7 Conclusions

7.1 Introduction

Let me finish this book as I started it, by sharing with you my experience when watching a video. In this case, “The future starts now” by the Norwegian Center for ICT in Education46. I enjoyed that video very much. Please, watch it, and if you cannot watch it, at least see Figure 7.1 with one of the snapshots of the video.

![Figure 7.1: Snapshot of the video “The future starts now”](image)

Some people may think that the future is something far ahead of us, that we are now developing the technology and later we will learn how to use it for education. However, I agree with the video, the future of education is now! We already have the technology, both the hardware and the software. In this book, you have learnt (I hope!) about different tools that you can use to accomplish pedagogical goals.

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46 See the video at https://www.youtube.com/watch?v=NfN5SSiRoPs (last visit on August 27th, 2013)

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by using technology, and NOW you can start using them in your class! Why wait until some point in the future? It is like when, in the first chapter, we talked about the history of education. To make some progress, some changes are necessary, and by making changes we need to identify what works better for us.

To help you with this amazing task, I have created a synopsis table (Section 7.2). You can use this as a starting point, as a guide to the tools that you can start using to achieve your pedagogical goals classified according to Bloom's taxonomy. Section 7.3 provides you with a troubleshooting guide for any problems that you might have when using these tools or devices. Finally, the chapter ends, as always, with some exercises (Section 7.4) and their solutions (Section 7.5).

Let me tell you something that you may have already noticed from previous chapters. It is that in many of the exercises in this book, the goal is to make you search. In years to come, there will be other tools, new technologies, and the more you practice with technology for education, the easier it will be to try new tools and technologies and see how you can take advantage of them in your class.

This is necessary because now and in some decades from now, even if you do not want to change anything in your class, the students change and they will keep changing! The students change because they are from new generations, digital natives able to interact with technology in an easy and familiar way, and they need new tools to accomplish the pedagogical goals in a way that is natural for them, so think about all the new possibilities you have and enjoy them!

### 7.2 Synopsis Table

Table 7.2 gathers together the tools taught in this book, classified according to the pedagogical goal in Bloom's taxonomy that they can help to achieve. Please, remember that it is just a synopsis, there are many more possibilities, and in some cases, the tool can be used in a creative way so that it can accomplish other pedagogical goals. Teachers have the last word!

In the case of the first and second level of Bloom's taxonomy, the tools Education Portals, MOOCs, Google Resources for Education and Dropbox were chosen because they are very useful to help learning and understanding new knowledge. In particular, Education Portals have many high quality resources such as documents and videos. Students can read and watch these and later explain what they have seen, or answer some simple basic understanding questions.

MOOCs are considered by some experts as the evolution of education portals. MOOCs have high quality resources similar to Education Portals, but they do not only gather documents and videos. MOOCs also integrate social networks to help students communicate with others, and they even have assessment features for groups of students or for students to do individually on-line.
Table 7.2: Synopsis table

