web page that is presented when launching a browser (captive portal).

For existing customers of a public hotspot that runs the above method of connection (described as the "Universal Access Method (UAM)" in [4]) together with a separate WPA enabled connection, logon can be achieved with little user intervention. This dual mode operation is described in detail in [4].

### 13.2.3.2 General recommendations

When the users are registered (see clause 12), and when they are not automatically logged on, they get a username and a password (or an access code), which will have to be entered into the terminal to start a session.

In anonymous user systems, the username and password will be automatically generated by the system, so they will be more difficult for the user to remember. This is why the username and password are given to the users in some permanent form (e.g. on a ticket, in an SMS) so that the users have a record from which they can retrieve the information during logon. If the users lose this record of the username and password, they will be denied access to the PIAP. In this case, the system will be unable to provide a mechanism for them to recover their money or session time, as the user identity is not stored in the system and the accounts the users use to start sessions are temporary and anonymous.

In registered user systems, the username and password are usually chosen by the users, so that they are easier to remember. However, this is not always the case. On the other hand, if the users forget their username or password, it will be very easy for the system to recover them, as the user account is associated with the user identity. The system should have the capability to obtain the username and to restore the password given some personal data from the user (e.g. name and surname, identity number). Another option is to send the username and password to the user in an email, if desired, so if the user forgets then the information can be retrieved from it (but the users may need to access their emails before being admitted to the PIAP). If a password given to the user contains a mix of numbers, lowercase and uppercase letters, it should be in a way that avoids confusion, (e.g. the number six, "6" can easily be confused with the lower case letter "b", the number eight, "8" can easily be confused with the capital letter "B", the number "0" can be confused with the capital letter "O", and the number "1" can be confused with the capital letter "I" or the lower case letter "l". The size and contrast should be good enough to avoid confusion between numbers and letters, and in addition, a parenthesis might be used for clarification such as "1 (number one)" or "I (upper-case letter I)". Also, the use in passwords and access codes of special national characters and characters with diacritics should be avoided as non-national users may find it difficult to find these characters on the keyboard.

The following issues related to passwords should be considered:

- how easy it is to type the password;
- how easy it is to remember the password;
- password expiration, defines how often passwords must be changed as well as who may change them;
- password strength;
- lockout, to prevent password attacks by limiting the number of password failures permitted within a period of time.



**Easy to read and to enter the username and password or access code**

**Goal 13.2.3.2.a:** The username/password/access code on the ticket should be easy to read and enter into the PIAP system.

**Recommendation 13.2.3.2.b:** If the password/access code is longer than five characters, then it should be presented in chunks of three or four characters.

**Recommendation 13.2.3.2.c:** Whenever possible, the chunks should be of the same length.

**Recommendation 13.2.3.2.d:** Passwords or access codes that are issued by the PIAP should not contain any special national characters or characters with diacritics as these may be difficult for non-national users to find on the keyboard.

**Recommendation 13.2.3.2.e:** The system should provide sub-fields that match the chunks of characters in the password or access code on the card with the cursor automatically positioning itself to the beginning of the next sub-field when a sub-field is completed. Alternatively, the system could ignore any spaces entered in a single field by the user.

**Recommendation 13.2.3.2.f:** The size and contrast should be good enough for avoiding confusion between numbers and letters, and in addition, a parenthesis might be used for clarification such as "1 (number one)" or "I (upper-case letter I)".

**Recommendation 13.2.3.2.g:** Wordings such as username and password should be used when supplying the user with access codes. The codes should be entered in a logon window with input fields labelled in the same wording, and in alternative languages.

**Recommendation 13.2.3.2.h:** The text in the logon windows should be displayed in a large font size. Preferably, it should be possible to display the window enlarged.

**Restoring username/password**

**Recommendation 13.2.3.i:** The system should have the capability to obtain the username and to restore the password given some personal data from the user (e.g. name and surname, identity number, name of pet, etc.).

**Recommendation 13.2.3.j:** The user should be given the option to receive the username and password in an email.

## 13.2.4 Biometric identification

### 13.2.4.1 Introduction

Biometrics is used to identify a person by comparing an input sample of some human characteristic with a previously stored template for that user (e.g. voice template, fingerprint template). By measuring an individual's physical features in an authentication inquiry and comparing this data with stored biometric reference data in the template, the identity of a specific user is determined.

Research has been focusing on using biometrics to overcome the weakness in traditional authentication systems that use tokens, passwords or both. Advancing automation and the development of new technological systems have led to users being more frequently authenticated by use of technical means rather than by human beings. Personal identification has taken the form of secret passwords and PINs. Everyday examples requiring passwords or PINs include the ATM and the mobile phone.

In order that a password cannot be guessed by an unauthorized person, it should be as long as possible, not appear in a dictionary, and include numbers and symbols such as +, -, %, or #. Moreover, for security purposes, a password should never be written down, never be given to another person, and should be changed frequently. When one considers that many people today need very many passwords, most of which are rarely used, and that the expense and annoyance of a forgotten password is enormous, it is clear that users are forced to sacrifice security due to memory limitations. While the password is very machine friendly, it is far from user-friendly.

Biometrics can be grouped in two main classes, physiological or behavioural:

- physiological are related to the shape of the body. The most common examples are the recognition of fingerprints, faces, hand geometry, iris and retina characteristics;
- behavioural (behaviometrics) are related to the behaviour of a person. Typical examples are analysis of a person's signature, their voice characteristics, or the dynamics of their keyboard activity.

### 13.2.4.2 Biometric techniques

There are a number of biometric techniques that are in current use or now being deployed. These are:

- **Fingerprint recognition (physiological):** Among all the biometric techniques, fingerprint-based identification is the oldest method which has been successfully used in numerous systems. Everyone is known to have unique, immutable fingerprints.
- **Iris recognition (physiological) :** Iris recognition uses pattern recognition techniques based on high-resolution images of the irises of an individual's eyes. Iris recognition makes use of camera technology and can be performed from about 10 cm to a few meters away.  
Iris recognition efficacy is rarely impeded by glasses or contact lenses. Iris technology has the smallest outlier (those who cannot use/enrol) group of all biometric technologies. A key advantage of iris recognition is its stability, or template longevity as, barring trauma, a single enrolment can last a lifetime.
- **Retinal Scan (physiological) :** A retinal scan is used to map the unique patterns of a person's retina. A retinal scan is performed by casting an undetectable ray of low-energy infrared light into a person's eye as they look through the scanner's eyepiece. The need to have the retina positioned very close to the scanner (e.g. 75 mm) means that the technique can be perceived as being too invasive.
- **Voice verification (behavioural) :** Voice verification is the process of comparing a biometric sample voiceprint against a single reference of a specific user to confirm a person's identity. Basically, it is a one-to-one comparison that confirms (verifies) the identity of the speaker. Simply by prompting users to repeatedly speak a single phrase, the system grants the identified user access. Voice verification captures the unique characteristics, such as speed and tone, associated with an individual's voice and creates a non-replicable voiceprint. Unlike voice recognition, which must identify a variety of phrases for a broad population, voice verification's primary objective is to match a voiceprint to a single user for identity authentication. In banking services, where security is of greatest importance, voice verification may prove to be the ultimate choice to prevent fraud. However, an alternative should be available in case the user has a sore throat.  
Voice verification is the only biometric that will work over the phone or web - without the need for any special equipment. Voice biometrics is a user-friendly method of authentication that provides higher levels of authentication / verification and keep costs low by increasing process automation.  
Voice verification is natural and effortless and more cost effective than distributing PIN key fobs, hardware tokens etc, that can be easily lost, stolen, or simply not at hand when the user needs it.
- **Vein pattern recognition:** The vein (or vascular) pattern recognition technology works by identifying the subcutaneous (beneath the skin) vein patterns in the user's hand or finger. The vein patterns are unique to each individual. Apart from size, the pattern does not change over time. There are different types of vein recognition technology, which include finger, wrist, palm, and backhand vein recognition. It is the most private biometric in as much as it does not leave a latent image like fingerprints or material like DNA. An advantage compared to other techniques (e.g. recognizing face, iris, and voice) is that it cannot be read from a distance. The technology offers an advantage over fingerprint scanners because identical twins have highly similar (although not identical) fingerprints but different vein patterns. Apart from size, the pattern does not change over time.

### 13.2.4.3 User acceptance

It could be assumed (not verified) that user acceptance will increase as users get more used to various biometric methods. Currently, some laptops use biometric techniques to reduce the need for the user to enter passwords. User acceptance plays a major role regarding ease of deployment of biometric verification techniques.

At the time of publication of the present document it is difficult to find comprehensive and accurate information about which techniques are considered most acceptable. Currently fingerprint recognition and voice identification appear to be quite acceptable to many people.

Vein pattern recognition technology overcomes aversion to fingerprint recognition and related privacy concerns since its traditional association to criminal activity is non-existent. In countries such as Japan, where there is strong opposition to finger-printing, vein recognition has become the biometric technology of choice.

#### 13.2.4.4 Advantages

Although there are quite a large number of disadvantages associated with biometrics (see clause 13.2.4.5) the advantages are very significant. These include:

- The fact that no user name or password has to be remembered by the user is perhaps the most positive impact of using biometric authentication. Currently the user's mind is littered with different passwords to get access to all the different services and applications that are needed in modern life. People are strongly recommended not to write down any password if they prove difficult to memorize. These conflicting aspects make it almost impossible to achieve the ideal of a personal password that nobody else knows.
- Many non-biometric techniques are subject to "replay" attacks where, once stolen, a security token can be re-used and this re-use cannot be detected e.g. if a PIN code is stolen it can be re-used by an impostor without being detected. However, with biometrics, this may not happen. For example, the scanned "live" image is virtually never the same from scan to scan owing to the inherent plasticity of biometrics; so, ironically, a "replay" attack using the stored biometric is easily detected because it is too perfect a match.
- Methods to circumvent some biometric techniques frequently need to be sophisticated, and this will act as a deterrent to attacking biometric techniques. The ways to circumvent many biometric techniques may also be visible (e.g. using a false finger) and quite easy to detect.

#### 13.2.4.5 Disadvantages

There are several disadvantages of the use of biometric techniques. These are:

- Enrolment overhead: The perhaps most important issue is the potentially significant overhead when enrolling with any biometric system. When enrolling using voice biometrics, the system usually demands three repetitions of a password phrase delivered at three different occasions in time. This enrolment overhead must be taken into account.
- False Acceptance: Where another person is falsely accepted as being the genuine user e.g. where a criminal gains access to the account of a bank customer and steals money from the account. This is measured as a ratio called the False Accept Rate (FAR).
- False Rejection: A more commonly encountered problem where the genuine user is not recognized. This is measured as a ratio called the False Reject Rate (FRR). This will sometimes prevent users accessing systems for which they have full authorization.
- Equal Error Rate (EER) : This is a rate which gives an overall measure related to both false accept and false reject errors. The lower the EER is the better. Some techniques used to have much higher EER rates than others, with voice identification being inferior. However, recent enhancements of many technologies are causing EER rates to reduce and converge.
- Methods to deceive the biometric authentication: There are three principal methods by which the biometric identification system can be deceived - faking of the item being scanned, faking of the data from the biometric scanner, and template faking:
  - The use of a fake object that represents the biometric object that is being scanned: The reliability of any biometric identification depends on ensuring that the signal acquired and compared has actually been recorded from a live body part of the person to be identified. For example, many commercially available iris recognition systems are easily fooled by presenting a high-quality photograph of a face instead of a real face.  
The chances of a fake object being recognized as genuine can be decreased by decreasing the FAR, although this may be likely to increase the FRR. The decision on how these thresholds should be set will depend on the seriousness that the PIAP places on the risk of intrusion.
  - Faking of output data from the biometric scanner: A person can pretend to be another person if they have firstly obtained a copy of the data from a genuine scan of the target person and can subsequently introduce that data into the path from the scanning device to the system that processes and compares this scan with the template.

- Template faking: Although it may be well protected, if a biometric template is tampered with, then the biometric authentication of this person will be compromised for the technique associated with the template until the user re-enrols with the identification system.

If a token or a password is lost or stolen, it can be cancelled and replaced by a newer version, i.e. re-issued. This option is not naturally available in biometrics. If a deception based on the first two methods above has taken place, then the biometric data of the user cannot be re-issued. For example, if the fingerprint is compromised (e.g. there is a physical copy of it), then it is compromised for life because users cannot change their fingerprints. The only solution available is for the user to re-enrol with another appropriate object (e.g. with another finger).

- Perception of physical harm: Some people believe that various biometric technologies can cause physical harm to the person being authenticated, or that the biometric scanning instruments used are unsanitary. Another reason why iris (retinal) scanning scores low on user acceptance may be due to the fact that people may believe that sending a beam of Infra Red light into the eye may be harmful to the recipient. Where the techniques require physical contact with the reading device some people will have issues related to cleanliness e.g. face contact with a retinal scanner.

#### 13.2.4.6 Ways to improve the effectiveness of biometric techniques

Biometric systems can also be combined with an alternative method, e.g. a token or a password, in order to further minimize the risk of theft of the biometric information.

##### **Ways to improve the effectiveness of biometric techniques**

**Recommendation 13.2.4.6:** The most frequently recommended way to use biometric authentication is in combination with a "regular" (simple) password or a token (two-factor authentication).

#### 13.2.5 Smartcard solutions

The smartcard solutions are always related to registered user systems. When the users register - by an assistant or by automatic payment machine - they will be given a smartcard in which will be stored:

- the username;
- the password or access code;
- it may also store the user profile or preferences of the users for the different services provided in the PIAP.

To start a session, the users will only have to enter the smartcard into a slot of the card reader that should be available in the terminal. They will not have to enter any username and password or access code into the terminal to log on, which makes the logon process much easier for the users.

There are a number of accessibility recommendations that can be made about the use of smartcards. The specific recommendations differ according to a number of factors such as the type of reader (e.g. card insert or card swipe) and the location and orientation of the reader. There are comprehensive accessibility and general recommendations on smartcards and smartcard readers in the following sources:

- Clauses 8.10, 9.6.1 and 10.11 of the ETSI Design for All guidelines document EG 202 116 [i.2].
- Clauses 11.1.7.2, 11.3, 11.8.3 of the Australian Bankers' Association accessibility guidelines [i.14].

### 13.3 Access to users' data

#### 13.3.1 Stored information about customers

Users may wish to allow PIAP providers access to a subset of their personal data related to payment and personalization of devices or services. PIAPs keeping information about their customers should be protected from access by the wrong people. It is therefore important to ensure PIAP provider's restrictions on release or modification of data (e.g. if the data is only used within the same PIAP premises or whether the data is shared with cooperating PIAPs sometimes with a national or international coverage).

**Stored information about customers**

**Recommendation 13.3.1.a:** PIAPs keeping information about their customers, such as a subset of their personal data related to payment and personalization, should be protected from access by the wrong people.

**Recommendation 13.3.1.b:** Users should be given the opportunity to get information about what data is stored by the PIAP.

**Recommendation 13.3.1.c:** Users should be given the opportunity to get information on the level of protection of their personal data stored by the PIAP.

## 13.3.2 While using the terminal

### 13.3.2.1 Issues related to services

When using some services such as Internet banking services, there will be extra strong requirements on confidentiality while performing the tasks. Some problems may arise if the bank requires that a certificate is installed on the terminal, as this should not be permitted by the PIAP provider.

### 13.3.2.2 Preventing unauthorized access to typed, displayed or stored personal data

The level of protection of personal data may depend on physical factors such as the ease with which people are able to see what another person is typing or what is on their screen. This can be achieved by placing the terminals in such a way that unauthorized people are prevented from viewing the keyboard or screen. A special filter may be attached on the screen, allowing only the person sitting in front of the screen or very close to it (e.g. friend, assistant) to see the content.

**Preventing unauthorized access to typed, displayed or stored personal data**

**Goal 13.3.2.2.a:** Other people should not be able to access any personal or private information related to a PIAP user.

**Recommendation 13.3.2.2.b:** Terminals should be placed in such a way that unauthorized people are prevented from coming close to the keyboard or screen e.g. by means of by means of a special disposition of terminals (e.g. zig-zag) or a visual barrier between them.

