

# CLASSIFICATION OF PUBLIC ADMINISTRATION INFORMATION SYSTEMS FROM USABILITY POINT OF VIEW

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**Abstract:** *This paper presents results of the classification of information systems of public administration. As a criterion of this classification the usability point of view was selected. Firstly, different types of information systems of public administration are discussed, further the problematic of usability engineering is outlined and then suitable methods of usability engineering are assigned to various types of information systems of public administration. This article can serve as a clue to usability engineering specialists.*

**Keywords:** *information system, public administration, usability, usability engineering, software engineering.*

## 1. Introduction

Usability engineering as a part of usability engineering has become extraordinary important in today's information age. The importance of usability evaluation of user interface increased rapidly during the last 10 years. In contrast to the past, users are no longer forced to use a particular product that does not fully satisfy their needs or meet requirements, just because another does not exist. A lot of usability specialists occur in this time. These specialists do usability evaluation particularly common commercial software. The authors of this paper are convinced the usability of information systems of public administration is important as well. But it is necessary to know differences of different kinds of public administration information systems.

## 2. Public administration information systems

Information system is possible to define as the functional unit which ensures purposeful and systematic collection, processing, storage and disclosure of information that each information system includes information base, hardware and software resources, technology, procedures and staff. Operating information systems means the implementation of activities aimed at gathering (collecting) information, the input processing, storing information in the data base, information processing system for internal purposes or for the provision of information services, which includes the operation of all or some of these activities. All the times information system must be considered as complex system for its purpose. [11]

Information systems of public administration (ISPA) are the part of information systems that are used for the exercise of public administration. These are also the information systems activities under special laws. An example would be to designate the Law No 89/1995 Coll., The State Statistical Service, as amended by Act No. 356/1999 Coll., Act No. 455/1991 Coll., The Trades, as amended, Act No. 48/1997 Coll., The public health insurance, as amended, Act No. 513/1991 Coll., The Commercial Code, as amended, and Act No. 337/1992 Coll., on the administration of taxes and charges, as future. [3]

Critical success factors of public information system can be described as following. [8]

- Project mission - Clear statement of goals and objectives
- Top management support - Necessary resources and authority present
- Client consultation - Communication, consultation and active listening to all stakeholders

- Schedule/plan - Detailed specification of actions required for project implementation
- Personnel - Recruitment, selection and training of necessary team personnel
- Technical tasks - Availability of required technology and expertise
- Client acceptance - The act of selling final projects to their ultimate intended users
- Monitoring and feedback - Timely provision of an appropriate network and necessary data to all key actors
- Communication - Appropriate network and necessary data to all key stakeholders in project implementation
- Trouble-shooting - Ability to handle unexpected crises and deviations from plan

### 3. Usability of information systems

The quality of information systems can be seen from many points of view. One of the many definitions of quality based on ISO / IEC 9126 is as follows. Under quality is understood the sum of the characteristics of the entity, which is related to the ability to meet specified and implied needs. Usability is clearly one of the basic indicators for assessing the quality of software applications of AI. Sometimes people also use the term quality in use, previously was used the term user-friendliness and user-friendly program. [3] [6]

Usability deals with how the software easy and intuitive to users is, as if it is clear and understandable. [9]

Software is considered as usable in case that [1]:

- user can quickly understand and use the software, which first comes into contact;
- user can easily and quickly achieve its objectives;
- user configuration and control software and remember to quickly equip,
- when it returns after a certain period;
- user makes a minimum of serious errors and each error is immediately recovering.

The usability presents a complex view of information system, as reflects the:

- the existence of different profiled end-users;
- varying skill levels of end-users;
- various of end users;
- varying complexity of tasks;
- different ways of measuring success;
- different interpretation problems;
- various equipment that end users need;
- different environment in which end-users work;
- different environment in which end users work.

Empirical data on the test usability, which relate to its application, are obtained using different methods to assess the usability. When assessing the usability is always needed to determine the reason for its rating, because the application involves three complementary views:

- view on the product - is the usability of the product's characteristics, contributing to its quality;
- view on the context of the application - the application depends on the context of use, and thus to the nature of the user, system, task and environment;

- view on the quality of use - the application is the result of interaction and can be measured through the performance, efficiency and user satisfaction in the performance of the tasks in a particular environment

Usability tests are used to determine the applicability of the quality of the user interface. They represent one of the methods of data collection. It's an effective method with a wide range of uses. Usability tests are an integral part of the design created specifically for the user (user centred design), it should include a series of tests designed primarily to evaluate the performance and user preferences. [10]

The usability should be tested primarily for reasons of obtaining information about the real product. The test can be also used to compare products with competitors. Usability tests can be used in the management of change, in ways how to find a common language developer, marketing and other product groups. Last but not least, reduces development costs and servicing the product. [3]

Each usability evaluation method should be realized according to the [7]:

- cheaply;
- quickly;
- with useful results.

In the typical usability tests [4]:

- are identified problems with the usability of the product;
- are collected data about users of product;
- is determined user satisfaction with the product.

It is possible test usability at any time. Prototypes can be already tested at the beginning of the development cycle. Before placing on the market tests of information systems serves to check whether the product is sufficiently prepared for the target user. Following the marketing of the product tests are used when entering the next version of the product on the market. Test should be repeated every remedy the deficiencies tested product. [9]

Full process of usability testing can be described as on following picture. In accordance to the purpose of information system are parts of this process able to be let out. All the times must be taken into account rate between cost of testing and benefits for user.

#### **4. Classification of public administration information systems**

Quantity of information systems and its use is now so extensive that it is almost inexhaustible number of possible division into groups and the classification of these systems. Three important of these are closer described in the division below [2], [3], [6].

One possible breakdown of information systems is broken down by way of interpretation of information within the information system.

