THE USE OF TIMELINES AS A STRATEGY FOR TEACHING LEGISLATION ISSUES TO IT ENGINEERING DEGREE STUDENTS

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Abstract

A timeline is a graph showing a sequence of events on a particular topic. Among other things, it allows to visualize a space-time relationship of the most relevant periods of the topic to be addressed. These timelines have always been valuable teaching strategies. However, with the use of multimedia resources linked to the timeline such as images or videos, there is a greater possibility that students will relate the contents to specific objects that will help them in the understanding and memorization of dates or events.

The course Deontology and Professionalism in the degree of IT engineering at the Universitat Politècnica de València incorporates contents that enable students to be exposed to issues of professional practice, ethical conduct and computer legislation. When working on the legislation aspects, we suggest the use of timelines as a teaching-learning strategy.

Specifically, the Spanish and European chronologies of data protection and intellectual property legislation are presented as an example. But if we really want to take advantage of this tool, there is nothing better than involving students in the creation of such timelines. In this way they will be much more involved and motivated.

Keywords: Timeline, teaching-learning strategy, legislation, deontology, professionalism, IT engineering.

1 INTRODUCTION

Timelines are valuable teaching strategies that serve to organize information in which it is relevant to locate in time outstanding events, occurrences, facts or phenomena [1]. A timeline is a set of graphics through which a sequence of events on a particular topic is ordered, allowing, among other things, to visualize a space-time relationship of the most relevant periods of the topic to be dealt with.

Although timelines have always been present in the classroom, the Information and Communications Technology (ICT) resources that facilitate their use allow us to go beyond facilitating the study of past kingdoms and battles. Thus, the use of timelines helps students to go deeper, and in a relatively simple way, into those subjects that require memorizing historical dates and events. As the saying goes, a picture often tells more than a thousand words.

Some of the most common implementations are seen in historical studies and project management. Since timelines are so common and intuitive nowadays, it is difficult to assume that the timeline as we know it today is up to 250 years old [2]. Used in project management, a Gantt chart is a form of timeline. Henry Gantt designed such a chart around the years 1910-1025 and it became popularized in 1922 by an American consulting engineer [3].

The course Deontology and Professionalism in the degree of IT engineering at the Universitat Politècnica de València incorporates contents that enable students to be exposed to issues of professional practice, ethical conduct and computer legislation. This paper focusses on the legislation issues and how the use of timelines can improve the teaching-learning process.

Timelines are very useful in subjects with legislation content, even though in this case the aim is not a merely memorization exercise but rather to become familiar with the spirit of the laws. With the use of multimedia resources linked to the timeline, such as images or videos, there is a greater possibility that students will relate the content to specific objects that will help them to understand the concepts.

2 METHODOLOGY

When a teacher prepares a class based on a timeline, the most immediate benefit is that it allows students to easily see important dates and events. In addition, it assists students in their metacognitive processes to comprehend time and its correlation with historical events. The timelines already created by the teacher may be used as a reference to introduce the different topics. They shall be made available later for consultation.

However, if you really want to take advantage of timelines, there is nothing better than involving students in their creation. This way they will be much more involved and motivated. Today, teaching is no longer a simple transmission of knowledge, but must be more active and dynamic, stimulating the interest, motivation and participation of students [4].

A possible activity involving the creation of timelines in the classroom could include the following tasks:

- Choice of topic. Data protection, intellectual property, with the teacher providing the sources of information to be used. Once the subject has been chosen, each member of the group can take responsibility for different roles.

- Research. It is not only a matter of finding the necessary information for the elaboration of the timeline but also of selecting the most relevant milestones. Then the audiovisual resources that will complete the timeline must also be selected.

- Writing. Prior to the creation of the timeline, it is recommended to follow a synthesis process that will result in the writing of the content of each milestone. The content of each milestone will be reviewed by all team members. This will allow them to be aware of each of the milestones introduced, beyond those for which responsibility has been taken.

- Creation of the timeline. Using the selected software tool, chronologically ordering the information and dumping all the data that has previously worked.