**Recommendation 13.3.2.2.c:** A filter, allowing only the person sitting in front of the screen or very close to it (e.g. friend, assistant) to see the content, may be attached over the screen.

**Recommendation 13.3.2.2.d:** Any information that a PIAP keeps about its customers, such as a subset of their personal data related to payment and personalization, should be protected from access by the unauthorized people.

### 13.3.2.3 Key logger

A key logger (or keystroke logger) is a program that runs invisibly in the background, recording all the keystrokes, usually saving the results to a log file. PIAP providers can use key loggers for finding out, what the users have been doing on the computers. Although a PIAP provider may use key loggers for good purposes (such as preventing criminal activities), many PIAP users might find it unpleasant (threatening their integrity) and they may also fear serious consequences when their personal data (such when their passwords to their bank accounts, or code for their credit cards) becomes available to the PIAP provider or other unauthorized people. It is also necessary to prevent a user from installing a key logger for acquiring information from other users.

**Key logger**

**Recommendation 13.3.2.3.a:** PIAP providers should not install key loggers.

**Recommendation 13.3.2.3.b:** If a PIAP provider installs a key logger, then the logged data should be protected from misuse.

**Recommendation 13.3.2.3.c:** If a PIAP provider installs a key logger, then the users should be informed that a key logger is running on the PC.

**Recommendation 13.3.2.3.d:** Users should not be able to install key loggers at the PIAP.

### 13.3.3 Leaving the terminal

It is important that other people cannot take over another user's session after they have left. It is therefore very important that users log out before they leave their terminal. In order to ensure that customers log out, the PIAP provider could consider the use of automatic logout. Before an automatic logout, the users should be informed that they may be logged out very soon, unless they cancel the automatic logout operation. The automatic logout may be activated in different ways such as:

- automatic logout after the terminal has been inactive for a certain time;
- the use of sensors (e.g. seat pressure sensor, temperature sensor) may be used for detecting when a user leaves the terminal and then the use may be automatically logged out.

It is highly recommended that all data stored during a session is automatically removed from the terminal immediately after a user has finished their session. Alternatively, everything can be removed, and then new OS images could be restored from a central server. A new image of the software will then be restored for each user session. This will be especially valuable as it should ensure that any viruses or other malware that may have entered the system during the last user's session are removed from the terminal.

#### **Leaving the terminal**

**Recommendation 13.3.3.a:** It is important that users' personal data do not remain available (for the wrong people) in the network after the user has left.

**Recommendation 13.3.3.b:** If users leave the terminal without logging out, the system can log them out automatically (e.g. triggered after a certain time or by a sensor).

**Recommendation 13.3.3.c:** Before an automatic logout, the users should be informed that they may be logged out very soon, unless they cancel the operation.

**Recommendation 13.3.3.d:** At the end of a user session the complete software environment should be removed, and a new OS images should be restored from a central server.

**Recommendation 13.3.3.e:** Alternatively, if Recommendation 13.3.3.d is not implemented, all user data stored during the session should be automatically removed from the terminal immediately when the users have finished their sessions.

## 13.4 Privacy management

### 13.4.1 Templates

A number of privacy related factors could be supported by the use of profile templates (see clause 15.4.3). Users need to be able to limit the availability of individual pieces of information to those entities that they desire to share it with. Templates could provide pre-configured privacy options that meet the expected needs of their users depending on individual users' needs and context of use. A set of predefined templates can be used for privacy management [i.3]. They may meet different needs and could be used for defining privileges, authentication methods and privacy preferences according to:

- user individuals;
- user roles;
- security levels;
- services;
- devices and accessories;
- objects and operations.

## 13.4.2 Privacy levels

The privacy levels can vary depending on the situation and role of the user and as defined in the currently active context dependent profile. For instance, when using a PIAP, the users might have other requirements than they have when using a PC at home or at work. Security mechanisms that are appropriate to the level of confidentiality [i.3] should be available for the transfer of user data to, from or between authorized entities. Users should be offered default settings at a sufficient level of security that is appropriate to the data stored or transmitted. However, a level of security that is higher than necessary should be avoided as it increases costs and may contribute to poor system usability.

An important consideration is that users will expect:

- a set of security levels together with a simple explanation of what these levels mean;
- an explanation of what could happen to their data in different security contexts;
- the option to be informed of visibility of or access to their profile data;
- the option to be asked for permission to allow visibility of or access to their profile data.

Users may assign privacy levels to different entities such as service providers, and related to specific services. There will also be some information that the user will want to share with every company and with every service.

For further information on privacy levels, see clause 13 in [i.3].

### **Privacy levels (from clause 13 in [i.3])**

**Goal 13.4.2.a:** Users should be offered default settings at a sufficient level of security that is appropriate to the data stored or transmitted.

**Goal 13.4.2.b:** There should be a common security level at which user identity needs to be verified. The authentication can be controlled in different ways such as one or more of a range of alternative authentication schemes, restrictions to passwords, and choice of authentication method.

**Recommendation 13.4.2.c:** There should be a mechanism to inform a user whenever any information in their profile above a selected privacy level is read by an external entity, along with identification of that entity.

**Recommendation 13.4.2.d:** When communicating with devices and services, the profile processing agent should respect user and legally required privacy requirements (see clause 13.5).

**Recommendation 13.4.2.e:** There should be a mechanism for the user to be informed about any changes of security level.

**Recommendation 13.4.2.f:** All elements of any profile need to have selectable levels of information sharing to specific single entities or to a well known sharing group, such as Friends, Family, Business Associates, Buddy Lists.

**Recommendation 13.4.2.g:** Security levels should have common definitions between entities, so that users can share a common expectation.

**Recommendation 13.4.2.h:** A new user's default start-up security profile should be preconfigured with default security levels. The user may redefine the security levels at any time.

**Recommendation 13.4.2.i:** The users should be able to easily understand, chose and apply their desired security policies.

**Recommendation 13.4.2.j:** The profile provider should apply the appropriate level of security to the transfer of the data.

**Recommendation 13.4.2.k:** Access to profile data should be limited to the subset of data required to perform the given service or function.

**Recommendation 13.4.2.l:** There should be a mechanism for informing the user about any identified security breaches.

## 13.5 Privacy policies

Users may not wish to make explicit choices on whether their privacy preferences are being respected each time they use a communication or information service. For this reason, mechanisms (such as the W3C's P3P initiative [3]) that attempt to compare users' privacy preferences against a web site's published privacy policy present a potential model that ensures users' privacy preferences are being respected. The principle of this model could be extended, and include PIAPs, which could publish their privacy policy.

As users will not want to define independent privacy preferences for every service that they use, there is a need for a common way to define privacy preferences such that they apply across the widest possible range of services. What is also needed is an assurance that any claims made by service providers are accurate and can be trusted. Whatever method is adopted, there needs to be mechanisms for providing users with both positive and negative feedback on whether their privacy preferences are being respected. Where it is determined that a user's privacy preferences are not being respected, users will need a mechanism to ensure that they do not participate in ways that compromise their privacy preferences.

**Privacy policies (from clause 13 in [i.3])**

**Guideline 13.5.a:** Mechanisms that respect user's personal preferences with respect to the privacy of their personal information should be used. At this time, mechanisms that are based upon the W3C's P3P recommendation [3] should be used for web based services.

**Guideline 13.5.b:** Users should be provided with feedback on whether their privacy preferences are being respected. Users should be given positive indications that their privacy preferences are being met. Where their privacy preferences cannot be met, users should be informed and offered an option that ensures that their privacy preferences will not be violated.

**Guideline 13.5.c:** Users should be provided a mechanism to request details of any information stored about or relating to them.

## 13.6 Privacy regulations

The privacy requirements need to fulfil local privacy regulations. Lawful interception and other regulatory requirements may imply that PIAP users' data is delivered to authorities (e.g. if a crime has been committed), despite the privacy settings.

**Privacy regulations**

**Goal 13.6.a:** PIAP operators need to comply with lawful interception and other regulator requirements may imply that PIAP users' data is retained for a defined period and delivered to authorities, despite the privacy settings.

## 13.7 Specific security issues for public hotspots

There are two primary issues regarding security in wireless public hotspots:

- Access: making sure that only authorized people can use the wireless network. Methods by which users may gain access to a public hotspot are discussed in clause 13.2.3.1.
- Privacy: making sure that unauthorized people cannot get access to the data sent over the wireless network. These issues may arise since:
  - In wireless technology, data is transmitted by means of radio waves, which can be intercepted by a third party.
  - Although it is possible to use encryption, in public hotspots, data sent over the wireless network is frequently open and unencrypted, because of the usability issues described in clause 13.2.3.1.

Users generally have low security awareness, but this awareness is somewhat worse for public hotspots, as information regarding their specific security is not widely available.

To increase the level of security for users of public hotspots, some aspects should be taken into account:

- PIAP providers could restrict which computers should have access to the network. They can ask for the MAC (Media Access Control) address of the users' laptops when they register for the PIAP (prompting the user how to find out the MAC address), so that only those computers verified by a known MAC address are granted access to the wireless network. There may be also automatic mechanisms for the PIAP providers to accept or reject a new device trying to attach to the network. Although this does not solve the problem of a PIAP user eavesdropping on other users, it at least reduces the risks that problems will occur.



- PIAP providers could provide a WPA protected connection for use by existing customers (see [4] for guidance on methods of deploying this solution together with the Universal Access Method described in clause 13.2.3.1).
- PIAP providers should provide information about the level of security of the network and give recommendations to users. These include:
  - Users should be warned that the communication is unprotected, and that using a secure connection when dealing with sensitive information is recommended. The users should not enter sensitive information into a website that does not use a secure connection. For instance, most online banks/shopping websites use HTTPS (Secure HTTP) to encrypt the connection. Many companies use a secure connection for their employees to connect to the company when they are at home or at a PIAP.
  - Users should be made aware of the possibility that there are false access points, and that therefore they should ensure that they connect to the wireless network provided by the PIAP provider.
  - Users should be warned that, when using the Internet from their wireless device (and specifically through a wireless connection), it is generally recommended to have an up-to-date firewall, antivirus software and strong passwords.

#### **Security in public hotspots**

**Goal 13.7.a:** PIAP providers should provide information about the level of security of the network and give recommendations to users.

**Recommendation 13.7.b:** PIAP providers should restrict which computers can access their wireless network.

**Recommendation 13.7.c:** PIAP providers should consider deploying a WPA protected connection to their service for use by existing customers. This should be provided in accordance with the guidance given in [4].

**Recommendation 13.7.d:** There should be a sign that warns users about the security risks related to public hotspots. This should cover at least the topics covered in Recommendations 13.7.d to 13.7.g.

**Recommendation 13.7.e:** Users should be warned that the communication is unprotected, and that using a secure connection (e.g. https) when dealing with sensitive information is recommended.

**Recommendation 13.7.f:** Users should be made aware of the possibility that there are false access points, and that therefore they should ensure that they to connect to the wireless network provided by the PIAP provider.

**Recommendation 13.7.g:** They should be asked to check that the wireless network control software in their portable device should be set to an "Access Point only" mode (to avoid the danger that they may accidentally connect to a potentially malicious computer using the "Ad-hoc" connection mode).

**Recommendation 13.7.h:** Users should be warned that, when using the public hotspot, they should have an up-to-date firewall, antivirus software and strong passwords.

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## 14 Language and cultural issues

### 14.1 General issues

Some PIAPs are frequently visited by people who speak languages different to the national language of the country (e.g. in airports or places where people often go on vacation or business travel). Some countries have more than one official language. In these, and similar, circumstances there is a strong case that the PIAPs should support a range of languages.

People from different cultures may have different expectations regarding features that the PIAP provides for the users. These features include very concrete things such as the assignment of letters to the different keys of a keyboard through to much more subtle factors such as the amount of detail that is given in a set of instructions. The various clauses within clause 14 will address different aspects of these cultural expectations.

When a PIAP is established one of three options has to be chosen:

- a) Every aspect of the PIAP is set up respecting the local cultural expectations and using the language(s) of the place in which the PIAP is located;. This would only be considered acceptable in places where no tourists or visiting business travellers are expected to visit and where it is considered acceptable to exclude such people from using the PIAP. Adopting such an exclusive approach could only be justified in situations where absolute minimization of setup costs is an absolute design priority.

- b) Every aspect of the PIAP is set up respecting internationally shared cultural expectations and using a small range of internationally accepted languages (e.g. English, Spanish, German and French). This would be an option to consider in locations where high volumes of visitors from various places are expected (e.g. in major airports or major city railway stations). The disadvantage of choosing this option is that only those local people educated to understand the cultural expectations and languages offered in the PIAP will be able to easily use it. Other local people may feel excluded in their own home environment.
- c) The PIAP is set up respecting the local cultural expectations but using the language(s) of the place in which the PIAP is located (possibly including languages used by significant populations of immigrants in the area) and a choice of internationally accepted languages. This will often be the compromise option that is chosen for the majority of PIAPs where the intention is to provide the most familiar experience for local users whilst still trying to make it possible for people from other cultures or people who speak other languages to use the PIAP.

For PIAPS that offer support for multiple languages, users should be offered a way to specify the language that they wish to use. If language preferences cannot be written from information stored in a user profile, then the user should be offered some form of menu that presents a choice of languages.

A good way to enable language choice is to provide the name of the language in the actual language. For example:

- Deutsch;
- English;
- Français;
- Magyar.

This way, users who understand the language can select their preference, without leading to confusion regarding their culture-related settings.

Support of a suitable range of languages is also very important in relation to the issue of payment for PIAP services as this will frequently be the first language barrier that a user encounters. This need is identified in clause 12.5).

#### **Languages used in PIAP workstations and payment machines**

**Recommendation 14.1.a:** The PIAP should provide the local language(s) and at least one international language (e.g. English).

**Recommendation 14.1.b:** It should be easy to change the language.

**Recommendation 14.1.c:** It should be easy to reset the language.

**Recommendation 14.1.d:** The applications should not make assumptions about user's language.

## 14.2 PIAP keyboard layouts

There is a wide range of layouts of alphanumeric keyboard layouts for use with personal computers or computer terminals. Most of these adopt one of a very restricted set of physical layouts (e.g. QWERTY, AZERTY) that place the majority of the alphanumeric keys in standard positions with relation to each other, with some of the other keys (e.g. the "insert" and "delete" keys) placed in a range of alternative positions in relation to the alphanumeric keys. There is also a range of alternative designs that place these keys in very different configurations that are designed to enhance typing speeds or to reduce the risks of injuries such as repetitive strain injury.

The assignment of letters to the keys on the more conventional computer keyboards varies according to the languages and alphabet(s) that the keyboards are designed to support. These different designs can be approximately categorized according to the countries in which they are intended to be used.

In some cases (e.g. for Sweden) there are officially endorsed national keyboard layout definitions. In other cases, these layouts are established by mutual acceptance. A source of information on keyboards that has wide industry acceptance is the Microsoft Global Development and Computing Portal [i.29].

Where the localization of the keyboard does not match either the user's preferences or the settings of the application or service, the user will experience the disturbing situation where some keys do not result in the letters that are written on them. Such situations are difficult to avoid when people from different cultures use keyboards in PIAPs.

One option, instead of having multiple keyboards, is to have keyboards where the key labels and functions can be changed. This option could be helpful in the case of PIAPs that may be used by people of different nationalities. Predefined sets of keyboard layouts could be offered, and in addition, the user could be offered the option to make modifications to the standard key assignments.

Another, less technically advanced option is to provide instructions that tell people from different countries how they may use the keyboard provided in the PIAP to generate characters that are not written onto the key tops of the keyboard e.g. how to generate the many characters that have diacritics (e.g. accents). This instructional material should also include information about how the various characters that are written on the keys can be accessed i.e. what keys need to be pressed before or during the key press in order to generate the various characters shown on the key.

This instructional material could be made available to the PIAP users by means of:

- a help application accessed from the PIAP, with clear on-screen instruction being given to the user during the logon procedure to tell the user how to access this help application;
- an instruction card that can be provided to any PIAP user, on request;
- an instruction booklet located at each PIAP workstation. Steps would need to be taken to minimize the risk that this booklet was not stolen or damaged.

