



# **Maestría en Ingeniería en Sistemas y Cómputo Inteligente**

**Usability study of EPrints and DSpace  
interfaces to store learning objects**

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de Posgrado*



# Usability study of *EPrints* and *DSpace* interfaces to store learning objects

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Maestría en Ingeniería en Sistemas y Cómputo Inteligente

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## 1. Introduction

When searching academic content on the internet, users are confronted with the difficulty to contextualize a subject, find validated information or to deal with inconsistencies in the sources. *Learning Objects* (LO) are an alternative for these problems, they are used in face-to-face education and e-learning [1].

The technological platforms that support LOs are called *Learning Object Repositories* (LORs), they implement tasks addressed to storage, accessibility and distribution. According with [2], a LOR reduces the individual and institutional efforts to produce them and preserve them.

This poster presents the results of a usability study of *EPrints* [3] and *DSpace* [4] interfaces to store LOs, in compliance with [5], they are the most popular platforms to implement LORs (see Table 1). Note: the option "Others" refers to custom software.

Table 1. Technological platforms to implement LORs [5]

Platform	Number of LORs	Percentage
<i>DSpace</i>	1753	46.88%
Others	898	24.02%
<i>EPrints</i>	523	13.99%
<i>Islandora</i>	119	3.18%
<i>Weko</i>	110	2.94%
<i>Opus</i>	90	2.41%
<i>HAL</i>	69	1.85%
<i>dLibra</i>	62	1.66%
<i>Content dm</i>	59	1.58%
<i>Fedora</i>	56	1.50%
<b>Total:</b>	<b>3739</b>	<b>100%</b>

## 2. Goal

Assess the usability of *EPrints* y *DSpace* interfaces to store LOs.

## 3. Methodology

Figure 1 shows the two stages of the methodology to reach the goal, the results is the selection of one of two platforms to implement a LOR at the Universidad Politécnica de Puebla (UPPue).