In this case, offers three integrated groups:

- Information systems organizations; these systems work with the information as an economic resource, and thus introducing into the economic background information as one of the four cornerstones of the company.
- Public information systems; this is a second group of information systems; information is considered goods which is normally traded like any other commodity.
- Information systems of public administration; it forms a kind of offshoot of public information systems and have its own characteristics, which are derived mainly from the nature of ownership.

Another possible breakdown of information systems is broken down to the management systems:

- Transaction Systems – these systems are dealing with operational management, automation of typical tasks and operations. These systems are currently among the most widespread and most common
- Management information system - tactical management systems that make reports, cumulative reports and facilitate the work of managers, especially in monitoring the performance of individual departments and staff organizations.
- Executive information systems; these systems are already covered by the support of strategic management. Integrate all information systems in the organization and provide particularly important information to senior management. The application is primarily to decide on the future of the organization. The distinctive characteristics of these systems are simple to use and especially high explanatory power.
- Decision support systems - another group of systems supporting the tactical management. These systems constitute specific add-on management information systems. Used in the analysis required to support decision-making managers. Usually the results are presented in graphical form.

Systems can also break down under the action. In this case it is possible to identify individual systems for processing applications, processing data in real time and batch data processing.

This division can be also included in the resolution on the division of data processing in centralized databases and distributed databases, data [3].

Like all other systems, systems of public administration are formed for the user. These users are all citizens and employees of public administration. It is therefore important that these systems are subject to usability testing. Only through these tests is to ensure high-quality service provided by these systems. In the light of the research and testing may be in relation to the application for further breakdown of public information systems.

Information systems of public administration can be classified according to the territorial scope:

- Local information systems - the systems bounded by spatial scale, i.e. systems that focus on the territorial scope of pre-defined area. Local systems must take into account local traditions. Testing should be in such a case to take this into account, for example, a general heuristics in this case, edit. The local systems can be recommended especially tests taken as a moderate expensive.
- Global information systems - these systems aim to provide surveillance information such as the wide level. These information systems should no longer be aimed at testing on the edge of precious and precious medium tests, because the coverage is also more diverse users and thus the need for implementation of diverse views on the matter.

Another option is the division of information systems according to the level and type of decision-making. In this part we can split into three groups:

- Information systems for strategic management
- Information systems for operational management
- Information systems for tactical management

This split can be also taken in real live examples:

- Information systems management at the central level (ministries)

- Regional information systems
- Information systems of towns and municipalities

It can be reference to the previous division in such cases. Systems at municipality level mainly as local system. Regional information systems and information systems at the central level operates mainly as a global information systems.

From the perspective of client information systems can be divided into two groups: thin client and thick client.

- Thin client is the designation of such applications, which are the client-side application logic, performs a minimum, and most are performed on the server side. The advantage thin client is saving in testing access media. In this case, we can concentrate only on its own using.
- Thick client puts more hardware and software requirements on the client, contrary to the thin side and server communication. Thick client is usually lower than the volume of data transferred thin client. Distribution of client applications to thin and thick client is not strict; a number of applications are on the border between these groups. In the case of this client, it is necessary to focus on the client as such a test and its application. Minimum test client are heuristic testing and A / B analysis.

Information systems according to the type of user is possible to divide:

- Current user - using information systems through a home computer or laptop. Special case can also be terminal access via terminals, such as the Czech point.
- Mobile users - to access using mobile devices. In such cases, given the large number of different types of mobile devices need a general rule of usability.
- Information systems can be classically divided into groups such as beginner, advanced, expert in using IS. In such a case can proceed in the opposite proportionality. In the case of experts is sufficient to test the systems, some of the cheap ways of testing. It has been suggested that the target group of users will approach IS people who are not accustomed to work with IS, the more expensive testing should be selected. Of course can not be stated that the more expensive test is also better, but more detailed.

Last but not least it needs to be mentioned that all types of information systems should be tested minimally by tests stated as cheap group. These tests will support usability of application and should be taken as a standard part of development.

Overall knowledge resulting from experience with testing the usability of the recommendations can be summarized as how to test a specific group of projects. This recommendation provides the following Tab. 1.

**Tab. 1: Recommended methods of testing the usability (Source: own)**

	Local information system	Global information systems	Information systems for strategic management	Information systems for operational management	Information systems for tactical management	Thin client	Thick client	Beginners	Advanced	Expert	Public information systems	Information systems of public administration
Pluralistic walkthrough		X	X		X			X		X	X	X
Eye-tracking		X						X			X	
Coaching Method			X	X			X		X	X		
Question-asking Protocol	X					X						
Thinking aloud protocol	X	X	X	X	X	X	X	X	X		X	X
Logging Actual Use								X				X
Cognitive walkthrough	X				X	X					X	
User testing		X		X	X		X			X		X
Card sorting	X	X						X				X
Contextual Interview			X									
Field observation												
Heuristic estimation						X		X	X	X	X	
Performance Measurement			X	X			X			X		
Questionnaires					X			X				
Surveys		X										
Consistency inspection												
Standards inspection	X	X	X	X			X	X	X		X	X
Feature inspection lists												
Formal usability inspection						X						
Heuristic evaluation	X	X	X	X	X	X	X	X	X	X	X	X
Split – run testing- A / B testing					X	X			X	X		

## 5. Conclusions

Public administration information systems differ from common commercial software in different ways. Firstly, the goal of public administration branch is not profit but public services. Next, the audience of these information systems is more widely – from unemployment workman to advanced computer users.

When conducting usability engineering methods, it is necessary to think the kind of public administration information system. Some methods that are suitable for usability evaluation of some information system need not be suitable for the different one. In this paper the usability methods for different types of public administration information systems are proposed.

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