Work is being undertaken in CEN/ISSS Workshop on Multilingual Extensions to European Keyboard Layouts (WS/MEEK) [i.11] to identify how multilingual extensions can be made to European keyboard layouts. The aim of this work is as quoted below:

- "The multilingual extensions will be aimed to allow 'ordinary users' and Public Authorities to input primarily Latin-script characters, especially in light of current and potential future legal and common educational requirements. It will build on existing implementations of common official and de facto standards for national and regional computer keyboard layouts and related input methods."

Keyboards based on the CEN Workshop Agreement (CWA), that will result from this work, should allow people from a range of cultural and language backgrounds to be able to generate the special characters that are used in their languages in a simple and predictable way when using a PIAP. The scope of the Workshop confirms this view:

- "The Workshop will prepare a single-part CWA covering at least the following areas:
  - a list of aspects to be taken into consideration when designing regional multilingual keyboards and related input methods (both technical, legal and relating to usability);
  - specific recommendation and guidance related to the above aspects;
  - considerations and possibly guidance for publicly available terminals, e.g. in Internet Cafés, for travellers, etc."

#### **PIAP keyboards**

**Recommendation 14.2.a:** The keyboard used in a PIAP should be chosen according to the primary intended usage of the PIAP e.g. a local keyboard for a PIAP designed primarily for local users or an internationally well accepted keyboard (e.g. UK or US) for PIAPs intended almost exclusively for international travellers.

**Recommendation 14.2.b:** On screen or paper instructional material should be provided to help users from countries that do not use the provided keyboard to access both the multiple characters shown on the keyboard keys and also those characters (usually with diacritics) that are used by people from that country when writing personal names and common words.

## 14.3 User profiles

For maximum effectiveness in the delivery of information and communications, PIAPs need to be able to access and respond to relevant information found in a user profile. A description of user profiles can be found in clause 15.4. Users may define their language and cultural preferences in their user profiles.

People's language preferences may be expressed in different ways, ranging from the simplest to the most sophisticated methods:

- **Definite value:** The simplest type of language preference is a definite value such "my preferred language is English as it is my native language and I have not learnt any other language".
- **List of language choices ranging from most preferred to least preferred:** A more flexible approach is to define a list of languages based on the reasoning such as "I prefer information in my native language Swedish but I am rather good in English and I have basic skills in German so my list would be: 1) Swedish; 2) English; 3) German".
- **Rules (see clause 15.4.4):** The use of rules offers maximum flexibility for defining language preferences. Factors such as levels of language skills, different user roles and different situations and context of use may be taken into account.

## 14.4 Inferred language and cultural preferences

Frequently, assumptions about the language preferences are based on a number of factors unrelated to the actual user's preferences. In the case of a PIAP, the most likely case where this will occur is that the language and regional variant of a service that is delivered may be based upon the IP address of the PIAP.

There may sometimes be other data that a service, including the PIAP payment service, can use to infer the nationality of a user (e.g. the place of issue of a credit card issued to pay for the PIAP). Frequently the assumptions made from this type of information may be completely wrong. These will always be prone to error and should not be used if preferences that the user has directly set can be accessed. Such language preferences may be found in a person's user profile or the language to which they have set the PIAP terminal or applications.

### Language preferences inferred from information about a user

**Recommendation 14.4:** PIAPs should make use of user preferences, when available, to configure the PIAP behaviour and not make assumptions about the user's language and cultural preferences based upon other sources of information.

## 14.5 Independence of language and cultural preferences

Not only the language but also the content of a website is usually provided, by default, in the language where the service is located. In many cases it is beneficial to separate the choice of language and the content. For example:

- People who are abroad may often wish to access content that is local to their current destination (e.g. looking for information on hotels, restaurants or transport). However, most people would prefer to receive that information in their own language, which might be different to the language that is used in their current destination. Therefore, the language that users want is unrelated to the region about which information is being sought.
- When accessing information about their home location, people abroad might want both the content and the language to relate to their home location and language.
- When a person says that they wish to view a UK website in English, it does not mean that they wish to see the Imperial measurement system frequently used in the UK.

These examples show how, when people are searching for information about a country, the choice of language and cultural conventions may be independent of both their location and the country about which information is being sought.

**Independence of language and cultural preferences from the location of a user or information source**

**Recommendation 14.5:** Users may wish to define their language and cultural preferences to be different from their content preferences related to a certain country or region.

## 14.6 Language and cultural capabilities of terminals and services

When ensuring that a PIAP or its applications offers what a user requires, it will be necessary to compare a user's preferences with information about the capabilities of a PIAP or its applications. A PIAP and its applications, therefore, need to provide information about their language and cultural capabilities, both in a human readable and a machine readable form.

There is potentially a very large range of items that a PIAP or its applications may reveal about their capabilities. Some of these will be exclusively related to language and cultural issues and others will have some relevance in a linguistic and cultural context.

Examples of exclusively language and culturally related information are:

- the language(s) in which the PIAP applications are (or can be) presented;
- whether the content being presented has been translated.

**Language and cultural capabilities of the PIAP or its applications**

**Recommendation 14.6:** The language and cultural capabilities of the PIAP or its applications should be available in both human and machine readable form (e.g. to enable automatic matching with user preferences in their user profile).

## 14.7 Further guidance on language and cultural issues

Further guidance on language and cultural issues, particularly in relation to services that may be accessed from a PIAP, can be found in EG 202 421 [i.1].

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# 15 User preferences

## 15.1 Overview

### 15.1.1 User configurable settings

Settings can be used for adapting the PIAP to suit the users' needs and preferences. A solution that is frequently used is to provide users with default settings and offer alternative options for them to choose from.

Most people, and in particular people with disabilities would benefit if the following settings could be adjusted:

- text size and font;
- text colour;
- background colour;
- sound volume.

### 15.1.2 Avoiding unwanted preferences for the next user

Whereas there are advantages in letting users modify the settings in order to achieve better usability, in particular for people with disabilities, it is also important to recognize that there may be a need to prevent any trouble for users arriving later, and/or to prevent technical difficulties for the PIAP assistants.

In some PIAPs, the system is set up in a way that prevents users from changing settings. In other PIAPs, the system does not prevent users from changing settings, but users of the PIAP are informed that they should not change any settings.

The PIAP providers will wish to have some control on how these settings are changed, so the desired solution would be to allow people to change the settings (either manually or automatically via user profiles) and, when starting a new user session, reset to defaults to ensure that a user will not experience an unwanted combination of settings that were adjusted by the previous user.

Mechanisms to alter the user controlled settings can include:

- on-screen controls for the user to control each setting - with a mechanism to reset these settings at the end of each user session;
- reading the values of settings from a user profile (e.g. stored offline on a smartcard or a user's mobile phone or online) - see clause 15.4.

### 15.1.3 Current situation

Frequently, the choice of settings must be done manually and each time a service is used. In many cases, for example when using online services, the security policy of the PIAP will prevent the service from saving cookies in the terminal that contain the user's preferences. When using the online service later, users will have to re-enter their preferences.

Even if the services are not prevented from saving cookies, when using a new service, users need to select their preferences if they are different from the default preferences of the service. Some services allow the user to personalize the service by defining their preferences in a service specific profile. The problem with this solution is that users need to define their preferences many times - once for each service. Each time it may be necessary for the user to find out how to do this. This solution is not convenient if users wish to update their preferences because they would have to remember each instance of their service specific profile that needs to be updated.

### 15.1.4 Ideal situation: the user profile approach

With the increasing possibility of providing users with a range of options, there will also be a need for content and service providers to get information about user's preferences. When settings are stored in user profiles, then the PIAP can automatically access these settings and provide the desired user experience. User profiles are a particularly attractive mechanism for the control of settings as they permit the setting of a wider range of preferences than it would be reasonable to expect a user to manually set.

This concept is further described in clause 15.4, and explained in detail in EG 202 325 [i.3].

## 15.2 Categories of settings and preferences

Users may wish to express a wide range of preferences which may be applicable when using a number of different services and devices. These may include:

- generic preferences [i.3], clause 4.1.3, such as:
  - language and cultural preferences (see [i.3]);
  - people with visual disabilities may express a preference to change the visual appearance of the screen (e.g. background colours, contrast, fonts size);
  - dyslexic people may require a specific font colour and background colour;
  - capability of the PIAP, for example, if the user wants text information translated to voice when at a PIAP that offers enhanced accessibility - or for getting larger font size when text-to-voice is not available.
- location and situation based preferences which may become relevant when using a PIAP, for example:
  - the security policy of the company where the user is employed (see [i.3] clause 13 on "User identification and security"), can prevent the user from accessing sensitive company information if the user is accessing from a PIAP.

- affinity based preferences, such as a template (see clause 15.4.3) provided by an organization such as the RNIB (Royal National Institute of the Blind), which gives a wide range of default preferences that have been shown to be suitable for people with visual disabilities;
- service and device specific settings. In order for a services and devices to be personalized in ways that suit individual users, it is necessary to set a number of parameters that relate to the features of services and devices (see [i.3], clause 4.1.4) in ways that ensure that the services and devices will deliver the capabilities that the user desires.  
The number of user settable parameters is likely to depend on the complexity of the device or service. Examples of some of the very wide range of device/service parameters that may be relevant when using a PIAP include:
  - modality depending on PIAP equipment, rules and social factors (e.g. if it is suitable to listen to information that other people can hear; volume for output);
  - status of VoIP (e.g. it can be changed to "Not available" when users bring their own laptop to a PIAP where a VoIP session is not appropriate);
  - settings related to Internet banking services or other services that may have extra strong requirements on confidentiality (see clause 13 on "User identification and security").
- Content filtering. Web browsers could be associated with a filtering service that prevents specified content from being displayed (e.g. content that is unsuitable for young children).

## 15.3 Ways of storing user's preferences

### 15.3.1 Smartcards

Smartcards represent a potential way of providing or controlling access to a range of services in a PIAP.

As well as a means to store payment information and to enable logon (see clause 12.4), smartcards also offer a means to provide services, features and settings that are customized to the needs of different categories of user or to the needs of individual users. Individual users might have a range of different settings that they could configure once on their multi-session smartcard. This would then ensure that these settings apply each time the user logs in with their smartcard.

Other examples where smartcards can be useful are:

- Providing options whereby the same smartcard that is used to gain access to PIAP facilities could also be used to simplify usage of services from the user's own home.
- A single smartcard could potentially be used to pay for Internet usage, printing costs and, possibly, even payment for goods and services purchased over the Internet.

A comprehensive set of guidelines, accessibility checklist and a listing of smartcard related standards can be found at [i.17].

### 15.3.2 Cookies

A cookie is a piece of data that is sent to the browser from a web site that a user visits and it is stored as a file on the user's computer. A cookie often includes a unique identifier that uniquely identifies the user and it is then used to track their web usage.

The primary purpose of cookies is to enable a user to be recognized and to retain their personal preferences when they return to a website (e.g. if a user personalizes Web pages, or registers for products or services, a cookie helps the Web page server to recall information related to the user's actions). This may be useful to simplify the process of recording users' personal information, such as billing addresses, shipping addresses, or other preferences, such as those related to users' needs (e.g. preferred font type, size and colour, preferred background colour).

Cookies can do everything from monitoring users' visits throughout web sites, tracking how many times they have visited the site, how long they have been on the site, users' log-in information at a particular page, to remembering important information about the computer. Cookies also allow websites to track their visitors so that they can know how many visitors have viewed the site, how many repeat visitors they have received.

There are two types of cookies that differ according to how long they can be stored in the computer:

- Session cookies (or "non-persistent cookies") only exist as long as a user website session lasts and expire as soon as the user leaves the website. The primary purpose of session cookies is to help with navigation and to facilitate user activities within that site.
- Persistent cookies are stored on a computer in order to allow users to be recognized and retain their personal preferences when they return to a website.

A limitation of cookies is that they cannot be used to store general user preferences about general computer usage. They can only store preferences related to navigation in a specific website. Different websites will need different cookies to store user preferences. If the user has a cookie stored in their computer related to a website, it will not be valid for a different website; users will have to select their preferences again when they access a different website. Moreover, in a PIAP environment, where it is likely (and recommended) that the users information (including cookies) is deleted at the end of the PIAP session, cookies are not a good method to store preferences, because they will only be valid for a session.

There are some privacy issues that must also be taken into account with persistent cookies. As they are stored in the computer, if anyone has access to them, personal information about the users can be gathered. Apart from this, there may also be "bad" cookies that, instead of being used as a way to store user preferences, may be used by a web site to track users visits to different web sites or to know users browsing habits, purchase history, etc. It is generally recommended that cookies are only enabled for trusted websites. Most commercial web browsers allow users to make such a configuration.

#### **Cookies**

**Recommendation 15.3.2.a:** Where the storing of cookies is allowed at a PIAP, the PIAP users should be advised that it is generally recommended that cookies are only enabled for trusted websites.

NOTE: PIAP operators who do not clear all system changes between user sessions may decide to prevent the download of cookies in order to protect themselves from liability for the compromise of user's personal information.

### 15.3.3 Personal Style Sheets

Cascading style sheets (CSS) [i.13] can be used to design and layout web pages (e.g. background colour, font colour, type and size) and to position text blocks and other elements on the web pages the user is viewing. They enable the design of the whole site to be altered by simply changing the style sheet.

Style sheets separate the content from the markup (e.g. HTML, XHTML), which makes it easier for users to present the content in their preferred way. It enables page content to be more effectively transformed for use in alternative input and output devices such as Braille displays, speech synthesizers and special browsers. For these reasons the use of style sheets is generally recommended [i.30] when designing a website.

However, despite their advantages (including improved accessibility), certain browsers and output devices do not support style sheets. So, it is also generally recommended that websites are designed in a way that makes them readable even if style sheets are not used or supported.

If a website is readable without style sheets, users are able to adapt the page markup to their own preferences by, for example, using a self-defined style sheet that has priority over the web page's own style sheet. These are called "personal style sheets", and allow the users to customize websites with their preferences, so that they are more easily readable depending on their preferences or needs. Most web browsers allow the use of personal style sheets.



## 15.4 User profiles

Instead of frequently having to choose options, users should be able to define their preferences and capabilities only once in their user profile [i.3]. This would enable devices, services and people they wish to communicate with, access to their preferences in order to provide content and services presented in a way that suit their needs. A preference set in a user profile should be capable of being overridden by the user at any time.

The user profile concept provides the users with a means to define their preferences in a flexible way that meets their requirements in a range of situations and roles. The most flexible solution for defining preferences is to have the ability to define rules in a user profile.

### 15.4.1 User profile support for user requirements

The user requirements specified below would all be supported by the user profile concept described in the ETSI Guide concerning user profile management [i.3]. Table 1, lists specific instances of how support would be provided for these user requirements. This clause defines what needs to be done to ensure that the full benefits of user profile management approach can be achieved.