- Final assessment and discussion. The teacher can close the activity looking for the groups to reach the appropriate conclusions, trying to get the students to see beyond that succession of relevant facts. These timelines can be published somewhere on the Internet if the work is to be shared.

2.1 Tools with Open Source license

Although not all the activities lend themselves to such an approach, combining the exploration of a software tool in the activities offered to students is a guaranteed success for introducing and consolidating any type of content. Students are thus challenged in a motivating way. The use of web applications and services constitutes an educational resource for the teacher to transfer knowledge as well as for the students to consolidate their learning.

As teachers we can decide to have our students use some software tools that let them build these timelines easily and even include some pictures and links. Today, there are plenty of alternatives to create timelines. The choice of the software tool to use has many considerations. Table 1 shows a selection of Open Source license tools that are also free.

Table 1. Tools with Open Source license.

	Tool	*Platforms*	*Free*
	Timeline	Windows Linux	Yes
	Timeline JS	Web Google Drive - Sheets	Yes
	WikiTimelines	Web	Yes

Our students are all digital natives [5]. Let´s take advantage of this fact. They need not agonize over manual preparations but rather just take time familiarizing themselves with the software tool. There is no much risk that the time spent by students will go mostly towards getting the software to work. However, it should be borne in mind that ideally as much time as possible should be given to the actual content. The software should help engage and inspire students to produce a timeline of highest quality.

3 RESULTS

The use of timelines is applied to the course Deontology and Professionalism in the degree of IT engineering at the Universitat Politècnica de València, and specifically to the legislation content. In this part of the course, the idea is to cover at least the basic legal framework for good professional practice. IT law does not exist as such; it refers to a set of laws governing other aspects and which can also be applied to IT. But there is also an increasing set of laws that do address IT aspects only. Obviously, it is impossible to address all of them. Hence the course provides an overview of the most important laws in terms of both the attention given by the courts and the impact on society, with an interest generally redirected by the media: the data protection law and the intellectual property law.

3.1 Timeline of Data Protection legislation

To draw up a timeline, it is necessary to identify the most important events and/or periods, as well as the initial and final dates if they are available. Fig. 1 shows the Spanish and European chronology of data protection legislation, one of the chapters of the course. It has been produced using the Timeline tool.

Figure 1. Timeline of Data Protection legislation for the course of DyP.

Privacy exists wherever personally identifiable information or other sensitive information is collected and stored. In 1978 the Spanish fundamental law recognizes that the law shall limit the use of data processing in order to guarantee the honour and personal and family privacy of citizens and the full exercise of their rights. This is our starting point. Since then, it has become increasingly necessary to update the laws in place to keep up, albeit from afar, with the rapid and inexorable advance of technology.

Apart from the chronology, the colour coding in the timeline of Fig. 1 is noteworthy. In this case, the colour coding is chosen according to the type of law: the fundamental law in yellow, organic laws in red, the European directive and regulation in green, and the implementing regulations in blue.

This timeline was shown to the students since the beginning of the chapter and used as reference to introduce the different topics. It guided the students through the whole chapter and at the end the teacher paid attention to it one more time to summarize and highlight the important concepts.

3.2 Timeline of Intellectual Property legislation

Fig. 2 shows the chronology of intellectual property legislation in Spain, one of the chapters of the course. It has been produced using the Timeline tool.
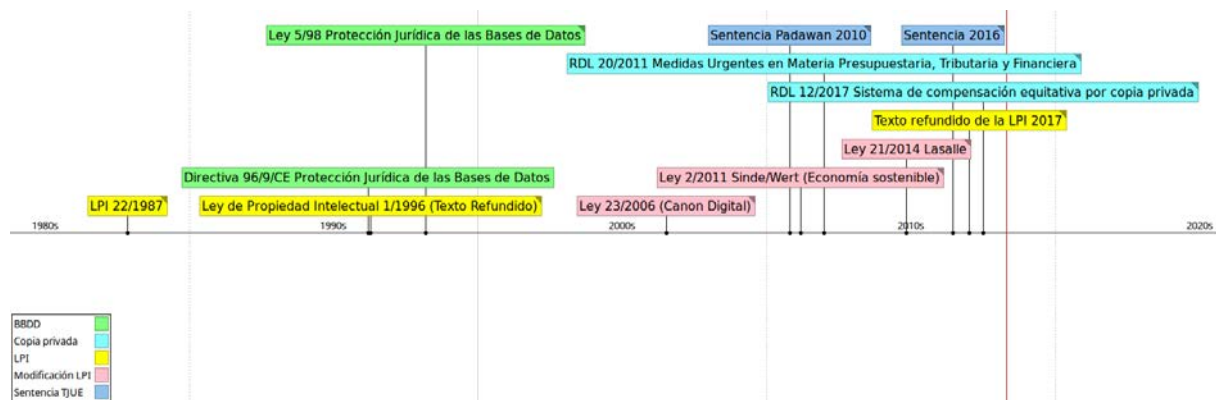
Figure 2. Timeline of Intellectual Property legislation for the course of DyP.

