INTED 2011

CONFERENCE PROCEEDINGS

5th Edition - Valencia (Spain) - 7th - 9th March, 2011

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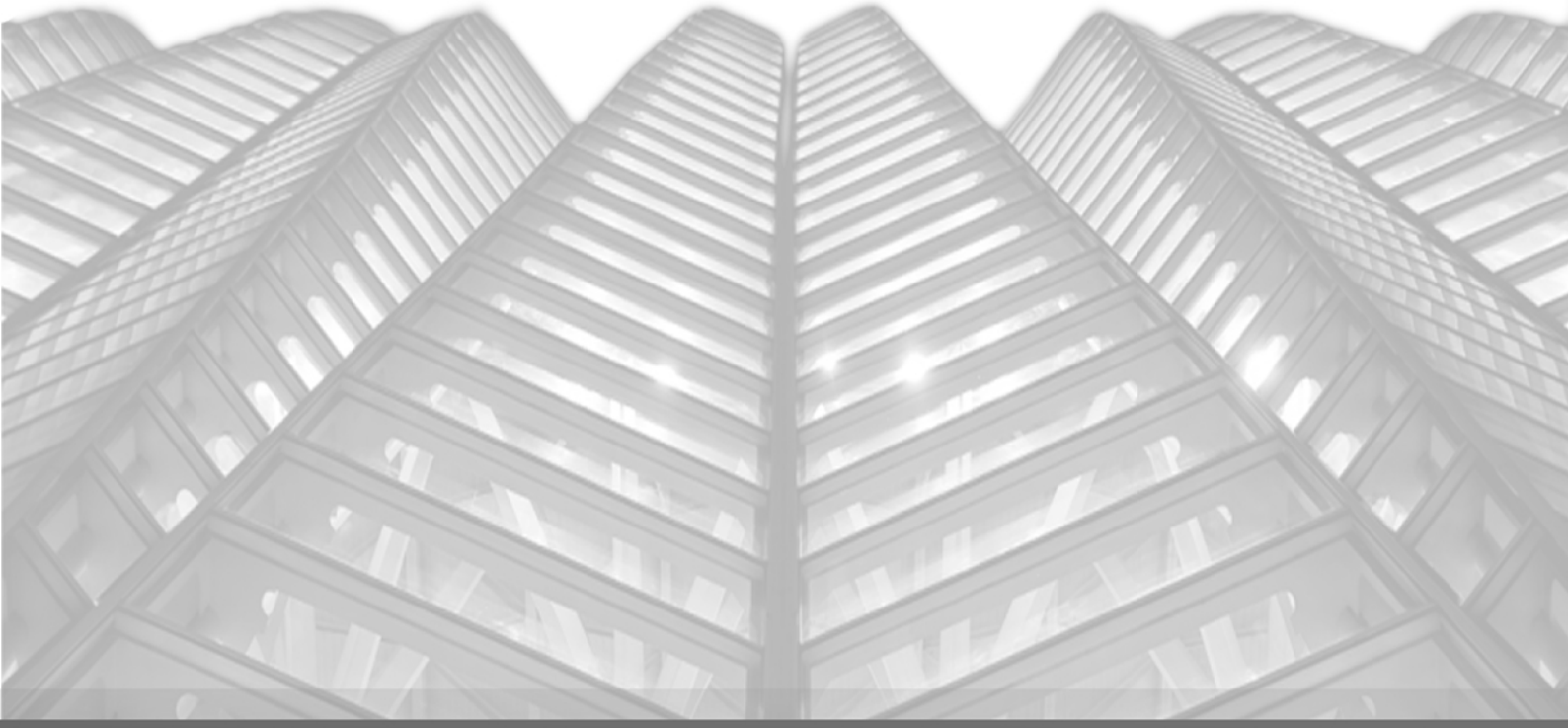

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WELCOME INTRODUCTION

Dear INTED2011 participants,

INTED, being in its 5th edition, is a key annual networking event for the sector of technology, education and development, attracting and bringing together experts in education from around the world.

INTED2011 has once again emerged as a large international platform for exchanging ideas and experiences. Experts and academics presenting at this conference will share with you their most up-to-date and practical information on education and learning innovations.

In 54 parallel sessions, delegates will discuss the latest trends and developments in education and ICT supported learning. More than 410 oral presentations, 125 posters and 600 attendants from 65 countries will contribute to this intensive program.