**Table 1: User requirements related to user profiles**

User requirements	Support provided by user profiles
<p><b>Requirement 1: Ability to specify and change preferences.</b> Users require the ability to specify and change their previously defined preferences, and to subsequently change them.</p>	<p>A profile tool is defined in [i.3], clause 10.4, as the entity that enables the user to create and edit user profiles.</p>
<p><b>Requirement 2: Avoiding repetition of preferences.</b> The user should not have to continually specify their preferences each time a PIAP session is initiated.</p>	<p>Many preferences are useful for several devices or services and should, therefore, be centrally available. Ideally, preferences should always be available, over all networks, from all supported devices and services, including fixed and mobile services allowing service continuity and the optimal user experience. A profile storage agent is defined in [i.3], clause 4.6.2, "Storage agent and components" is the entity that stores the users' language and cultural preferences and the locations of data repositories of profile data related to users.</p>
<p><b>Requirement 3: Consistent application of preference changes across devices and services.</b> Users require that if they change a language or cultural preference on any device or on any service, then those changes will be automatically applied to all other devices and services that they use.</p>	<p>This may be achieved by synchronization of data and transaction security. This capability is provided by the storage agent described in [i.3] clause 10.10, "Data Storage, synchronization and back-up".</p>
<p><b>Requirement 4: Matching preferences and capabilities such as the PIAP hardware and software, communication link and various services.</b> Where the user's preferred value of a setting and the default setting of the PIAP (e.g. hardware and software and various services) are different, users require a solution that suits the requirements and capabilities of both.</p>	<p>Users may have defined their preferences, but it may not always be possible for an exact match to their preference to be achieved. To resolve such situations, negotiation can take place in order to try and achieve a good, if not perfect, match (see [i.3], clause 7.5 on "Capability and preference negotiation"). Where the relevant capability is supported, negotiation will take place between:</p> <ul style="list-style-type: none"> <li>• user's preferences - terminal capabilities;</li> <li>• user's preferences - service capabilities;</li> <li>• terminal - service capabilities;</li> <li>• preferences of two or more communicating users;</li> <li>• terminal capabilities of two or more communicating parties;</li> <li>• service capabilities of two or more communicating parties.</li> </ul> <p>In some cases, a capability may be technically supported, but the policy of the PIAP may limit the capabilities such as when employing filtering of web pages for children below a certain age.</p>
<p><b>Requirement 5: Privacy.</b> Users require that their preferences and capabilities should be stored in a secure manner with user agreed levels of privacy applied to the availability and distribution of that data.</p>	<p>The profile storage agent stores the preferences in a secure manner with user agreed levels of privacy applied to the availability and distribution of that data, see [i.3], clause 4.6.2, "Storage agent and components".</p>

## 15.4.2 User profile support for system requirements

The service and terminal related requirements map well to the user profile concept described in [i.3]. This concept assumes that a user manages their own user profile, that they do not need to have to repeatedly specify the same preferences, and that they do not need to be concerned where their user profile data is stored. Table 2, lists requirements from the service and terminal point of view and matches them with the user profile concept [i.2].

**Table 2: System requirements related to user profiles**

System requirements	Support provided by user profiles
<p><b>Requirement 1: Access to and interpretation of preferences.</b> Any service/device should be able to access and interpret the user's preferences.</p>	<p>The preferences need to be centrally stored and accessible. They also need to be expressed in a standardized form (see clause 19 in the present document and [i.3] clause 4.8).</p>
<p><b>Requirement 2: Combining multimodality with language and cultural preferences (see clause 14).</b> Some users such as those with disabilities might want to define their preferences as a combination of modality and language and cultural preferences. An example is people with a visual impairment who would typically prefer audible information that matches their language and cultural preferences. Modality and language personal preferences can be very valuable for communication between people with a disability and other people. An example is a person with a severe hearing loss who uses an automated system which recognizes his sign language and converts it to speech in a choice of languages.</p>	<p>The user profile concept can deal with combinations of modality and language and cultural preferences, see [i.3], scenario in clause 8.8 on "A person with a severe hearing loss". That scenario also explains how the combination of the profile concept and the Universal Communications Identifier (UCI) concept (see clause 4.7.1) may further enhance usability.</p>

## 15.4.3 Default values and templates

Templates [i.3] that contain typical rules and settings will be of particular benefit in the initial configuration of profiles. First time users could set up their profiles by using a wizard and templates. The wizard guides the user by explaining and proposing a set of templates that suit different group of users, roles and situations. These different types of templates may propose relevant settings and rules as default values.

The use of templates is useful as it is easier if information is already filled in as suggestions or default values as starting points and the user can choose to accept it or otherwise select available alternatives. A wizard could ask the user some questions in order to suggest templates that suit various categories of user in their different roles and situations. Further details on default values and templates are described in [i.3], clause 9.

Templates may be provided by profile providers, service providers, device manufacturers, affinity groups, corporate and club administrators, and by the users themselves. It should be possible for users to create new templates by customizing existing ones.

When creating templates, the following will need to be considered [i.3]:

- Which preferences, settings and rules can be assumed to be appropriate defaults for a target set of users, roles and situations. These default parameters should be acceptable to a maximum (such as "at least 90 %") of the target communities.
- Which default values could be set by values in the user's base profile (if specified in the base profile).
- The scope of application of a template and the granularity of information. The range is from a very detailed and comprehensive template for a very specific purpose to more general templates that apply to a wide variety of applications.
- The methods used for the creation and modification of templates.
- If a template needs to be a creation template or a live template (see clause 9.4 of [i.3]).
- In what way changes to live templates will affect existing profiles that were based on these templates.
- What privacy issues need to be reflected in the templates?

- Which items in the template define things that the user can subsequently alter and which items will have fixed values.
- Which preferences and settings are related and may be grouped together.

## 15.4.4 Rules

Rules can be used to define preferences. For simplicity, only the issue of language preferences have been addressed in detail. The same principles can apply for other preferences.

### 15.4.4.1 The concept of a rule

Users often express conditional phrases in their everyday life. When doing so, they express rules (even if they do not call them rules) such as "WHEN it rains, THEN I bring the umbrella". This concept is also useful when defining language preferences.

Many users have simple preferences as they only know one or two languages which can be defined in a simple way by choosing the preferred language. However, some users who know several languages might have more complex requirements about the circumstances in which they wish to use each language. The flexibility of rules makes them useful for defining preferences for language negotiation.

Users may define rules which permit maximum flexibility when defining their language and cultural preferences and needs. The rules may take into account a combination of factors such as:

- levels of the users' language skills in each defined language;
- preferred cultural settings depending on the situations, such as currency to be used at home or when travelling abroad;
- different user roles (e.g. business, private) and different situations (e.g. at home, at a PIAP) and the context of use (e.g. searching for travel information, shopping).

### 15.4.4.2 Conditions and actions

Rules consist of one or more conditions (e.g. "When it rains") and one or more actions (e.g. "bring the umbrella"). When defining language preferences then the action would be the choice of one or several language preferences. Users should be given the option to define a condition first and then the language option (action) - or the other way around, first define language option and then condition(s). Alternative actions could be defined by using "Otherwise".

### 15.4.4.3 Examples of rules

There are different ways of defining and expressing rules. These are described in EG 202 325 [i.3], clause 8.

Here are some examples of different types of conditions:

EXAMPLE 1: *When Role is Business, Then Language is English.*

EXAMPLE 2: *When Role is Private, Then Language is Swedish.*

### 15.4.4.4 Rule exceptions

Exceptions are circumstances where that rule does not apply. Users may define a rule and then define zero, one or several exceptions. Defining rule exceptions could also be compared to defining alternative actions by using the specific word "*Otherwise*". An example of an exception would be:

EXAMPLE: *When Textual information is in French And French is the original language, then Language is French, Otherwise the Language is English.*

## 15.4.5 Address book

The address book contains the user's contact information useful for communication services (e.g. email, VoIP, messaging). The information in the address book could be used to set up filtering rules related to the user's preferences about using these communication services.

Language preferences of the contacts can also be stored in the address book. This information can be used when communicating with each of these contacts. For example, if a contact's language is stored in their address book record, then their language preferences would then ensure that the appropriate language is selected for writing messages to that person. This solution could also be used for the spell checking when writing emails.

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# 16 Guidance

## 16.1 Guidance principles

One characteristic of a PIAP is that there could be a very diverse mixture of potential users. These users could vary according to their familiarity with:

- the specific PIAP (or with other PIAPs owned by the same PIAP provider);
- the use of the Internet;
- the use of computers;
- the specific applications used at the PIAP workstation;
- the PIAP workstation hardware (e.g. especially the keyboard layout);
- the payment methods used at the PIAP;
- the features provided in the PIAP that can be used to help them overcome barriers related to any disabilities that they may have.

In addition, in many PIAPs the users may be from a wide range of cultural and linguistic backgrounds.

In order that PIAP users are able to make full use of the PIAP and all its facilities and features, it will be necessary to provide some guidance to help them overcome the potential difficulties that they encounter due to the issues introduced above. The following clauses indicate different approaches that can be taken to giving PIAP users the guidance that they require.

## 16.2 Guidance from PIAP assistants

Clauses 7.2 and 9.6 indicate the many ways in which PIAP assistants can provide assistance to PIAP users. PIAP assistants are potentially the most flexible way to provide assistance to users. There will also be some users who will have a strong preference for having a person to assist them rather than having to find out for themselves how to use the PIAP by reading the guidance material provided.

PIAP assistants are not suitable as the only form of user guidance for a number of reasons that include the following:

- It is unlikely that sufficient PIAP assistants could economically be provided in a PIAP to offer the on-demand assistance to the many users that could simultaneously request it.
- It would require a great deal of training of PIAP assistants before they could be relied upon to instantly know the answer to most of the questions that they may be asked.
- Only PIAP assistants with significant training or experience in dealing with people with disabilities would be able to provide the specialist assistance that may be required to assist PIAP users with uncommon (combinations of) disabilities.

**Guidance from PIAP assistants**

**Recommendation 16.2.a:** Wherever possible, PIAP assistants should be provided to assist users to make full use of the PIAP.

**Recommendation 16.2.b:** PIAP assistants should not be relied upon as the sole means of providing guidance to PIAP users.

## 16.3 Guidance from printed documentation

One of the most common and simple methods of providing guidance to PIAP users is by means of the provision of printed documentation. This documentation may be in the form of notices on the walls or the notice boards of a PIAP, instructions sited on or immediately adjacent to a piece of equipment, free-standing notices or booklets provided near to the place at which they will be needed (e.g. workstation, payment machine, printer).

Two immediate benefits of printed documentation are that its availability is not dependent on:

- the presence or availability of a PIAP assistant;
- the current state of the device or system (e.g. PIAP workstation or payment machine) to which the guidance material relates.

Also, unlike on-screen guidance (see clause 16.4), the quantity of the guidance material provided is not constrained by the amount of information that can be presented on a screen. It is also not constrained by the concern that the on-screen guidance information can very easily hide the user interface features to which the guidance is related.

However, there are also a number of limitations of printed documentation. These include the fact that it:

- can be more costly to prepare than on-screen material (e.g. the cost of binding or mounting materials);
- is subject to accidental or deliberate damage and consequently has to be specially protected or frequently replaced;
- cannot be as easily and frequently updated as on-screen guidance material;
- the surfaces or space for mounting or storing printed documentation may be very limited.

**Guidance from printed documentation**

**Recommendation 16.3.a:** Printed documentation may be provided in the form of notices on the walls or notice boards of a PIAP, instructions sited on or immediately adjacent to a piece of equipment, free-standing notices or booklets provided near to the point at which they will be needed.

**Recommendation 16.3.b:** Printed documentation should be protected from accidental or deliberate damage, or frequently replaced.

**Recommendation 16.3.c:** Printed documentation should be updated when the information contained in it is not valid anymore.

## 16.4 On-screen guidance

The provision of on-screen guidance material is obviously an attractive option and has a number of inherent benefits. These benefits include:

- the guidance can be presented at the exact point where the user is already focussed (i.e. the screen);
- the guidance can be presented in short segments that are focussed on the current step of a user's task;
- the user can quickly find information by using the automatic search/find functionality;
- blind users or those with visually impairments have a better chance of getting access to adapted information in on-screen guidance (e.g. by getting larger text or by listening to text);
- the guidance material can be fairly easily and regularly updated to match any changes to the PIAP hardware and software;

- manufacturer provided guidance material for the operating system and software of the PIAP terminal is also available in an on-screen form as "Help" files and this can form a part of the overall on-screen PIAP guidance;
- it is possible to consider providing on-screen guidance material in many more languages than is possible for printed guidance material because only a single language version of the guidance will be displayed to a user whereas printed guidance would have to be presented as a single multilingual document or a set of language specific documents.

However on-screen guidance has disadvantages that include:

- users may find it difficult to access the on-screen guidance material;
- presentation of on-screen guidance material may disrupt the user's ability to use and comprehend what the current user interface context is (i.e. what is being shown to them behind the window showing guidance material);
- it can be difficult to present on-screen guidance in a way that allows quick and comfortable browsing of long and complex guidance material (where paper based booklets than can be quickly browsed may be preferred);
- the user might feel stressed while consulting the information as their session time is being consumed, in particular if they perceive the session time as expensive.

## 16.5 Choice of methods to present guidance

The previous clauses make it clear that no one method of delivering guidance material is perfect in all circumstances. In practice, a combination of methods is frequently the best solution. The specific circumstances of each PIAP should be considered in making choices about how best to deliver guidance information. In addition, small-scale trials of alternatives, or at least the proposed methods of delivery, should be attempted before committing to a final plan for how to deliver guidance information. However, the following points can be considered in making initial choices of how to deliver guidance:

- Printed guidance information is a good choice for information that it is of benefit to know before commencing or paying for a PIAP session (e.g. what facilities are provided at the PIAP, what forms of payment are accepted, in what languages the PIAP can be configured).
- Simple on-screen information can be a useful method to guide a user through any registration, payment or initial logon procedure.
- It is also beneficial to have information on how to logon, logoff and how to change language, as printed instructions attached to the workstation desk or any panels immediately adjacent to the desk.
- On-screen information, in the form of help files, is an appropriate way to present information about the PIAP operating system and applications.
- A simple large print printed instruction that directs people to seek the help of a PIAP assistant may be the best way of helping people with disabilities who are uncertain about how to optimize the PIAP configuration to meet their needs.

### **Choice of methods to present guidance**

**Recommendation 16.5.a:** Provide printed guidance for information required by the user prior to starting or paying for a PIAP session.

**Recommendation 16.5.b:** Provide both printed and on-screen information to guide the user about logon, logoff, language change and registration procedures.

**Recommendation 16.5.c:** Provide on-screen presentation for help files about the PIAP operating system and applications.

**Recommendation 16.5.d:** Provide a simple large print printed instruction that directs people to seek the help of a PIAP assistant to help them optimize the PIAP configuration to suit their disabilities.

## 16.6 Sources of help on authoring guidance material

Understanding the best ways of presenting guidance and instructional material is a large and complex topic. Therefore, including sufficient detailed guidance on how to present guidance material is beyond the scope of the present document. However there are a number of good general sources about how to present such material and also some other sources more specifically relevant to the domain of PIAPs.

One of the most definitive general sources of guidance is IEC 62079 [i.12]. Very good practical guidance on all aspects of the process of producing instructional material, including consideration of less obvious issues such as legal liability issues, is contained in [i.31].

Although it is targeted at providing advice for stakeholders in the mobile telecommunications marketplace, EG 202 417 [i.5] provides high quality recommendations of relevance to both printed and on-screen guidance material. It also provides extensive recommendations about the processes for the production and testing of guidance material as well as a detailed consideration on the production of information in a range of different languages.

Clause 7.8, in EG 202 116 [i.2] provides a large quantity of detailed recommendations related to all types of user guidance material including audio and multimedia presentation of guidance information.

ETR 167 [i.6] was based upon a large amount of careful study and user testing to determine the best methods of providing instructional material for public payphones. In many ways the context of use of a PIAP is very similar to that of a public payphone as both cater for a diverse range of users with varying levels of knowledge and expertise and who may speak a range of different languages. The similarity between Internet kiosks and public payphones is even greater as both of these have a similar form (freestanding object) and usage pattern (walk-up and use) and both are usually used by people who are standing. Because of these similarities between PIAPs and public payphones, the recommendations made in ETR 167 [i.6] are particularly relevant for PIAPs. These recommendations fall under a number of categories that include advice on the layout and content of the guidance material and how to present sequential instructions for multi-step processes. There is also advice on the use of symbols and multiple languages.

As well as having a close relationship with public payphones, Internet kiosks and other PIAPs also share characteristics with Automatic Teller Machines (ATMs) as both are used by a very diverse group of users, have card reading facilities and involve a walk-up and use style of usage. The Australian Bankers' Association Industry Standards on ATMs and EFTPOS [i.14], [i.15] provide useful recommendations related to user guidance, (as well as on a wide range of other topics).