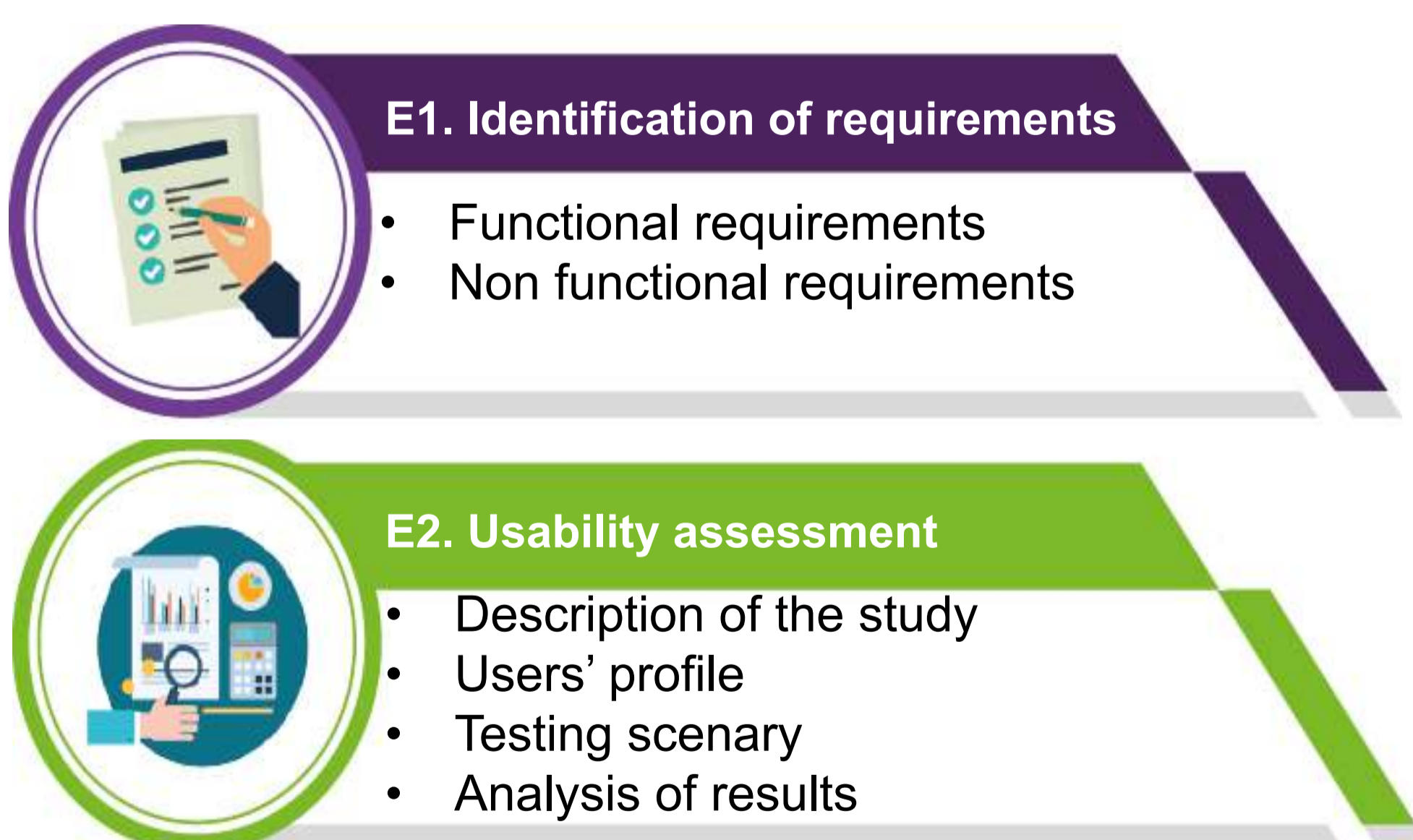


Figure 1. Methodology to choose a LOR platform.

Table 2 and 3 present the functional and not functional requirements for an LOR at the UPPue. Besides users' perception about the interfaces, the selection should take into account technical aspects related with installation and maintenance.

Table 2. Functional requirements

Description	Priority
1. Storage of an LO	High
2. Keyword-based retrieval of LOs	High
3. Content visualization	Medium
4. Retrieval of the reference of a LO	Low

Table 3. Examples of non-functional requirements

Requirement	Description
1. Non-proprietary language	Multiplatform and public license GNU (GLP GNU)
2. Operative system	Linux or Windows
3. Database	Open source
4. Software minimum requirements	Open source
5. Metadata	Use of standards
6. Storage	Independency of content and metadata
7. Interoperability	Metadata exportation and importation

### 3.1 Description of the study

A study has been designed to assess usability of the interfaces of *EPrints* and *DSpace* to store LOs. The study uses the Jakob Nielsen heuristics [6]. Table 4 shows the tasks of an assessment session; more information is available in [7].

Table 4. Tasks of an assessment session [7]

No.	Actor	Description of tasks
1	Tester	Presents the letter of rights
2	Tester	Asks for the sign of the format consent
3	Tester	Delivers pre-test
4	Participant	Answers pre-test
5	Tester	Delivers the task sheet
6	Tester	Registers the start time
7	Tester	Register observations
8	Participant	Makes the tasks
9	Tester	Registers the end time
10	Tester	Delivers post-test
11	Participant	Answers post-test
12	Tester	Harvests and analyzes the tests, writes the usability report

### 3.2 Users' profile

In the usability study, the participants were divided into two groups, each of 6 students between 20 and 29 years old. The first group assesses *EPrints*, this was formed by 4 women and 2 men; while the second group worked with *DSpace*, this was formed by 3 woman and 3 men. The participants were chosen by a random method; all of them reported experience with LOs but anyone with LORs.

### 3.3 Testing scenery

The study was performed at the User Experience Lab (m@ux<sup>1</sup>), the version 3.3.15 of *EPrints* and version 6.2 of *DSpace* were installed on a desktop computer with the Windows 10 operative system. The version 35.0.1 of Mozilla Firefox browser was used to access these platforms.

## 4. Results

Table 5 shows the values of the Likert scale used (maximum value 5, minimum value 1). Table 6 presents the results by heuristic.

Table 5. Colors and description of the Likert scale

<span style="color: green;">■</span>	Totally agree (5)
<span style="color: yellow;">■</span>	Agree (4)
<span style="color: orange;">■</span>	Neither agree or disagree (3)
<span style="color: red;">■</span>	Disagree (2)
<span style="color: black;">■</span>	Totally disagree (1)

<sup>1</sup> The home page of the User Experience Lab is available at: <http://informatica.uppuebla.edu.mx/~mmedina/maux>.

Table 6. Results by heuristic.

Heuristic	DSpace	EPrints
Help users recognize	4 (Green), 1 (Yellow), 1 (Red)	2 (Yellow), 3 (Green), 1 (Red)
	5 (Green), 1 (Red)	3 (Green), 3 (Yellow)
Aesthetic and minimalist design	2 (Yellow), 3 (Green), 1 (Red)	4 (Green), 1 (Yellow), 1 (Red)
	1 (Red), 3 (Green), 1 (Yellow), 1 (Red)	3 (Green), 3 (Yellow)
Recognition rather than recall	2 (Yellow), 3 (Green), 1 (Red)	4 (Green), 1 (Yellow), 1 (Red)
	1 (Red), 3 (Green), 1 (Yellow), 1 (Red)	3 (Green), 3 (Yellow)
Error prevention	2 (Yellow), 1 (Green), 3 (Yellow)	2 (Yellow), 3 (Green), 1 (Red)
	4 (Green), 2 (Yellow)	2 (Yellow), 3 (Green), 1 (Red)
Consistency and standards	4 (Green), 2 (Yellow)	5 (Green), 1 (Red)
	2 (Yellow), 3 (Green), 1 (Red)	2 (Yellow), 4 (Green)
User control and freedom	4 (Green), 2 (Yellow)	5 (Green), 1 (Red)
	2 (Yellow), 3 (Green), 1 (Red)	2 (Yellow), 4 (Green)
Match between system and real world	4 (Green), 2 (Yellow)	5 (Green), 1 (Red)
	2 (Yellow), 3 (Green), 1 (Red)	2 (Yellow), 4 (Green)

Participants reported the same values for the 3 missing heuristics; all of them accomplish the storage of a LO represented as a PDF file; Figure 2 shows the time to achieve this task; the average time in minutes by platform is 22:13 for *EPrints* and 15:58 for *DSpace*.