<table>
<thead>
<tr>
<th>Pedagogical goal</th>
<th>Tool</th>
<th>Brief description</th>
<th>To know more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels 1 &amp; 2: to remember and understand new knowledge (define, describe, duplicate, identify, label, list, match, memorize, name, order, outline,...)</td>
<td>Education Portals</td>
<td>Websites created by the educational community for the educational community with content and services</td>
<td>Section 2.2</td>
</tr>
<tr>
<td></td>
<td>MOOCs</td>
<td>Massive Open On-line Courses created by experts in the area, open to thousands of students, usually uploaded in repositories with assessment and integrated social network possibilities</td>
<td>Section 2.3</td>
</tr>
<tr>
<td></td>
<td>Google Resources for Education</td>
<td>Gmail to communicate to the students, Google Drive to create and share new resources on-line, Google Calendar to organize your class events, Google Video to find videos, Google Books to find books, Google Sites to create your own website and Google Blogger for edublogs</td>
<td>Section 2.4</td>
</tr>
<tr>
<td></td>
<td>Dropbox</td>
<td>A program to share and upload files on-line so that you can access them from any device connected to the Internet</td>
<td>Section 2.5</td>
</tr>
<tr>
<td>Levels 3 &amp; 4: To apply and analyze knowledge and competences (apply, change, choose, compute, demonstrate, discover, dramatize, employ, illustrate,...)</td>
<td>Hot Potatoes</td>
<td>JCloze to create fill-in-the-blank exercises, JMatch to create matching exercises, JQuiz to create tests, JCross to create crosswords, JMix to create exercises to order words in sentences, and The Masher to create units with Hot Potatoes exercises</td>
<td>Section 3.2</td>
</tr>
<tr>
<td></td>
<td>JClic</td>
<td>A program to create projects with interactive exercises selected from 16 different categories: puzzles, word search, matching, text activities, etc.</td>
<td>Section 3.3</td>
</tr>
<tr>
<td>Levels 5 &amp; 6: To evaluate and create (collect, combine, comply, compose, construct, design, develop, devise,...)</td>
<td>Delicious</td>
<td>A program to bookmark on-line your favorite links so that you can share them, and have access to them from any device connected to the Internet</td>
<td>Section 4.2</td>
</tr>
<tr>
<td></td>
<td>Webnotes</td>
<td>A program to create and organize notes on-line about webpages and PDF documents, used to do research</td>
<td>Section 4.3</td>
</tr>
<tr>
<td></td>
<td>Prezi</td>
<td>A program to create presentations on-line, based on relating concepts and focusing on the most important with zoom and size</td>
<td>Section 4.4</td>
</tr>
<tr>
<td></td>
<td>Animoto</td>
<td>A program to create videos on-line to express your ideas in a multimedia way with sound and sequences of images in movement</td>
<td>Section 4.5</td>
</tr>
</tbody>
</table>
Google Resources for Education has been classified here but these can serve to accomplish goals in any of Bloom's taxonomy levels depending on the use made of these tools by the teacher. In the basic use, they serve to keep a website to show something to your students, watch videos, keep a blog, read documents together, but they can be also used to edit documents collaboratively, share events in a common agenda, and store documents in Google Drive or Dropbox.

In the case of the third and fourth level of Bloom's taxonomy, the Hot Potatoes and JClic tools were chosen because they are very useful to create assessment exercises to apply and analyze knowledge and competences. In particular, my advice is that they are used for formative assessment, i.e. not just to put a score, but to help students to reach some pedagogical goals, so that students can learn from their mistakes.

There are some activities that can be created both with Hot Potatoes and JClic such as the text activities, matching exercises or crosswords. In these cases, teachers can choose whether they prefer to have the activities organized in a unit created by Hot Potatoes on-line, or with a project played by JClic. In some cases, if it is not possible to install Java on a particular computer and you can only access on-line resources, Hot Potatoes can be more useful. In other cases, you may want to have more configuration possibilities (up to 16 different combinations of activities) and using JClic could be more appealing. Sometimes, it is just a matter of taste. In any case, try different possibilities because students usually find these activities fun, and they are able to learn while having fun!

In the case of the fifth and sixth levels of Bloom's taxonomy, Delicious, Webnotes, Prezi, and Animoto were chosen because they are very useful for letting students create and evaluate their knowledge. In these higher levels, it is no longer a matter of teaching something new to the students, but the students are responsible for their own learning. Tools such as Delicious and Webnotes allow them to do some research. In the case of Delicious they can bookmark the webpages they consider interesting, and later with Webnotes make notes and highlight the main ideas. They can even generate a report with those notes to help them with their research.

Finally, Prezi and Animoto are presented because in the highest levels, just to generate a document isn't enough. Students should give oral expositions using the presentation software of Google Drive or Prezi. Prezi is different in that the exposition is not based on a sequence of slides, but on a sequence of related ideas according to a mind map. Animoto helps the students to add sound, and images in a video sequence, so that they have all the multimedia possibilities that current technology offers to allow them to communicate their ideas in a much more effective way than just talking.

Please, remember that this book is not a novel, so any time you have a doubt regarding any of the tools that I have been talking about, go back to the section in which it is explained step-by-step and practice! Practice makes perfect! So, even if you make a mistake, don't worry, you can undo almost everything you have done. The computer will not get broken because you clicked on the wrong option, and the worst
you can do is just ignore all the possibilities that these technologies can bring to education. As I said in Section 7.1, the future is now, so start using these tools, try them, see what works best for you and explore new options. You will see how your students achieve your pedagogical goals, and you’ll see something that it is really rewarding for any teacher: that they are able to enjoy your class and have fun!