# 17 Maintenance

## 17.1 Motivation

There are different stakeholders with an interest in the appropriate maintenance of PIAPs. Each of these stakeholders has a different motivation:

- Users: The main motivations for users are:
  - Good maintenance will ensure that all equipment and services work, so that nobody is prevented from using the PIAP. From an accessibility point of view, a well maintained PIAP will be more accessible.
  - Users will feel more comfortable and will be likely to rely more on the PIAP provider if everything works properly. This will also be beneficial for the PIAP provider, as more users will be willing to make use of the PIAP more frequently.
- PIAP operators: The main motivations for PIAP operators are:
  - For commercially provided PIAPs, good maintenance will ensure that all the devices and services that the PIAP provides are available to the users, which should increase profitability. Insufficient maintenance can result in some devices or services not working properly, which makes them unavailable to users. This will result in a financial loss for the PIAP provider. This concept is highly related to sustainability (see clause 6).

- For publicly provided PIAPs, directly run by a local body (e.g. a council, a library) or by a subcontractor, the success of the PIAP will normally be measured by frequency of usage. One of the factors that can contribute to a higher usage is good maintenance (see the points above related to users). If the usage of the PIAP is not as high as expected, then the funding from public bodies might stop.
- Public bodies: The main motivations for public bodies are:
  - Public bodies will be generally interested in complying with the social purposes that they intended when funding the setting up of PIAPs (e.g. overcoming the digital divide). Good maintenance can contribute to a high level of usage of the PIAPs, and hence to complying with those purposes.
  - When combining PIAPs with services of social benefit (see clause 6.4), a higher PIAP usage can result in a higher usage of those other services (e.g. library). Hence, good maintenance of PIAPs can result in higher usage of those services.

## 17.2 Types of maintenance

### 17.2.1 Local maintenance

In manned PIAPs, the maintenance is normally done by the staff at the PIAP. Depending on the skills of the PIAP staff, this maintenance can be:

- Simple tasks (e.g. changing the printer paper, helping users to make use of the PIAP). In this case, when there is a more complex issue (e.g. a computer does not boot, there is a problem in the building), they may call a central office that may take the actions needed (e.g. call a computer expert, call a plumber), or they can also take those actions themselves.
- Maintaining the cleanliness of the PIAP is an important maintenance task. Regular cleaning of the items which PIAP users touch, such as the keyboard and mouse, is particularly important to ensure an adequate level of hygiene.
- More complex tasks related to maintenance of the equipment. PIAP staff can be highly computer skilled and hence most of the maintenance tasks related to issues in the terminals, peripherals, other electronic equipment, and the software related issues, can be undertaken by them. In this case, when there is a maintenance problem in the building they will normally call a central office that may take the actions needed, or they can also take those actions themselves.
- Surveillance tasks, in the sense of preventing users from stealing or damaging PIAP equipment (e.g. terminals, workspace furniture). The presence of the PIAP assistants or any other staff is likely to act as a deterrent to stealing or damaging the equipment.

### 17.2.2 Remote maintenance

In unmanned PIAPs, it is especially important to have even better maintenance procedures, as there is nobody in the PIAP supervising the equipment, the building and the users' behaviour. In this case, remote maintenance is normally done. For this task to be accomplished, some specific tools are needed:

- Remote monitoring software: This is software running in a central server that monitors the local equipment of the PIAP.
- All the devices of the PIAP should inform (e.g. send an event to) the remote monitoring software when a problem arises (e.g. a peripheral is disconnected, there is a new update pending, a software error has occurred).
- It is also important that the remote monitoring system polls periodically all the devices in the PIAP to determine their status (e.g. to check whether or not the terminals are running).
- The remote monitoring system normally has a graphical console where alarms are triggered when there is any problem with the devices of the PIAP. This console is monitored by a remote operator who, when an alarm is triggered, will take the actions necessary to solve the problem. The action taken to solve the problem may be a remote intervention, or it can result in someone going to the PIAP to make a local intervention.



- Remote surveillance system using video cameras: This system can substitute for local staff in the task of deterring people from stealing or damaging PIAP equipment (e.g. terminals, workspace furniture) or detecting if they do so. The presence of the camera is also likely to make the customers feel more secure against being attacked or robbed.

Sometimes the remote monitoring cannot detect all the maintenance problems that may arise in a PIAP, especially problems related to the workspace furniture (e.g. desk, chair) or the building (e.g. a broken door handle, a broken tap in the toilet). There is a need for some complementary actions to be taken to detect these problems, for example:

- Some maintenance person employed or subcontracted by the PIAP operator could visit the PIAPs periodically (e.g. once every two weeks) to see if there is an undetected problem.
- A method of reporting problems at the PIAP should be provided. This could be by using a direct voice connection to a helpdesk, or users can report problems by filling in an on-line form, or by using a messaging system. The PIAP should provide contact information and inform users about alternative ways to report problems.

### 17.2.3 Mixed maintenance

In a manned PIAP, where staff undertake the tasks explained in clause 17.2.1, there can also be a remote monitoring system that monitors the status of all the devices of the PIAPs owned by the PIAP provider, as explained in clause 17.2.2.

This form of mixed maintenance is normally used by PIAP providers that run multiple PIAPs and that need to have more standardized and quick procedures to detect and solve the maintenance problems that could arise in their PIAPs.

#### **PIAP maintenance**

**Goal 17.2.3.a:** PIAPs should have an adequate level of maintenance that ensures that all the provided devices are kept in good condition and all the offered services are available to users.

**Recommendation 17.2.3.b:** If the PIAP is manned, the staff in the PIAP should do at least the basic maintenance tasks (e.g. changing the printer paper, helping users to make use of the PIAP) and surveillance tasks. It is also desirable that the skills of the staff allow them to do more complex maintenance tasks related to issues in the terminals, peripherals, and in other electronic equipment, as well as deal with the software related issues.

**Recommendation 17.2.3.c:** Maintaining the cleanliness of the PIAP is an important maintenance task. Regular cleaning of the items which PIAP users touch, such as the keyboard and mouse, is particularly important to ensure an adequate level of hygiene.

**Recommendation 17.2.3.d:** Either when the staff's skills do not allow them to do complex maintenance tasks, or when staff are not able to solve some issue, the PIAP provider should provide a procedure so that staff are able to report these issues so that they can be solved by a third party.

**Recommendation 17.2.3.e:** If the PIAP is unmanned, the PIAP provider should have someone (either a person employed directly by the PIAP provider, or a third party maintenance company) who visits the PIAP periodically to do basic maintenance tasks when needed, or report when a more complex issue arises.

**Recommendation 17.2.3.f:** If the PIAP is unmanned, the PIAP provider should have a remote monitoring system that detects when a device or service is not working properly, and that enables necessary maintenance to be carried out. This is also recommended for manned PIAPs, as a complement to the local maintenance tasks.

**Recommendation 17.2.3.g:** A method for PIAP users to report problems at the PIAP should be provided.

## 17.3 Items to be maintained/monitored

There is a wide range of items that may be subject to maintenance, monitoring or surveillance. The following non-exhaustive list, tries to enumerate some of the most common ones:

- terminal software issues, including:
  - logon system;
  - billing system;
  - virus alerts;
  - hacking alerts;

- operating system updates management;
- filtering (e.g. for preventing children from accessing unsuitable web sites).
- terminal hardware problems;
- peripherals (e.g. mouse, keyboard, screen, adapted peripherals), specifically when they are connected or disconnected from the terminal;
- payment machine;
- printer;
- surveillance cameras;
- broadband connection throughput;
- software in the server - if there is a server in the PIAP (e.g. authentication server, billing server, database);
- workspace furniture (e.g. desk, chair);
- building (e.g. floor, walls, doors, door handles, toilets);
- access to the building (e.g. remove snow and ice).

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## 18 The benefits of PIAP terminal enhancements

It has been assumed that the most basic PIAP terminal will just be a basic computer, screen, keyboard and pointing device. It will only run software that allows the user to perform basic registration and payment tasks and browse the Internet using a simple Internet browser. This most basic PIAP will have no audio input or output, no camera and will not allow the connection of any external devices.

Any features that are added to a PIAP that extends it beyond this most basic minimum:

- will bring benefits to users by offering them enhanced capabilities that they value;
- will bring benefits to the PIAP provider by attracting a wider range of users by adding those who either want or need these extra facilities;
- may increase the cost of providing and maintaining a PIAP terminal;
- may add associated risks and problems for the PIAP provider.

The benefits and disadvantages of various aspects of a PIAP are discussed throughout the present document, but table 3, summarizes some of the more significant potential effects of adding enhancements to a base level PIAP.

**Table 3: The effects of adding enhancements to a base level PIAP**

<b>PIAP feature</b>	<b>Benefits to users</b>	<b>Types of user attracted</b>	<b>Potential disadvantages</b>
USB sockets provided for use by PIAP users	Enables users to: bring their own data; store data obtained during their PIAP session; run specialized software; connect audio headsets; connect special peripherals such as assistive devices deal with their photos taken by digital cameras (e.g. put them on an online album or send photos to friends).	This should attract : business users who carry their own data or specialized programmes with them; people wanting to listen to online audio material; people with disabilities who use assistive devices; people who are travelling and needs to "empty" their memory of their cameras, or just send their own "post cards".	It is much easier for a PIAP user to introduce malware into the PIAP workstation (this effect can be nullified when the PIAP workstation software environment is rebuilt between each user).
Video replay software together with USB and audio output sockets	This allows users to play online video and audio material.	This should attract a wide spectrum of users, especially the younger segment of the marketplace.	No additional risk to the inclusion of USB sockets other than potential liability for the playing of illegal video content by users.
A DVD-ROM drive, together with video replay software, and USB + audio output sockets	This allows users to play their own audio or video content together with online video and audio material.	This should attract a wide spectrum of users, especially the younger segment of the marketplace.	This carries the additional danger that malware may be loaded from the DVD-ROM disc loaded into the DVD-ROM drive.
Internet telephony software together with USB and audio input and output sockets	This allows users to make voice calls from the PIAP if they are subscribers to the Internet telephony service provider (or are able to establish a temporary arrangement with that provider).	All people who are travelling and wish to speak to people at home at a competitive cost.	Extensive use of voice telephony in a PIAP may cause: a high noise level that will disturb other PIAP users; a high load on the Internet connection to the PIAP site which could impair the quality of the voice calls and other Internet activity.
A video camera and software that can provide a "Total Conversation" service	A "Total Conversation" service gives users a rich communication service that offers the freedom to communicate in any mode, such as voice, video, or text.	"Total Conversation" could be offered as a service that would be very attractive to all people, including people with a range of disabilities.	Multiple simultaneous total communication sessions would provide similar disadvantages to those listed above for Internet telephony. It is possible that the noise level could be less (due to the non-speech parts of the dialogue) but the load on the Internet could be higher.
Displaying continuous real-time information (e.g. information in railway stations on arrivals and departures)	A PIAP terminal could provide people near the terminal with full-screen information services when it is not being used and could provide PIAP terminal users with notification of significant events by means of an information area on the screen or by time-restricted popup information boxes.	People visiting the building in which the PIAP is located may be attracted to use the PIAP when they read information from the PIAP terminal displays.	The information display facility will disappear (or be limited to those actually using the terminals) when all the terminals are in use.

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## 19 Need for further guidance and standards

There are a few areas where it is not possible to recommend a fully adequate solution for users because of the lack of relevant standards or policies. Creating the required detailed standardized solutions is outside the scope of the present document, but these areas are recommended for possible further standardization work.

### 19.1 Keyboard issues

The natural choice when establishing a PIAP would be to use the standard national keyboard for the location where the PIAP is situated. The alternative in areas where the majority of visitors to the PIAP are expected to be visitors from other countries would be to use a keyboard that is widely used worldwide (e.g. US English keyboard).

Where a national keyboard is used, visitors from other countries will frequently encounter difficulties in being able to generate certain characters from the keyboard. This can frequently apply to many of the symbols commonly used in writing e-mail or web addresses (e.g. : / @ \_ -). They may either not find the desired characters marked on the keyboard or they may find the characters marked but be unable to identify the simultaneous key presses necessary to generate the character.

Where people use a more commonly used keyboard with which they have some familiarity, including their own national keyboard, they may be unfamiliar with how infrequently used characters can be generated. In a PIAP context, the generation of these characters is likely to be a more common occurrence because:

- some of the software applications used or local websites visited may request the user to input national characters that are unfamiliar to the PIAP user;
- the user may wish to, or in some cases be required to, correctly spell the name of a person whose name contains unfamiliar characters.

Currently, many people will experience great difficulties in understanding how to generate characters in languages that contain characters with a number of unfamiliar diacritics. Work is currently underway in CEN to investigate the best solutions to supporting the easy generation of a full range of characters including those with unfamiliar diacritics and some of the more common characters used in using e-mail and the Internet.

### 19.2 PIAP specific guidance and standards

The present document references standards and guidance material from a number of sources that are potentially relevant to PIAPs, but which have either a very general focus or a focus on a related topic such as guidelines for ATM machines or public payphones. Although such documents are referred to throughout the present document, clauses 9.5 and 16.6 identify a number of such documents.

There would appear to be a significant benefit in the bodies that have produced such standards and guides to consider updating these documents to cover PIAPs or, to produce PIAP specific variants of the original documents. The present document would form a very significant input for bodies who wish to update or supplement their existing standards and guides to focus on PIAPs.

The ITU-T have already stated a clear aim that they wish to take the present document and look at how it could be put into a context which also addresses the needs of less developed nations (which were outside the scope of the present work).

## Annex A (normative): Collective table of recommendations

### A.1 PIAP premises

#### A.1.1 Names and symbols

##### Names and symbols

**Recommendation 9.2.2.a:** The name or symbol of the PIAP should indicate the functions provided by the PIAP. A combination of simple words and symbols identifying the functions may be useful.

**Recommendation 9.2.2.b:** The name or symbol of the PIAP should have words and symbols that can be internationally understood.

**Recommendation 9.2.2.c:** Use familiar terms related to the Internet as part of the PIAP name e.g. "Web", "www", "@" symbol, "Internet", "Internet Café", "Cyber", "Cyber Café", "net", "Internet Spot", "Wi-Fi Spot".

**Recommendation 9.2.2.d:** The term PIAP is not commonly recognized by the public and should not be used as part of the name.

#### A.1.2 PIAP accessibility

##### A.1.2.1 Location related accessibility issues

###### General location related accessibility issues

**Recommendation 9.3.2.a:** There should be various means to get information on where to find a PIAP which is adapted to people with disabilities, e.g. web pages that provide search criteria on adaptation for people with disabilities, or an option to phone a disability organization or public service that could provide information on adapted PIAPs.

**Recommendation 9.3.2.b:** Electronic wayfinding and signage systems based on Bluetooth or Wi-Fi should be provided.

**Recommendation 9.3.2.c:** Public equipment should be placed in "accessible" places.

###### Location related issues associated with sight impairments

**Recommendation 9.3.2.d:** Directional signs should be placed so that they are easy to locate.

**Recommendation 9.3.2.e:** Directional signs should be printed in large letters.

**Recommendation 9.3.2.f:** Directional signs should also be provided in Braille.

**Recommendation 9.3.2.g:** Directional contrasted and standardized colours should be used.

**Recommendation 9.3.2.h:** Large, contrasting, LCD screens should be used for the display of location related information.

**Recommendation 9.3.2.i:** Wayfinding and signage should be shown in contrasted large displays.

**Recommendation 9.3.2.j:** Written information should also be provided in an audio recorded form.

###### Location related issues associated with hearing impairments

**Recommendation 9.3.2.k:** Signs for loop systems other forms of amplification or signage should be provided.

###### Location related issues associated with dyslexia and reduced language comprehension

**Recommendation 9.3.2.l:** Standardized icons or words should be used in signage.

###### Location related issues associated with cognitive impairment

**Recommendation 9.3.2.m:** Directional signs should be placed so that they are easy to spot.

**Recommendation 9.3.2.n:** Standardized icons, pictograms, or words should be used where relevant, combined with speech output.

## A.1.2.2 Accessibility of the building where the PIAP is located

### Accessibility of the building

**Recommendation 9.3.3.a:** Public transportation should be available to get to the PIAP. The path from the nearest transportation stop to the PIAP should be accessible [i.22].