This is an excellent opportunity to acquire skills and inspire yourself by learning from experiences and innovative approaches in education. We invite you to participate in INTED2011 and take the best of its presentations and specific sessions, discussions and debates, as well as the posters exhibition throughout the two-day conference.

In addition, we also wish you enjoy your stay in Valencia. Having a heritage of over two thousand years of history, Valencia offers a wide range of monuments and cultural places to visit, being as well a very modern city. Its culture, cuisine and art tradition along with its location on the Mediterranean coast and its pleasant climate make this city an ideal setting to enjoy during your stay.

We thank all of our participants for attending this event and making it a unique place to learn and discuss about Education and Technology.

INTED2011 Organising Committee

SCIENTIFIC COMMITTEE AND ADVISORY BOARD

CONFERENCE SESSIONS

ORAL SESSIONS, 7th March 2011.

Enhancing learning and the undergraduate experience (I)
Educational Software and Serious Games
International Projects (I)
University-Industry Collaboration
Technology-Enhanced Learning in Engineering Education
Experiences and Research in Arts & Humanities Education
Enhancing learning and the undergraduate experience (II)
Computer Supported Collaborative Work
International Projects (II)
Experiences in Business Adm. & Economics Education
Experiences in Architecture & Urban Planning Education
Pedagogical & Didactical Innovations in Foreign Languages Education
Pedagogical & Didactical Innovations. Learning and Teaching Methodologies (I)
E-content Management and Development (I)
E-learning & blended learning (I)
New Trends in Business Adm. & Economics Education
Experiences in Engineering Education (I)
Experiences & Research in Foreign Languages Education
Pedagogical & Didactical Innovations. Learning and Teaching Methodologies (II)
E-content Management and Development (II)
E-learning & blended learning (II)
Pedagogical & Didactical Innovations in Business Adm. & Economics
Experiences in Engineering Education (II)
General Issues. Education and Globalization

POSTER SESSIONS, 7th March 2011.

Poster Session1. Technological Issues in Education and E-content Management

Poster Session2. New Trends in the Higher Education Area, Global Issues and International Projects

ORAL SESSIONS, 8th March 2011.

Pedagogical & Didactical Innovations. Collaborative and Problem-based Learning
Technological Issues in Education
Virtual Universities
Curriculum Design and Innovation. Strategies, Principles and Challenges
Experiences & Research in Primary & Secondary Education
Experiences and Research in Life & Health Sciences Education (I)
Experiences in Education. Vocational Training & Lifelong Learning
Technology-Enhanced Learning (I)
ICT skills and competencies among teachers
Curriculum Design and Innovation. New Experiences for Curriculum Design (I)
Technological Issues in Primary & Secondary Education
Experiences and Research in Life & Health Sciences Education (II)
New challenges for the Higher Education Area (I)
Technology-Enhanced Learning (II)
Research in Education. Links between Education and Research
Curriculum Design and Innovation. New Experiences for Curriculum Design (II)
Pedagogical & Didactical Innovations in Primary & Secondary Education
General Issues. Impact of Education on Development
New challenges for the Higher Education Area (II)
Experiences in Education. New projects and innovations (I)
Experiences in Education. Student Support in Education
Quality assurance in Education
Learning Experiences in Primary & Secondary School (I)
General Issues. Barriers to Learning (e.g.: age, psychosocial factors, ethnicity…)
New Trends in the Higher Education Area
Experiences in Education. New projects and innovations (II)
Research on Technology in Education
Experiences in Research in Education
Learning Experiences in Primary & Secondary School (II)
General Issues

POSTER SESSIONS, 8th March 2011.