Intellectual Property is a broad concept that covers different types of recognised rights originating from some intellectual activity: copyrights, patents, trademarks, database rights, and trade secrets.

The colour coding in the timeline of Fig. 2 differs from the one used in the timeline of Fig. 1. Here, rather than discriminating between different types of law, more attention has been paid to the subject matter: complete Spanish IP laws in yellow, their amendments in red, database protection legislation in green, in dark blue the sentences from the Court of Justice of the European Union with repercussions on Spanish legislation, and in light blue specific legislation on the controversial private copy.

This timeline was not shown to students until the end of the chapter. It was in fact used as a possible result of the timeline creation activity carried out by the students to close it. It allowed the teacher then to underline the different topics addressed throughout the chapter.

3.2.1 Activity involving the creation of timelines in the classroom

The activity was simplified from that presented in Section 2. The main reason for this was to fit it into the schedule of the course. The timelines were developed in pairs and the students were free to choose the software tool they considered most appropriate. In addition to the course notes, the students were introduced to two very useful resources:

- EUR-Lex [6]: an online gateway that provides the official and most comprehensive access to EU legal documents.
- WIPO Lex [7]: an online gateway that provides access to legal information on Intellectual Property from around the world.

Fig. 3 shows four examples of timelines presented by students and summarizing the chronology of intellectual property legislation in Spain. All the tasks began to be developed in the classroom but the students asked for more time to improve them at home.
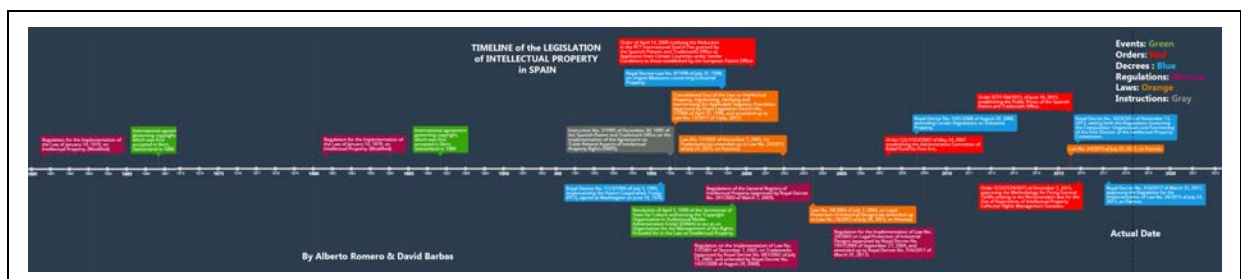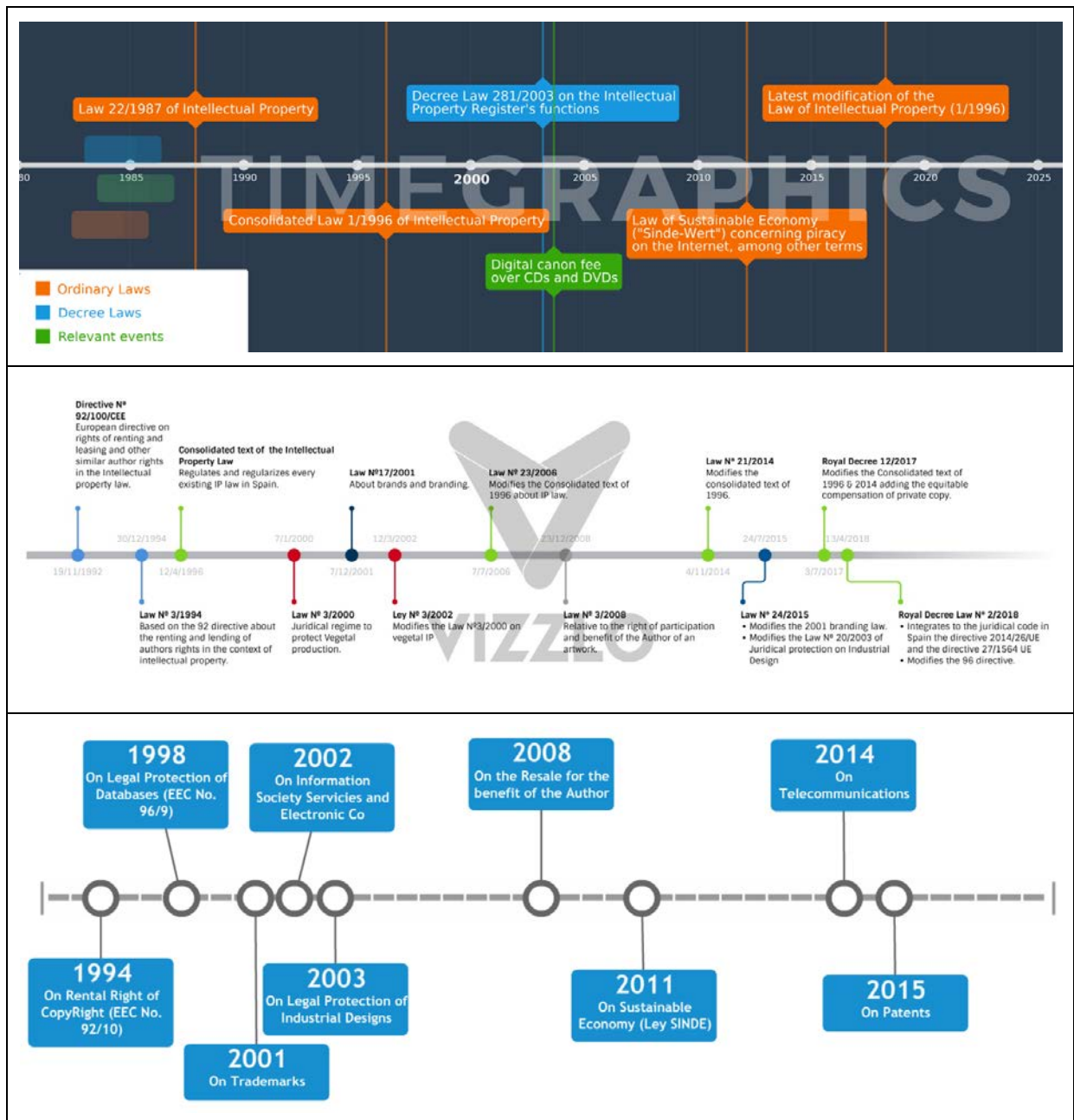
Figure 3. Timelines of Intellectual Property legislation performed by students.

4 CONCLUSIONS

The activity involved students in an unexpected way. It was during the execution that they realized the complexity of the subject and when a multitude of concerns were raised. Furthermore, the results are promising in terms of both content and design considering the time limitation of the activity.

In regards to design, students can draw inspiration from different creative timeline examples [8]. However, in a storytelling context, more expressiveness is desirable while maintaining the effectiveness of linear representations. Informed by a survey of 263 timelines, [9] is intended to inspire the design of future tools for storytelling with timelines. Besides, comic strips can be used to tell all kinds of stories. Rather than simply writing summaries of key events, timelines can be enriched with illustrations of the events. In this way, each frame of the comic should be dated to take the place of a hash mark on a timeline.

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