**Recommendation 9.3.3.b:** A public parking area should be available near the PIAP. Some parking spaces should be reserved for people with disabilities with the appropriate space around them to be able to get out of the car in a comfortable way. The path from the nearest transportation stop or parking to the PIAP should be accessible.

**Recommendation 9.3.3.c:** There should not be level changes in the building (including the entrance). If there is any change in level greater than 13 mm, then a curb ramp, ramp, elevator, or platform lift shall be provided.

**Recommendation 9.3.3.d:** If a ramp is provided, the least possible slope should be used. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any run shall be 760 mm.

**Recommendation 9.3.3.e:** The use of automatic opening doors is recommended. Where this cannot be done, it shall be possible to push the door open from either direction.

**Recommendation 9.3.3.f:** Doorways shall have a minimum clear opening of 815 mm with the door open 90 degrees, measured between the face of the door and the opposite stop.

**Recommendation 9.3.3.g:** Doors that invade circulation space should be avoided. When sliding doors are not provided, they should have slow automatic closing systems so that they do not remain open.

**Recommendation 9.3.3.h:** When providing glass doors, these should have some indicator that allows the users to easily identify them. It is recommended that they have a 200 mm width band that extends along all the width of the door, at a height between 1 m and 1,5 m.

**Recommendation 9.3.3.i:** Door handles or latches should be placed at a height between 850 mm and 1,2 m, and their colour should have some contrast with the door's colour.

**Recommendation 9.3.3.j:** Detection systems used for automatic door opening should not leave dead spaces, and should be effective for users of different heights, such as children or wheelchair users. Opening time should be adjusted to the time needed to cross the door by a reduced mobility person.

**Recommendation 9.3.3.k:** Automatic doors will have a security mechanism that will avoid the risk of trapping or collision.

**Recommendation 9.3.3.l:** Ideally, the PIAP should be located on the ground floor of the building. Where this cannot be done, a lift should be provided. The lift should conform to general accessibility guidelines related to lifts.

**Recommendation 9.3.3.m:** When a lift is provided, the lift's doors should be automatic and sliding, with a minimum clear width of 900 mm. The approach area in front of lifts should be free of obstacles and will be 1,5 m by 1,5 m, so that it facilitates unassisted entry, operation, and exit from them for wheelchair users or people with walking aids.

**Recommendation 9.3.3.n:** The minimum clear width of doors, ramps and corridors for single wheelchair passage shall be 815 mm at a point and 915 mm continuously. For large corridors, the minimum width for two wheelchairs to pass is 1 525 mm.

**Recommendation 9.3.3.o:** It is recommended that there is some clear space before and after a door, of about 1,2 m.

**Recommendation 9.3.3.p:** The minimum clear floor or ground space required to accommodate a single, stationary wheelchair and occupant is 760 mm by 1 220 mm. This would affect in general in any situation where a wheelchair user has to use any object (space in front of a desk, space in front of an automatic payment machine, space in a lift).

**Recommendation 9.3.3.q:** For a wheelchair user, if the clear floor space only allows forward approach to an object, the maximum high forward reach allowed shall be 1 220 mm. The minimum low forward reach is 380 mm.

**Recommendation 9.3.3.r:** For a wheelchair user, if the clear floor space only allows parallel approach to an object, the maximum high side reach allowed shall be 1 370 mm and the low side reach shall be no less than 230 mm above the floor.

**Recommendation 9.3.3.s:** Walks, halls, corridors, passageways, aisles, or other circulation spaces shall have 2 030 mm minimum clear head room.

**Recommendation 9.3.3.t:** If vertical clearance of an area adjoining an accessible route is reduced to less than 2 030 mm in (nominal dimension), a barrier to warn blind or persons who have visual impairments shall be provided.

**Recommendation 9.3.3.u:** Ground and floor surfaces along accessible routes and in accessible rooms and spaces including floors, walks, ramps, stairs, and curb ramps, shall be stable, firm and slip-resistant.

**Recommendation 9.3.3.v:** Users should be warned of potential hazards (e.g. obstacles), both temporary and permanent, so that they can use the PIAP without injury due to unperceived hazards. Clear visible and audible signs should be provided for this purpose.

**Recommendation 9.3.3.w:** It is recommended that there is some contrast between doors, walls and floor colours, so that they are easily distinguishable.

### A.1.2.3 Accessibility of an individual workspace

**Wheelchair access** (Adapted from material in the CEN Workshop Agreement, CWA 14661 [i.10]):

**Goal 9.3.4.a:** Provide workstations that allow easy access.

**Recommendation 9.3.4.b:** Apply standardized dimensions for public booths ( [5] clause 3) to Internet kiosks.

**Recommendation 9.3.4.c:** Knee spaces at least 685 mm high, 760 mm wide, and 485 mm deep should be provided at the workstation.

**Recommendation 9.3.4.d:** The chair should be adjustable and have an adequate backrest.

**Recommendation 9.3.4.e:** It should be possible for the chair to be moved away from the front of the desk.

**Recommendation 9.3.4.f:** There should be additional space at the workstation for a second person (e.g. friend, child, assistant or care person).

**Recommendation 9.3.4.g:** It is desirable that there is enough space at the work station for placing objects the users bring with them (e.g. walking sticks, pram, shopping bags, and suitcases).

**Recommendation 9.3.4.h:** There should be a place at the work station to put walking sticks so that it will easy to take the walking stick when leaving (e.g. the stick could be hanging or standing as it might be difficult for a person with impairments to pick it up if it is laying on the floor).

### A.1.2.4 Signage inside the PIAP

#### Signage

**Recommendation 9.3.5.a:** Relevant information in the PIAP should be at least provided in a visual and audible form, although it is also recommended that it is provided in a tactile way.

**Recommendation 9.3.5.b:** Floor maps of the building should be located so that they are easily seen, positioned as close as possible to the entrance door.

**Recommendation 9.3.5.c:** The content or information shown in the signage should be concise, basic and uniform, and should avoid superfluous information.

**Recommendation 9.3.5.d:** Signs and their support should not be a danger to people with visual disabilities.

**Recommendation 9.3.5.e:** It is recommended that internal routes are displayed. This includes having direction signs at the beginning and the end of the route, and where there are changes of direction. If the route is very long, additional signs or maps (highlighting the current location) should be placed more frequently to reinforce the message. It is also recommended that directional signs are provided on the floor.

**Recommendation 9.3.5.f:** When visual signs are provided, symbol or character colours should have a high contrast with the background, and should have an appropriate size to be easily read from a reasonable distance.

**Recommendation 9.3.5.g:** When audible information is provided, it should be provided at a volume that is easy to hear, but not disturbing. The signal information should also be communicated through the use of inductive loops for people who have any severe hearing loss. When possible the information should be provided in alternative languages.

**Recommendation 9.3.5.h:** When tactile information is provided, it should be provided by means of rough textures (e.g. on the floor to signal some route), or by means of embossed Braille characters at certain points (e.g. for a handrail of a stair, ramp or lift, the information should be on the internal side of the handrail at its beginning).

## A.1.3 Public hotspots

### Public hotspots

**Recommendation 9.4.a:** The PIAP should provide information signs that show where a good wireless signal can be found.

**Recommendation 9.4.b:** Power sockets should be provided so that the users have a means to plug in their own mobile devices.

**Recommendation 9.4.c:** It is recommended that network sockets are provided so that users who have mobile devices without wireless access (e.g. old laptops) can connect to the Internet.

**Recommendation 9.4.d:** Power and network sockets should be provided at a suitable height so that they are easily accessible for all users, including those with disabilities.

**Recommendation 9.4.e:** It is recommended that the PIAP provide a solution so that blind people and those with vision impairments can find the power and network socket (e.g. an embossed sign on the desk just in front of the position of the power and network sockets on the wall).

**Recommendation 9.4.f:** If the wireless area is provided outdoors, appropriate socket protection against water and dirt should be provided for network and power sockets.

**Recommendation 9.4.g:** Power sockets should be protected from misuse by young children.

**Recommendation 9.4.h:** It is recommended that the PIAP provides socket adaptors for different plugs, so that they can be used with the most widely used power supply plugs.

**Recommendation 9.4.i:** Space for adaptors and for power supply should be provided. It is also recommended that the space on which a laptop can be placed should be suitable for laptops of different sizes, as well as that there is enough space to place wrist rests, so that users who bring them can use them.

## A.1.4 PIAP assistants

### PIAP assistants

**Goal 9.6.2.a:** Staff should treat people with disabilities naturally.

**Recommendation 9.6.2.b:** Staff should understand the overall functioning of the PIAP, including the terminals, wireless Internet, monitoring systems and accounting systems.

**Recommendation 9.6.2.c:** Staff should be able to assist users with payment, registration and logon.

**Recommendation 9.6.2.d:** Staff should match their style of interaction to the person to whom they are speaking. They should be patient and encouraging, in particular with those users with very limited computer skills and those with low self-esteem.

**Recommendation 9.6.2.e:** It is particularly important to have manned PIAPs in deprived areas.

**Recommendation 9.6.2.f:** In multicultural areas, it is very beneficial that the PIAP assistants are familiar with the cultures and languages of the potential users (using people from the same cultural background can be an advantage). An awareness of the range of social problems in the area will also be extremely beneficial.

**Recommendation 9.6.2.g:** The dress style of the PIAP assistants should not diverge significantly from what is considered normal in the area in which the PIAP will be located.

**Recommendation 9.6.2.h:** Staff will require specific training in order to learn appropriate ways to deal people with disabilities and to gain an understanding about the use of a customer's assistive devices.

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## A.2 Hardware and accessories

### A.2.1 Computer

#### Computer

**Recommendation 10.2.a:** The computer should be hidden in a case to leave space on the desk and to avoid deliberate damage or theft.

**Recommendation 10.2.b:** The computer should be electromagnetically shielded to not interfere with users with hearing aids.



## A.2.2 Screen

### Screen

**Recommendation 10.3.a:** The screen should be adjustable in height and viewing angle. It should be possible to adjust its position using only one hand, without movements that require a force of more than 22.2 N. These operations should not require turning the wrist or the use of a pinching motion.

**Recommendation 10.3.b:** The viewing angle of the screen should be enough so that at least two people can read the screen properly when sharing the same workstation.

**Recommendation 10.3.c:** A means of preventing unwelcome viewing of the screen by other people should be provided (i.e. "shoulder surfing"). This can be achieved either by providing a visual barrier between desks, by means of special disposition of terminals (e.g. zig-zag), or by means of a privacy filter to prevent other people from reading the screen.

**Recommendation 10.3.d:** The screen should be, at least, a 19" TFT display.

**Recommendation 10.3.e:** The screen should be adjustable in colour, brightness and contrast.

**Recommendation 10.3.f:** The On/Off button on the screen should be hidden or protected, to ensure that users will not be presented with a blank screen after the previous user switched the screen off.

**Recommendation 10.3.g:** The screen surface should be protected from finger prints (e.g. by a transparent cover).

**Recommendation 10.3.h:** The screen should be designed to avoid flickering between 2 Hz and 50 Hz.

## A.2.3 Keyboard

### Keyboard/Keypad

**Recommendation 10.4.a:** The choice of keyboard layout (e.g. QWERTY, AZERTY) should be made according to the recommendations of clause 14.2.

**Recommendation 10.4.b:** A keyboard with a numeric keypad section should be used where space permits.

**Recommendation 10.4.c:** The keyboard should not be fixed to the table.

**Recommendation 10.4.d:** If the keyboard is fixed, it is recommended that the mid-point of the alphanumeric part is in line with the mid-point of the screen (whether the keyboard has a numeric keypad or not).

**Recommendation 10.4.e:** It is recommended that light coloured keyboards with the letters in black are provided, as they are more easily readable by people with visual impairments.

**Recommendation 10.4.f:** Where dark keyboards with white letters are used, it is recommended that stickers (with white background and large, black, and bold letters) are stuck to the keys.

**Recommendation 10.4.g:** An alternative to the traditional keyboard is to have software on the terminal that displays a virtual keyboard on the screen. This may be more suitable for people with visual impairments, as the symbols can be as large as necessary, and also the contrast and colours can be optimized.

**Recommendation 10.4.h:** To assist people with hand tremor provide a keyboard with raised ridges between all the keys should be provided.

**Recommendation 10.4.i:** To assist people with hand tremor and those with visual impairments a keyboard with extra large keys should be provided.

**Recommendation 10.4.j:** To assist people with learning disabilities a keyboard with a range of different coloured keys on it should be provided.

**Recommendation 10.4.k:** There should be enough space in front of the screen to move away or unplug the keyboard, so that it is possible to add alternative input devices.

**Recommendation 10.4.l:** Free-standing wrist rests should only be supplied to those users who specifically request them.

**Recommendation 10.4.m:** The force needed to activate the keys of the keyboard should be 22.2 N maximum. It is also recommended that the keystroke should give a tactile and audible sensation to the user.

**Recommendation 10.4.n:** It should be possible to sense the keys in a tactile way. It also is recommended that they are not activated just by touching them, but that some pressure and/or movement is required.

**Recommendation 10.4.o:** Colour should not be the unique way to distinguish between keys e.g. for some functions it may be necessary to add tactile indications to differentiate between keys.

## A.2.4 Pointing device

### Pointing device

**Recommendation 10.5.a:** A mouse with a scrolling wheel is recommended as a pointing device.

**Recommendation 10.5.b:** The length of the cable of the mouse should be long enough to allow it to be moved to the left or right side of the keyboard (depending on if the user is left- or right-handed), but not so long that it can fall down on the floor.

**Recommendation 10.5.c:** An additional wrist rest for the mouse should be provided (on request) for ergonomic reasons.

**Recommendation 10.5.d:** The surface on which the mouse is intended to be used should be appropriate for the technology of the mouse.

**Recommendation 10.5.e:** For people with mobility impairments, the PIAP should have alternative pointing devices available (e.g. joystick or trackball), as the best option for people with disabilities depends on the specific individual users' needs. The trackball may also be provided as an alternative to a mouse for general purpose PIAPs.

## A.2.5 Connection of peripherals

### Connection of peripherals

**Recommendation 10.6.a:** PIAPs should provide the users with the option to connect their own devices. The insertion and extraction of the connectors should be possible using only one hand, without movements that require a force of more than 22,2 N. These actions should not require turning the wrist or the use of a pinching motion.

**Recommendation 10.6.b:** The terminal should provide at least one (preferably two or three) easily accessible USB ports.

**Recommendation 10.6.c:** The terminal should provide easily accessible audio input/output connectors.

**Recommendation 10.6.d:** Ideally, USB ports and audio connectors should be facing the user, and at the height of the keyboard or higher. It is also desirable that there is a clear and visible sign that indicates their presence and that there is a tactile indicator to assist blind users or users with visual impairments to locate them.

**Recommendation 10.6.e:** It would be beneficial if the terminal provide the option to connect Bluetooth or Infra Red devices to the user.

**Recommendation 10.6.f:** It is recommended that headphones, if possible with built-in volume control, are provided for those who wish to use them.

**Recommendation 10.6.g:** It would be beneficial if the PIAP provides the user the option to download/upload information from/to an external device.

**Recommendation 10.6.h:** It would be beneficial if the terminal provide loudspeakers that could be used by users who do not have headphones. These should be directed towards the user.

**Recommendation 10.6.i:** If the terminal delivers output by an audio transducer which is normally held up to the ear, there should be a means for effective wireless coupling to hearing aids.

## A.2.6 Printer

### Printer

**Recommendation 10.7.a:** If the PIAP is manned, the assistant should have the ability to carry out the maintenance of the printer.

**Recommendation 10.7.b:** If the PIAP is unmanned, maintenance activities on the provided printer should be carried out on a regular schedule. Additional regular checks should be made, and there should also be provided a rapid response maintenance helpline to the users.

**Recommendation 10.7.c:** To address the accessibility issues, and as long as the PIAP is manned, it would be beneficial that a Braille printer is provided.

**Recommendation 10.7.d:** If a printer is provided in an unmanned PIAP, it should be located in a clearly visible and accessible place, so that it is easy for all users, including those with disabilities, to locate it and collect the printed pages.