Finally, I would like to encourage you to try the future trends described in Chapters 5 and 6. I know that Pedagogical Conversational Agents (PCAs) can still seem a little bit like science fiction, a computer agent able to interact with your students. However, the research in the field suggests that in the last decade, students using PCAs have been able to achieve higher final scores, they have found the task of doing homework more satisfactory (pretty amazing!) and, at least, when they are children, they can study more when they are interacting with these agents because they can feel that they are helping the computer (their friend).

Similarly, when I say computer, I mean equally tablet or digital whiteboard. As I said in Chapter 6, the computer as we know it, with its screen, CPU, keyboard and mouse may be destined to disappear. Have a look around you, you can see more and more laptops, tablets, and smartphones. These are all intelligent devices that can also run educational programs, and they have the advantage of being easy to carry and easy to interact with (you just touch what you want to use!). The future is now, so enjoy it!

7.3 Troubleshooting

In this Section, you can find ten problems, which I have chosen because they are pretty common from what I have seen in my teaching experience with computers. Please, use the following list for reference to know how to solve such problems:

1. If you try to type a link in a browser, and it does not work (i.e. you cannot see the webpage in the browser), just try to type into a search engine like Google some keywords related to the content of the webpage, surely it is because it has been updated or changed, and you will find some updated link or a related link in one of the top ten results gathered.

2. If a website does not look exactly the same as it does in the book, please remember that webpages change, so when reading any chapter of the book, please get the basic knowledge to get you started, and the skills to be able to work with any version even if it is not exactly the same picture as shown on the page. You can ask questions on the book’s online forum.

3. If you have problems trying to recover images, sounds or any other resource that you have uploaded to a website, blog, or even a program such as Hot Potatoes, please check that the path in which you saved the resource has not changed. If it changes, the computer will not be able to find it, and you will not be able to use it.
4. If you have problem 3, and you have already checked that the path has not changed, then you can check the name that you gave to the resource. In some cases, it is not possible to use accents, spaces or strange symbols such as ::-}... so if you rename the resource to a simple short and meaningful name with just letters and/or numbers you will be able to use it.

5. If you do not remember where you have saved some work on your computer, you can use the “Recent files” options of the software that you are using, or the “Search” option of the Operating System (e.g. in Windows by clicking on the magnifying glass).

6. If the file does not appear even after trying 5, then maybe you did not save the file. To avoid losing work, the first step whenever you start working with any software on the computer is to save the file with a name, taking into account points 3 and 4 above.

7. Sometimes a website or a computer application may take a while to respond, but it is working, so it is useless and even harmful to click several times to try to get an answer faster. It is better to wait some minutes (with one click being enough), and after that time, if the website or the computer application does not respond, then you may need to restart your computer.

8. Some websites require that you log in with your username and password in order to be able to work with them. If you have forgotten your account information, you can try the “I have forgotten my password” option that many websites offer to recover your access data.

9. Sign out every time you finish working with any website. If you just close the browser, the session may remain open, and other people could access your data.

10. If, when working with some mobile device you have problems, check the version of the operating system, and whether the software has had its latest update (otherwise, update it with Google Play, Apple Store or by asking the software provider for a new version). If it still doesn't work, check that there isn’t a hardware problem (i.e. there is enough battery, everything is turned on and not in stand by mode), otherwise call technical support.

### 7.4 Exercises

Let’s start with some exercises to get warmed up. Remember that all exercises are solved at the end of the chapter, but do not read the solutions until you have tried to solve the exercises on your own first! It is also possible that you’ll find different answers to these questions; in that case, you can tell us about them on the book’s website.

1. Search on the Internet for another tool that you can use to achieve pedagogical goals in each one of Bloom’s taxonomy levels. Provide a sample of how you can use that tool to achieve a sample goal.