Poster Session1. Experiences in Education and Research

Poster Session2. Pedagogical & Didactical Innovations and Curriculum Design

VIRTUAL SESSIONS

Computer Supported Collaborative Work
Curriculum Design and Innovation
E-content Management and Development
Educational Software and Serious Games
Experiences in Education. Competence Evaluation
Experiences in Education. Enhancing learning and the undergraduate experience
Experiences in Education. Learning Experiences in Primary and Secondary School
Experiences in Education. Lifelong Learning
Experiences in Education. New projects and innovations
Experiences in Education. Student Support in Education
Experiences in Education. Vocational Training
General Issues. Barriers to Learning (e.g.: age, psychosocial factors, ethnicity…)
General Issues. Digital divide and access to internet
General Issues. Diversity issues and women and minorities in science and technology
General Issues. Education and Globalization
General Issues. Organizational, legal and financial issues
International Projects
New Trends in the Higher Education Area. ECTS and Erasmus experiences
New Trends in the Higher Education Area. New challenges for the Higher Education Area
Pedagogical & Didactical Innovations. Evaluation and Assessment of Student Learning
Pedagogical & Didactical Innovations. Language Learning Innovations
Pedagogical & Didactical Innovations. Learning and Teaching Methodologies
Pedagogical & Didactical Innovations. Learning space design
Pedagogical & Didactical Innovations. Tutoring and Coaching
Quality assurance in Education
Research in Education. Experiences in Research in Education
Research in Education. Links between Education and Research
Research in Education. Research on Technology in Education
Technological Issues in Education. Blended Learning
Technological Issues in Education. E-learning
Technological Issues in Education. Mobile learning
Technological Issues in Education. Technology-Enhanced Learning
University-Industry Collaboration
Virtual Universities

BLENDED LEARNING LABS PRACTICE. MAGNETIC FIELD MEASUREMENT

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Abstract

In the current academic year, the widespread implementation of the new degrees in the Spanish higher education has brought the development and application of new methodologies with the aim of trying to improve the way students learn. In order to promote scientific interest of the students and to help in the improvement of the teaching-learning process of physics, we have scheduled plan blended learning labs.

A lab practice that deals with magnetic fields, whose concepts have been already discussed in theoretical sessions, is proposed to students. They have to prepare and develop this practice by themselves. In order to assist students in this phase, a web page indicating those previous steps has been developed using the eLearning XHTML editor (eXe). It is an a freely available Open Source authoring application to assist teachers and academics in the design, development and publishing of web-based learning and teaching materials without the need to become proficient in HTML or complicated web-publishing applications. Once this phase is finished, students proceed to the assembly and conduct of the session and, finally, they make a public presentation of the results.

Although time and resources has been limited (first quarter of current year and just one practice), results have been very encouraging. We have performed test understanding of concepts studied, resulting in a significant improvement compared to usual method of working within laboratories. Also, is detected as remarkable fact that the students observed conjunction between the theoretical and practical lectures.

Keywords: Blended learning, Magnetic field, eXe, laboratory practice.

1 INTRODUCTION

The widespread implementation of the new degrees in the Spanish higher education has brought the development and application of new methodologies with the aim of trying to improve the way students learn. Much of the current studies of the Faculty of Science, of the Technical School and of the School of Nursery at the University of Alicante, include subjects with a high number of credits assigned to experimental laboratories [1-3] in the first year. More specifically, in the vast majority of these degrees, Physics appears as a basic subject in the first semester of their studies. Although the different disciplines have different interests, many of the skills required in a laboratory are common to all of them. Moreover, they are included in some of the generic or specific skills that students will acquire at the end of their studies [3].

In order to promote scientific interest of the students and to help in the improvement of the teaching-learning process of physics, we have scheduled blended learning labs. A web page indicating concepts specified in the theoretical sessions and all the steps for carrying out the practice has been developed using the eLearning XHTML editor (eXe) [4]. It is an a freely available Open Source authoring application to assist teachers and academics in the design, development and publishing of web-based learning and teaching materials without the need to become proficient in HTML or complicated web-publishing applications. The web page has been published in the Institutional Repository of the University of Alicante (RUA) [5], which offers open access to on-line documents. It consists of a *.zip file containing the web page (http://hdl.handle.net/10045/15876). Once decompressed, it is necessary to look for the index.html file and execute it in a web browser

The possibility of a widespread access to internet and to the Virtual Campus tool of the University of Alicante by students, offers new channels for the blended learning. Bearing in mind the students to whom the material is directed, the level of semi-autonomy must always be controlled.

2 OBJECTIVES

Trying to improve the access to correct information, providing a better presentation of the contents in order to try to increase the student motivation, promoting self-realization and self-education in students recently joined higher education are the general objectives of this work. Furthermore, the goals pursued with the development of a practical activity in the lab are manifold: approach to experimental problems, selection of appropriate variables, issuing and testing of hypotheses, manipulation of equipment, measuring magnitudes and their error, use of new technologies to find mathematical correlations between variables, correct presentation of measurements and results, conclusions extraction and critical evaluation. In short, the goal is to develop their own skills of scientific work [6].

A lab practice that deals with magnetic fields, in which the concepts specified in the theoretical sessions are treated and observed, is proposed to students. They have to prepare and develop this practice by themselves. Once this phase is finished, students proceed to the assembly and conduct of the practice session and, finally, the student must show all his colleagues the results.