## A.2.7 Camera

### Camera

**Recommendation 10.8.a:** The camera should be placed as close as possible to the midpoint of the upper frame of the screen.

**Recommendation 10.8.b:** The angle of the lens of the camera should be adjustable, so that users can adjust the image in order that their head (or their head and hand position in the case of users wishing to use sign language) appears correctly positioned on the screen.

**Recommendation 10.8.c:** The quality of the video should be at least QCIF resolution, 10 fps to 14 fps frame rate and with a delay of less than 400 ms to support lip-reading and sign-language usage (CIF resolution, 20 fps and less than 100 ms give good quality).

## A.2.8 Buttons and switches

### Buttons and switches

**Recommendation 10.9.a:** Buttons and switches should be in a position where they are easy to locate and activate.

**Recommendation 10.9.b:** Users should be able to use a button or switch with only one hand, and its activation should not require a force of more than 22.2 N. These operations should not require turning the wrist or the use of a pinching motion.

**Recommendation 10.9.c:** Buttons should be concave, big enough, and their surface should have a non-slippery surface.

**Recommendation 10.9.d:** Buttons and switches should be easy to detect by touch alone, and they should not be activated just by touching them. It is also recommended that their state is distinguishable visually, by touch and by sound.

**Recommendation 10.9.e:** Colour should not be the only way to distinguish buttons and switches.

**Recommendation 10.9.f:** Those functionalities that can be activated or modified by means of buttons and switches should also be able to be activated or modified through software.

**Recommendation 10.9.g:** Button and switch labels should be easily readable.

## A.2.9 Audio

### Audio

**Recommendation 10.10.a:** The volume of any audio device should be controlled by a physical or software control (preferably both).

**Recommendation 10.10.b:** Where a synthesized voice output is provided, a means to listen to it in a private and non-disturbing way should be provided. When audio headsets are provided, these should not cause interference with hearing aids.

## A.2.10 Assistive devices

### Other assistive devices

**Recommendation 10.11.a:** It is desirable that PIAPs provide one Braille line (specifically designed for blind people to read the content of the screen).

**Recommendation 10.11.b:** It is desirable that PIAPs provide a scanner and OCR software with related software applications, which makes it possible to listen to the content of a printed text.

**Recommendation 10.11.c:** Individual PIAP workstations should be fitted with an inductive loop interface connected to the audio output of the PIAP terminal. This interface can be used by the users of hearing aids with a "T" position or by users of a loop listening headset.

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## A.3 Software

### A.3.1 General software recommendations

**General software recommendations**

**Recommendation 11.2.a:** Applications should follow common industry user interface conventions.

**Recommendation 11.2.b:** The software should be designed to minimize the number of steps that should be undertaken to activate any option or use any functionality.

**Recommendation 11.2.c:** The software should allow the users to choose the input/output devices they want to use. Hence, it should be possible to use the software effectively with any of the common input devices.

**Recommendation 11.2.d:** It is recommended that the operating system allows the possibility to install keyboard or mouse emulators by means of specialized devices (e.g. mouse control operated by eye movements).

**Recommendation 11.2.e:** The operating system should provide base accessibility features so that the software applications can use them. These should be easily activated or deactivated by the users. The system should inform the users of the accessibility features provided and the state of those features.

**Recommendation 11.2.f:** The software applications should use the accessibility features provided by the operating system when needed, and should not override the accessibility features of the operating system or other products unless this can be clearly seen to be of benefit to the user and explicitly accepted by the user.

**Recommendation 11.2.g:** Options to allow the user to undo any action should be provided. If an action cannot be undone, confirmation should be requested before undertaking it.

### A.3.2 Web browser

**Web browser recommendations**

**Recommendation 11.3.a:** The PIAP should use content filters to prevent access to unsuitable content when browsing the web. The scope of the content filters may be variable to suit the requirements of different categories of user (e.g. for adults or for young children).

**Recommendation 11.3.b:** The web browser should implement the W3C User Agent Accessibility Guidelines (UAAG) [2].

### A.3.3 Time related issues

#### A.3.3.1 Limited time for using the PIAP

**Session time**

**Recommendation 11.6.1.a:** The user should be given the option to be provided with information on how much session time is left.

**Recommendation 11.6.1.b:** When the time limit is approaching, the system should warn the users so that they can close all their applications before the session ends, or make necessary arrangements for prolonging the session by purchasing more session time.

## A.3.4 Software accessibility recommendations related to hardware devices

### A.3.4.1 Keyboard

#### Keyboard software

**Recommendation 11.7.1.a:** The users should be able to activate all the functions of the software using only the keyboard.

**Recommendation 11.7.1.b:** The operating system should allow the state of some function keys that are generally used to access different functionalities (e.g. Shift, Ctrl and Alt keys) to be blocked.

**Recommendation 11.7.1.c:** Alternatives to simultaneous keystrokes of several keys should be provided in the software.

**Recommendation 11.7.1.d:** The operating system should allow the user to configure the minimum time needed to hold down a key before it is accepted by the system.

**Recommendation 11.7.1.e:** The operating system should allow (minimum) the delay required to start the automatic repetition when a key is held down, to be adjusted to 2 seconds.

**Recommendation 11.7.1.f:** The operating system should allow the user to configure the time threshold to accept or reject consecutive keystrokes of the same key.

**Recommendation 11.7.1.g:** The software should provide key combinations that allow quick access to the main functions, and these combinations should be documented in a place that the user can easily access.

**Recommendation 11.7.1.h:** The operating system should provide a keyboard emulator that can be controlled by the pointing device (e.g. mouse).

### A.3.4.2 Pointing device

#### Pointing device software

**Recommendation 11.7. 2.a:** It should be possible to adjust the speed and acceleration of the pointer.

**Recommendation 11.7. 2.b:** It should be possible to emulate a multiple click by means of a single button keystroke.

**Recommendation 11.7. 2.c:** The buttons on the pointing device should conform to recommendations 11.7.1.c - f.

**Recommendation 11.7. 2.d:** The operating system should provide a pointing device emulator that can be controlled by the keyboard.

**Recommendation 11.7. 2.e:** Software applications should provide alternate methods to enter information normally entered by the pointing device.

## A.3.5 Software accessibility recommendations related to other aspects

### A.3.5.1 Screen appearance

#### Screen appearance

**Recommendation 11.8.1.a:** Colour should not be used as the unique source of information.

**Recommendation 11.8.1.b:** It should be possible to change the appearance of the text cursor and the mouse pointer.

**Recommendation 11.8.1.c:** Elements flickering in frequencies between 2 Hz and 50 Hz should be avoided.

**Recommendation 11.8.1.d:** The icons in the graphical interface should have an associate text label. It should be possible to only show the label. It should also be possible to adjust the size of the icons and other graphical objects, and also to move or group them.

**Recommendation 11.8.1.e:** The graphical interface should adapt, in terms of contrast, size and other attributes, to the configuration defined by the users in the operating system. Pre-defined colour combinations that are suitable to specific groups of people with visual impairments should be provided.

**Recommendation 11.8.1.f:** The labels of information entry fields or form data fields should be placed as close as possible to these fields.

**Recommendation 11.8.1.g:** It should be possible to activate a window by passing the pointer over it, instead of selecting it with the mouse button.

### A.3.5.2 Sounds and Multimedia

**Sounds and Multimedia**

**Recommendation 11.8.2.a:** Audio, video or picture contents should, where relevant, be offered in an alternative format (e.g. text description of pictures and sub-titling of video).

**Recommendation 11.8.2.b:** Users should be able to enable the generation of visual warnings when the system gives an audible warning.

**Recommendation 11.8.2.c:** The system should provide functions that allow any textual information to be sent to a synthetic voice output.

**Recommendation 11.8.2.d:** The user should be able to adjust the volume of sounds.

**Recommendation 11.8.2.e:** It should be possible to adjust the fundamental frequency of the audible warnings.

### A.3.5.3 Notification Messages (including warning messages)

**Notification messages (including warning messages)**

**Recommendation 11.8.3.a:** Notification messages should be short, simple and written in easy to understand language.

**Recommendation 11.8.3.b:** Notification messages should be easily identifiable: they should always have a common layout and be labelled in a standard way.

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## A.4 User registering and payment

### A.4.1 Payment

**Running out of money in a session**

**Recommendation 12.2.a:** When the users are having a session on a terminal, and the money they have available is running out, the billing system should warn them in a non-intrusive way, so that they are able to end their tasks and close all their applications before the session ends, or to load more money in their account or buy another ticket.

**Recommendation 12.2.b:** When the user's money runs out, the system should block the session but not close it completely. It should also give the users some time to load more money into their account or buy another ticket.

**Recommendation 12.2.c:** If the system has blocked the session because the money has run out, and user has loaded more money into their account or bought another ticket, the system should provide a mechanism to recognize this and allow the user to unblock the session - either by entering their username and password, or by entering the username and access code on the ticket.

## A.4.2 Payment machines

### Accessibility of registering/payment machines

**Goal 12.5.1.a:** Registering / payment machines should be accessible to all, including elderly, those with disabilities and people from other countries.

**Goal 12.4.1.b:** All users, including those with disabilities, should be able to identify the location of the registering/payment machine as soon as they enter the PIAP. Methods to assist any user, regardless of disability, to locate the registering/payment machine from the entrance should be provided. These methods should include making the machine visible from the entrance.

**Recommendation 12.5.1.c:** The height of registering / payment machines should be adapted so that it can be usable by wheelchair users.

**Recommendation 12.5.1.d:** The position of the coin and note slots and the return money box should be adapted in height so that they can be accessed by wheelchair users.

**Recommendation 12.5.1.e:** Registering/payment machines should accept a wide range of notes and coins and give change to the user. This is particularly important for PIAPs that expect visitors from outside the local currency zone,

**Recommendation 12.5.1.f:** Instructions should be brief and easy to understand so that it is easy for older people and people with cognitive impairments to register, and will give information about which currency is used and which coins and notes the machine accepts.

**Recommendation 12.5.1.g:** Instructions/interactions should be available in a selectable choice of languages.

**Recommendation 12.5.1.h:** Instructions should be adaptable in appearance (e.g. size and colour of font, background colour).

**Recommendation 12.5.1.i:** Instructions/interactions should be available in alternative modes (written text and spoken).

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## A.5 User identification and security

### A.5.1 Access control

#### A.5.1.1 Anonymity and identification

##### Secure authentication

**Goal 13.2.2.a:** The identification of the user should be reliable and secure. The system will implement the necessary security mechanisms so that it is not possible for a user to acquire the identity of another user.

##### Customized services

**Goal 13.2.2.b:** Based on the authenticated users and their preferences (e.g. stored in a user profile), the system should have the capability to provide different customizations to the users depending on the service they are using.

## A.5.1.2 Username / password identification

### Easy to read and to enter the username and password or access code

**Goal 13.2.3.2.a:** The username/password/access code on the ticket should be easy to read and enter into the PIAP system.

**Recommendation 13.2.3.2.b:** If the password/access code is longer than five characters, then it should be presented in chunks of three or four characters.

**Recommendation 13.2.3.2.c:** Whenever possible, the chunks should be of the same length.

**Recommendation 13.2.3.2.d:** Passwords or access codes that are issued by the PIAP should not contain any special national characters or characters with diacritics as these may be difficult for non-national users to find on the keyboard.

**Recommendation 13.2.3.2.e:** The system should provide sub-fields that match the chunks of characters in the password or access code on the card with the cursor automatically positioning itself to the beginning of the next sub-field when a sub-field is completed. Alternatively, the system could ignore any spaces entered in a single field by the user.

**Recommendation 13.2.3.2.f:** The size and contrast should be good enough for avoiding confusion between numbers and letters, and in addition, a parenthesis might be used for clarification such as "1 (number one)" or "I (upper-case letter I)".

**Recommendation 13.2.3.2.g:** Wordings such as username and password should be used when supplying the user with access codes. The codes should be entered in a logon window with input fields labelled in the same wording, and in alternative languages.

**Recommendation 13.2.3.2.h:** The text in the logon windows should be displayed in a large font size. Preferably, it should be possible to display the window enlarged.

### Restoring username / password

**Recommendation 13.2.3.i:** The system should have the capability to obtain the username and to restore the password given some personal data from the user (e.g. name and surname, identity number, name of pet, etc.).

**Recommendation 13.2.3.j:** The user should be given the option to receive the username and password in an email.

## A.5.1.3 Biometric identification

### Ways to improve the effectiveness of biometric techniques

**Recommendation 13.2.4.6:** The most frequently recommended way to use biometric authentication is in combination with a "regular" (simple) password or a token (two-factor authentication).

## A.5.2 Access to user's data

### A.5.2.1 Stored information about customers

#### Stored information about customers

**Recommendation 13.3.1.a:** PIAPs keeping information about their customers, such as a subset of their personal data related to payment and personalization, should be protected from access by the wrong people.

**Recommendation 13.3.1.b:** Users should be given the opportunity to get information about what data is stored by the PIAP.

**Recommendation 13.3.1.c:** Users should be given the opportunity to get information on the level of protection of their personal data stored by the PIAP.



## A.5.2.2 While using the terminal

### A.5.2.2.1 Prevented unauthorized access to typed, displayed or stored personal data

**Preventing unauthorized access to typed, displayed or stored personal data**

**Goal 13.3.2.2.a:** Other people should not be able to access any personal or private information related to a PIAP user.

**Recommendation 13.3.2.2.b:** Terminals should be placed in such a way that unauthorized people are prevented from coming close to the keyboard or screen e.g. by means of by means of a special disposition of terminals (e.g. zig-zag) or a visual barrier between them.

**Recommendation 13.3.2.2.c:** A filter, allowing only the person sitting in front of the screen or very close to it (e.g. friend, assistant) to see the content, may be attached over the screen.

**Recommendation 13.3.2.2.d:** Any information that a PIAP keeps about its customers, such as a subset of their personal data related to payment and personalization, should be protected from access by the unauthorized people.

### A.5.2.2.2 Key logger

**Key logger**

**Recommendation 13.3.2.3.a:** PIAP providers should not install key loggers.

**Recommendation 13.3.2.3.b:** If a PIAP provider installs a key logger, then the logged data should be protected from misuse.

**Recommendation 13.3.2.3.c:** If a PIAP provider installs a key logger, then the users should be informed that a key logger is running on the PC.

**Recommendation 13.3.2.3.d:** Users should not be able to install key loggers at the PIAP.

## A.5.2.3 Leaving the terminal

**Leaving the terminal**

**Recommendation 13.3.3.a:** It is important that users' personal data do not remain available (for the wrong people) in the network after the user has left.

**Recommendation 13.3.3.b:** If users leave the terminal without logging out, the system can log them out automatically (e.g. triggered after a certain time or by a sensor).

**Recommendation 13.3.3.c:** Before an automatic logout, the users should be informed that they may be logged out very soon, unless they cancel the operation.

**Recommendation 13.3.3.d:** At the end of a user session the complete software environment should be removed, and a new OS images should be restored from a central server.

**Recommendation 13.3.3.e:** Alternatively, if Recommendation 13.3.3.d is not implemented, all user data stored during the session should be automatically removed from the terminal immediately when the users have finished their sessions.

### A.5.3 Privacy management

#### Privacy levels (from clause 13 in [i.3])

**Goal 13.4.2.a:** Users should be offered default settings at a sufficient level of security that is appropriate to the data stored or transmitted.

**Goal 13.4.2.b:** There should be a common security level at which user identity needs to be verified. The authentication can be controlled in different ways such as one or more of a range of alternative authentication schemes, restrictions to passwords, and choice of authentication method.

**Recommendation 13.4.2.c:** There should be a mechanism to inform a user whenever any information in their profile above a selected privacy level is read by an external entity, along with identification of that entity.

**Recommendation 13.4.2.d:** When communicating with devices and services, the profile processing agent should respect user and legally required privacy requirements (see clause 13.5).

**Recommendation 13.4.2.e:** There should be a mechanism for the user to be informed about any changes of security level.

**Recommendation 13.4.2.f:** All elements of any profile need to have selectable levels of information sharing to specific single entities or to a well known sharing group, such as Friends, Family, Business Associates, Buddy Lists.