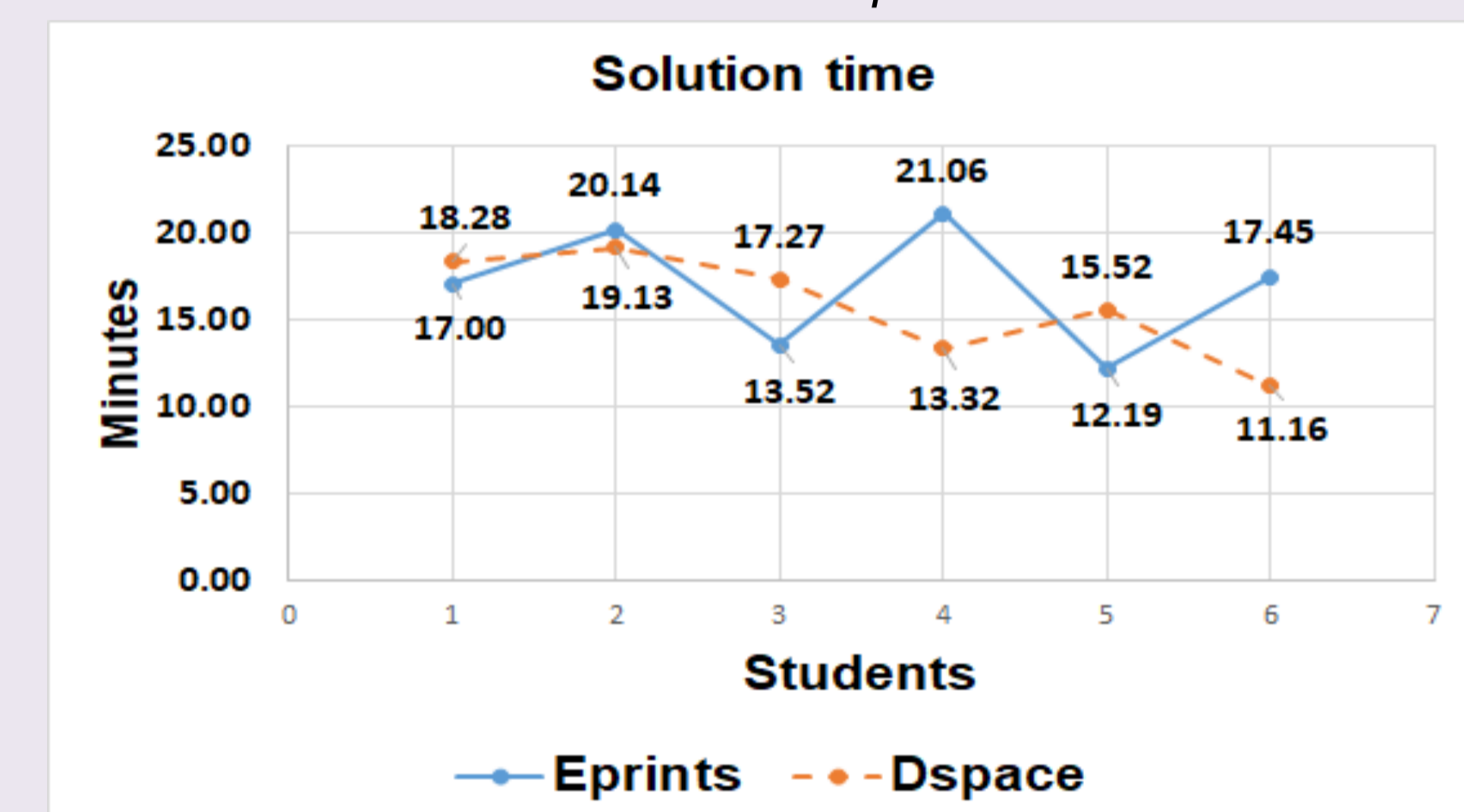


Figure 2. Time to store a LO by participant

## 5. Conclusion

A usability study of the *EPrints* and *DSpace* interfaces to store LOs was done. Thought the participants do not constitute a statistical representative sample of potential users, the experimental results suggest that *DSpace* is the best option to implement a LOR at UPPue. The implementation of a LOR will support teaching-learning process and improve the dissemination of validated academic content.

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