2. What challenges do you think that teachers of XXI century have still to overcome?
7.5 Solved Exercises

1) For level 1, to learn new knowledge, I really like Khan's Academy (https://www.khanacademy.org/). It has over 4,500 videos in nearly all areas of knowledge. It is amazing how well Salman Khan explains complex concepts with simple videos. Please, have a look at them! It is free and you can help your students a lot by telling them to watch the videos and then later discussing them together. However, this is just one possibility. As I mentioned before, please if you have found other interesting links at this, or any other, level do not hesitate to share them with us on the book’s website.

For level 2, to understand new knowledge, I really like on-line tests such as the Geography test (http://www.purposegames.com/game/countries-europe-quiz). You do not need to log in, you just need to be connected to the Internet. It is very intuitive, as you can see in Figure 7.3, you just need to click on the country that the program asks you about. If it is the country requested, the country has a green background color. If it is not the country, then the program makes a wrong answer noise, and you can try again. If you are able to identify the country in less than three tries, then the country has an orange background. Otherwise, it has a red background.

Figure 7.3: Sample on-line Geography test to identify countries
For level 3, to apply knowledge and competences using formative evaluation tools, I really like the Physics classroom exercises page (http://www.physicsclassroom.com/class/1dkin/u1l6d.cfm). Again, you do not need to log in, you just need to be connected to the Internet. There are many exercises in which you need to apply a formula, which you have just learnt, in order to solve a problem.

For level 4, to analyze knowledge and competences using formative evaluation tools, I really like on-line interactive exercises for linguistics analysis, which you can find at this page:

(http://www.cs.bham.ac.uk/~pxc/nlp/InteractiveNLP/NLP_syn1.html). You do not need to log in, you just need to be connected to the Internet. The exercises are interactive and students can try them several times.

For level 5, to synthesize (create) knowledge and competences using formative evaluation tools. I really like Skype (http://www.skype.com/) if you need to ask some students to present some project work, but they are not in class, say because they are abroad or they cannot come to the class for some other reason. The quality of the video and audio connection is usually good and you can interact with them as if they really were in class.

For level 6, to evaluate knowledge and competences using formative evaluation tools, I really like Dipity (http://www.dipity.com/). It is an easy on-line tool that allows you to create interactive digital timelines, as you can see in Figure 7.4.

Figure 7.4: Sample Dipity timeline

Other interesting options are:
- Padlet to create your own wall on the Internet (http://padlet.com/)
- StudyBlue to create tests on devices such as smartphones (http://www.studyblue.com/)
- Wordle to create word clouds (http://www.wordle.net/)
- Storybird to create stories and share them for viewing on any device (http://storybird.com/)
- Popplet to share ideas on-line (http://popplet.com/)
- Storify to aggregate content from social networks and create a story (http://storify.com/)
2) In my opinion, the main challenges for XXI teachers are to how to filter the amount of knowledge and resources that surround us nowadays. It is an amazing time to be an educator! You no longer have the responsibility of being the only source of knowledge, your students are proactive and they can interact with many exercises to apply what you are saying. They can have fun while they are learning! This is wonderful! However, there are also some issues to take into account: teachers who do not want to change or teachers that want to change too much!

Some teachers may want to keep doing things the same way they’ve always done them. This is not good. As I said, it is important to try new possibilities and explore new teaching strategies, always according to the pedagogical goals that you pursue. For those teachers, I encourage them to read this book and choose some tools to start practising. They will see how technology can really help in their class, no matter the age of the students or the area of knowledge.

There is also the other extreme, teachers who always want to be up to date. They want to have the latest app, the latest tool, the latest information, and that task can be too time-consuming. Moreover, these teachers cannot enjoy the tool they have just learned, because they are thinking of the new possibilities that are to come. For those teachers, I encourage them to try new tools, but without the need to always be using the latest technology.

Technologies, like students, evolve, but it is not necessary that you always know the latest fashion. Reading some blogs (e.g. at the beginning or end of the week), such as Lisa Nielsen, The Innovative Educator (http://theinnovativeeducator.blogspot.com.es/), Free Technology for Teachers (http://www.freetech4teachers.com/), or Steve Wheeler, Learning with “e”s (http://www.freetech4teachers.com/), is enough to keep updated. Moreover, you can talk to other colleagues and your students.

My advice is to try tools for a while, keep what you like and change what you think can be improved. Remember that technology for education is something that can make the way you teach much more fun, so please enjoy it!