**Recommendation 13.4.2.g:** Security levels should have common definitions between entities, so that users can share a common expectation.

**Recommendation 13.4.2.h:** A new user's default start-up security profile should be preconfigured with default security levels. The user may redefine the security levels at any time.

**Recommendation 13.4.2.i:** The users should be able to easily understand, chose and apply their desired security policies.

**Recommendation 13.4.2.j:** The profile provider should apply the appropriate level of security to the transfer of the data.

**Recommendation 13.4.2.k:** Access to profile data should be limited to the subset of data required to perform the given service or function.

**Recommendation 13.4.2.l:** There should be a mechanism for informing the user about any identified security breaches.

### A.5.4 Privacy policies

#### Privacy policies (from clause 13 in [i.3])

**Guideline 13.5.a:** Mechanisms that respect user's personal preferences with respect to the privacy of their personal information should be used. At this time, mechanisms that are based upon the W3C's P3P recommendation [3] should be used for web based services.

**Guideline 13.5.b:** Users should be provided with feedback on whether their privacy preferences are being respected. Users should be given positive indications that their privacy preferences are being met. Where their privacy preferences cannot be met, users should be informed and offered an option that ensures that their privacy preferences will not be violated.

**Guideline 13.5.c:** Users should be provided a mechanism to request details of any information stored about or relating to them.

### A.5.5 Privacy regulations

#### Privacy regulations

**Goal 13.6.a:** PIAP operators need to comply with lawful interception and other regulator requirements may imply that PIAP users' data is retained for a defined period and delivered to authorities, despite the privacy settings.

## A.5.6 Specific security issues for public hotspots

### Security in public hotspots

**Goal 13.7.a:** PIAP providers should provide information about the level of security of the network and give recommendations to users.

**Recommendation 13.7.b:** PIAP providers should restrict which computers can access their wireless network.

**Recommendation 13.7.c:** PIAP providers should consider deploying a WPA protected connection to their service for use by existing customers. This should be provided in accordance with the guidance given in [4].

**Recommendation 13.7.d:** There should be a sign that warns users about the security risks related to public hotspots. This should cover at least the topics covered in Recommendations 13.7.d to 13.7.g.

**Recommendation 13.7.e:** Users should be warned that the communication is unprotected, and that using a secure connection (e.g. https) when dealing with sensitive information is recommended.

**Recommendation 13.7.f:** Users should be made aware of the possibility that there are false access points, and that therefore they should ensure that they connect to the wireless network provided by the PIAP provider.

**Recommendation 13.7.g:** They should be asked to check that the wireless network control software in their portable device should be set to an "Access Point only" mode (to avoid the danger that they may accidentally connect to a potentially malicious computer using the "Ad-hoc" connection mode).

**Recommendation 13.7.h:** Users should be warned that, when using the public hotspot, they should have an up-to-date firewall, antivirus software and strong passwords.

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## A.6 Language and cultural issues

### A.6.1 General issues

#### Languages used in PIAP workstations and payment machines

**Recommendation 14.1.a:** The PIAP should provide the local language(s) and at least one international language (e.g. English)

**Recommendation 14.1.b:** It should be easy to change the language.

**Recommendation 14.1.c:** It should be easy to reset the language.

**Recommendation 14.1.d:** The applications should not make assumptions about user's language.

### A.6.2 PIAP keyboard layouts

#### PIAP keyboards

**Recommendation 14.2.a:** The keyboard used in a PIAP should be chosen according to the primary intended usage of the PIAP e.g. a local keyboard for a PIAP designed primarily for local users or an internationally well accepted keyboard (e.g. UK or US) for PIAPs intended almost exclusively for international travellers.

**Recommendation 14.2.b:** On screen or paper instructional material should be provided to help users from countries that do not use the provided keyboard to access both the multiple characters shown on the keyboard keys and also those characters (usually with diacritics) that are used by people from that country when writing personal names and common words.

### A.6.3 Inferred language and cultural preferences

#### Language preferences inferred from information about a user

**Recommendation 14.4:** PIAPs should make use of user preferences, when available, to configure the PIAP behaviour and not make assumptions about the user's language and cultural preferences based upon other sources of information.

## A.6.4 Independence of language and cultural preferences

**Independence of language and cultural preferences from the location of a user or information source**

**Recommendation 14.5:** Users may wish to define their language and cultural preferences to be different from their content preferences related to a certain country or region.

## A.6.5 Language and cultural capabilities of terminals and services

**Language and cultural capabilities of the PIAP or its applications**

**Recommendation 14.6:** The language and cultural capabilities of the PIAP or its applications should be available in both human and machine readable form (e.g. to enable automatic matching with user preferences in their user profile).

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## A.7 User preferences

### A.7.1 Cookies

**Cookies**

**Recommendation 15.3.2.a:** Where the storing of cookies is allowed at a PIAP, the PIAP users should be advised that it is generally recommended that cookies are only enabled for trusted websites.

NOTE: PIAP operators who do not clear all system changes between user sessions may decide to prevent the download of cookies in order to protect themselves from liability for the compromise of user's personal information.

## A.7.2 User profiles

### A.7.2.1 User profile support for user requirements

User requirements	Support provided by user profiles
<p><b>Requirement 1: Ability to specify and change preferences.</b> Users require the ability to specify and change their previously defined preferences, and to subsequently change them.</p>	<p>A profile tool is defined in [i.3], clause 10.4, is the entity that enables the user to create and edit user profiles.</p>
<p><b>Requirement 2: Avoiding repetition of preferences.</b> The user should not have to continually specify their preferences each time a PIAP session is initiated.</p>	<p>Many preferences are useful for several devices or services and should, therefore, be centrally available. Ideally, preferences should always be available, over all networks, from all supported devices and services, including fixed and mobile services allowing service continuity and the optimal user experience. A profile storage agent is defined in [i.3], clause 4.6.2, as the entity that stores the users' language and cultural preferences and the locations of data repositories of profile data related to users.</p>
<p><b>Requirement 3: Consistent application of preference changes across devices and services.</b> Users require that if they change a language or cultural preference on any device or on any service, then those changes will be automatically applied to all other devices and services that they use.</p>	<p>This may be achieved by synchronization of data and transaction security. This capability is provided by the storage agent described in [i.3] clause 10.10.</p>
<p><b>Requirement 4: Matching preferences and capabilities such as the PIAP hardware and software, communication link and various services.</b> Where the user's preferred value of a setting and the default setting of the PIAP (e.g. hardware and software and various services) are different, users require a solution that suits the requirements and capabilities of both.</p>	<p>Users may have defined their preferences, but it may not always be possible for an exact match to their preference to be achieved. To resolve such situations, negotiation can take place in order to try and achieve a good, if not perfect, match (see [i.3], clause 7.5). Where the relevant capability is supported, negotiation will take place between:</p> <ul style="list-style-type: none"> <li>• user's preferences - terminal capabilities;</li> <li>• user's preferences - service capabilities;</li> <li>• terminal - service capabilities;</li> <li>• preferences of two or more communicating users;</li> <li>• terminal capabilities of two or more communicating parties;</li> <li>• service capabilities of two or more communicating parties.</li> </ul> <p>In some cases, a capability may be technically supported, but the policy of the PIAP may limit the capabilities such as when employing filtering of web pages for children below a certain age.</p>
<p><b>Requirement 5: Privacy.</b> Users require that their preferences and capabilities should be stored in a secure manner with user agreed levels of privacy applied to the availability and distribution of that data.</p>	<p>The profile storage agent stores the preferences in a secure manner with user agreed levels of privacy applied to the availability and distribution of that data, see [i.3], clause 4.6.2.</p>

## A.7.2.2 User profile support for system requirements

System requirements	Support provided by user profiles
<p><b>Requirement 1: Access to and interpretation of preferences.</b> Any service/device should be able to access and interpret the user's preferences.</p>	<p>The preferences need to be centrally stored and accessible. They also need to be expressed in a standardized form (see clause 19 on "Need for further standardization work and policies" in the present document and [i.3] clause 4.8).</p>
<p><b>Requirement 2: Combining multimodality with language and cultural preferences (see clause 14).</b> Some users such as those with disabilities might want to define their preferences as a combination of modality and language and cultural preferences. An example is people with a visual impairment who would typically prefer audible information that matches their language and cultural preferences. Modality and language personal preferences can be very valuable for communication between people with a disability and other people. An example is a person with a severe hearing loss who uses an automated system which recognizes his sign language and converts it to speech in a choice of languages.</p>	<p>The user profile concept can deal with combinations of modality and language and cultural preferences, see [i.3], scenario in clause 8.8. That scenario also explains how the combination of the profile concept and the Universal Communications Identifier (UCI) concept (see clause 4.7.1) may further enhance usability.</p>

## A.8 Guidance

### A.8.1 Guidance from PIAP assistants

#### Guidance from PIAP assistants

**Recommendation 16.2.a:** Wherever possible, PIAP assistants should be provided to assist users to make full use of the PIAP.

**Recommendation 16.2.b:** PIAP assistants should not be relied upon as the sole means of providing guidance to PIAP users.

### A.8.2 Guidance from printed documentation

#### Guidance from printed documentation

**Recommendation 16.3.a:** Printed documentation may be provided in the form of notices on the walls or notice boards of a PIAP, instructions sited on or immediately adjacent to a piece of equipment, free-standing notices or booklets provided near to the point at which they will be needed.

**Recommendation 16.3.b:** Printed documentation should be protected from accidental or deliberate damage, or frequently replaced.

**Recommendation 16.3.c:** Printed documentation should be updated when the information contained in it is not valid anymore.

### A.8.3 Choice of methods to present guidance

#### Choice of methods to present guidance

**Recommendation 16.5.a:** Provide printed guidance for information required by the user prior to starting or paying for a PIAP session.

**Recommendation 16.5.b:** Provide both printed and on-screen information to guide the user about logon, logoff, language change and registration procedures.

**Recommendation 16.5.c:** Provide on-screen presentation for help files about the PIAP operating system and applications.

**Recommendation 16.5.d:** Provide a simple large print printed instruction that directs people to seek the help of a PIAP assistant to help them optimize the PIAP configuration to suit their disabilities.

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## A.9 Maintenance

**PIAP maintenance**

**Goal 17.2.3.a:** PIAPs should have an adequate level of maintenance that ensures that all the provided devices are kept in good condition and all the offered services are available to users.

**Recommendation 17.2.3.b:** If the PIAP is manned, the staff in the PIAP should do at least the basic maintenance tasks (e.g. changing the printer paper, helping users to make use of the PIAP) and surveillance tasks. It is also desirable that the skills of the staff allow them to do more complex maintenance tasks related to issues in the terminals, peripherals, and in other electronic equipment, as well as deal with the software related issues.

**Recommendation 17.2.3.c:** Maintaining the cleanliness of the PIAP is an important maintenance task. Regular cleaning of the items which PIAP users touch, such as the keyboard and mouse, is particularly important to ensure an adequate level of hygiene.

**Recommendation 17.2.3.d:** Either when the staff's skills do not allow them to do complex maintenance tasks, or when staff are not able to solve some issue, the PIAP provider should provide a procedure so that staff are able to report these issues so that they can be solved by a third party.

**Recommendation 17.2.3.e:** If the PIAP is unmanned, the PIAP provider should have someone (either a person employed directly by the PIAP provider, or a third party maintenance company) who visits the PIAP periodically to do basic maintenance tasks when needed, or report when a more complex issue arises.

**Recommendation 17.2.3.f:** If the PIAP is unmanned, the PIAP provider should have a remote monitoring system that detects when a device or service is not working properly, and that enables necessary maintenance to be carried out. This is also recommended for manned PIAPs, as a complement to the local maintenance tasks.

**Recommendation 17.2.3.g:** A method for PIAP users to report problems at the PIAP should be provided.

## Annex B (informative): Recommendations classified by specific user needs

Complying with any recommendation in the present document is likely to be of benefit to all PIAP users. Also, no recommendation in the present document is likely to offer benefits that are exclusively limited to a single category of user. However, the following tables identify recommendations that are especially important to users with specific needs.

Impairment	Recommendations
Hearing impairments	9.3.2.a, 9.3.2.k, 9.3.5.a, 9.3.5.g, 9.4.d, 9.6.2.a, 9.6.2.h, 10.2.b, 10.4.m, 10.6.e, 10.6.f, 10.6.i, 10.8.a to 10.8.c, 10.10.a, 10.11.c, 11.2.e to 11.2.f, 11.3.b, 11.8.2.a, 11.8.2.d, 11.8.2.e, 12.5.1.a, 12.5.1.i, 13.2.2.b
Visual impairments	9.3.2.a to 9.3.2.j, 9.3.3.t, 9.3.3.v, 9.3.3.w, 9.3.5.a, 9.3.5.d, 9.3.5.f, 9.3.5.h, 9.4.d, 9.4.e, 9.6.2.a, 9.6.2.h, 10.3.d, 10.3.e, 10.4.g, 10.4.m to 10.4.o, 10.5.e, 10.6.d, 10.6.e, 10.7.d, 10.9.a, 10.9.d, 10.9.e, 10.9.g, 10.10.b, 10.11.a, 10.11.b, 11.2.d to 11.2.f, 11.3.b, 11.8.1.d, 11.8.1.e, 11.8.2.a, 11.8.2.c, 12.5.1.a, 12.5.1.b, 12.5.1.i, 13.2.2.b, 13.2.3.2.a, 13.2.3.2.f, 13.2.3.2.h, 16.5.d
Speech impairments	9.3.2.a, 9.4.d, 9.6.2.a, 9.6.2.h, 10.6.e, 10.7.d, 11.2.c to 11.2.f, 11.3.b, 12.5.1.a
Mobility impairments	9.3.3.a to 9.3.3.f, 9.3.3.g to 9.3.3.s, 9.3.3.u, 9.3.4.a to 9.3.4.h, 9.4.d, 9.6.2.a, 9.6.2.h, 10.5.e, 10.6.e, 10.7.d, 10.9.b, 10.9.f, 11.2.c to 11.2.f, 11.3.b, 11.7.1.c to 11.7.1.f, 11.7.2.b, 11.7.2.d, 11.8.1.g, 12.5.1.a to 12.5.1.d, 13.2.2.b
Learning difficulties	9.2.2.a to 9.2.2.d, 9.3.2.a, 9.3.2.l to 9.3.2.n, 9.3.5.a, 9.3.5.c, 9.4.d, 9.6.2.a, 9.6.2.d, 9.6.2.h, 10.4.j, 10.6.e, 10.7.d, 11.2.b, 11.2.c, 11.2.d to 11.2.f, 11.3.b, 11.8.1.e, 11.8.2.a, 12.5.1.a, 12.5.1.b, 12.5.1.e, 12.5.1.f, 12.5.1.i, 13.2.2.b, 13.2.3.2.a to 13.2.3.2.e, 13.2.3.2.g, 13.7.d, 13.7.f, 16.5.d
Low or no literacy (including users who are not familiar with the local language of the region where the PIAP is located)	9.2.2.a to 9.2.2.d, 9.3.2.a, 9.3.2.l, 9.3.2.n, 9.3.5.a, 9.4.d, 9.6.2.a, 9.6.2.f, 9.6.2.h, 10.6.e, 11.2.c, 11.2.d to 11.2.f, 11.3.b, 11.8.2.a, 11.8.3.a, 11.8.3.b, 12.5.1.a, 12.5.1.b, 12.5.1.e to 12.5.1.g, 12.5.1.i, 13.2.2.b, 13.2.3.2.a to 13.2.3.2.e, 13.2.3.2.g, 14.1.a to 14.1.d, 14.2.a, 14.2.b, 14.4, 14.5, 14.6
Epilepsy	10.3.h, 11.2.f, 11.3.b, 11.8.1.c, 12.5.1.a, 13.2.2.b
Hand tremor	10.4.h, 10.4.j, 10.6.e, 10.9.a to 10.9.c, 11.2.c, 11.2.d to 11.2.f, 11.3.b, 11.7.1.c to 11.7.1.f, 11.8.1.g, 12.5.1.a, 13.2.2.b



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## History

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