3 STUDENT PROFILE

The group of students to whom this work was focused included 80 students of the Degree in Optics and Optometry at the University of Alicante. The most common characteristics of this group of students are:

- Prior use of information and communications technologies (ICTs) [7], including software for editing and processing documents as well as information search on the net
- Availability of access to ICTs, both at home and at University
- Most have not studied physics during high school before their admission at the University
- Low initial interest in this kind of materials

4 DESCRIPTION OF THE PRACTICE

The practice “Measurements of magnetic fields” is proposed through a web page (figure 1a). As can be seen in Figure 1b, it is structured in six topics (objectives, background, materials, method results and appendixes) that appear in the browsing menu. This menu stands in the upper left side through all the pages thus permitting going forward and back when carrying out the practice. Regarding navigation tools, there also appears a Previous/Next link at each page in the lower right side

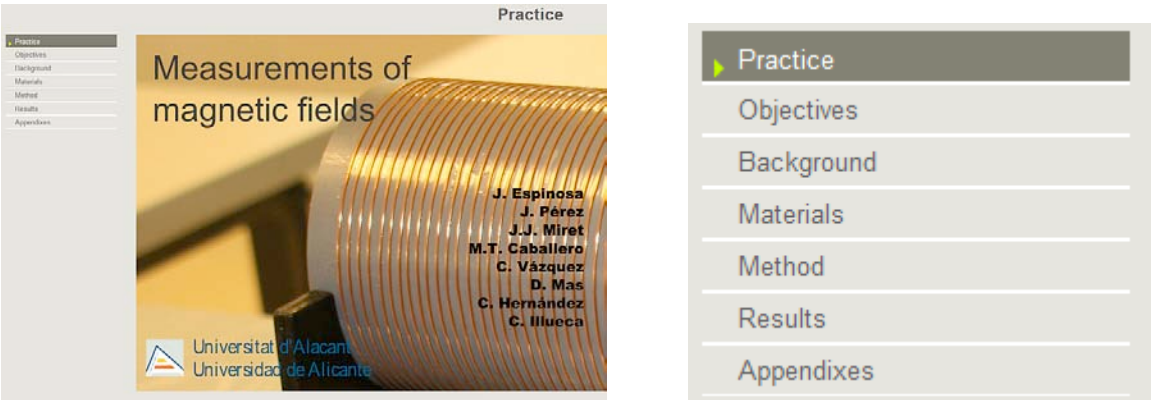

Figure 1 a) Initial page and b) browsing menu.

Below we describe the contents and sections appearing in each topic in which is divided the practice.

4.1 Objectives

First, we can find the four objectives of the practice together with figures illustrating them, as can be seen in Figure 2.

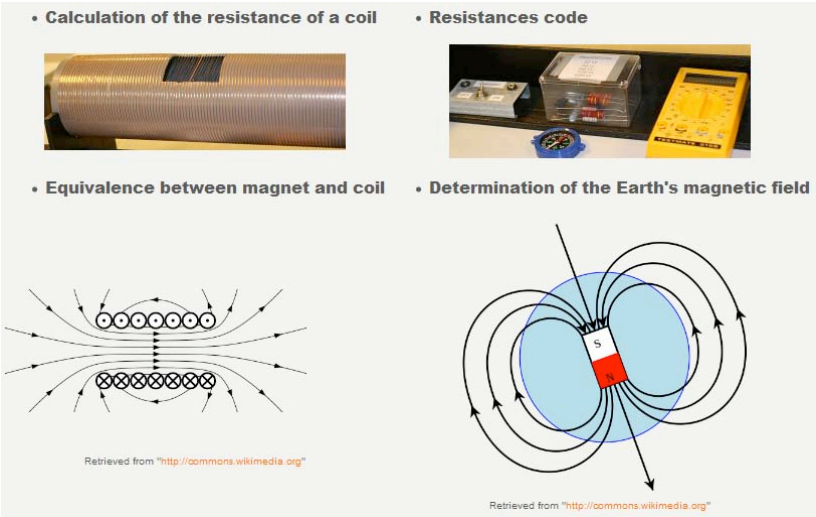

Figure 2. Snapshot of the web page in the objectives topic

4.2 Background

In this topic, the theoretical concepts are described using schematic figures for a better understanding. Besides the introduction of the equations that are used in the calculations, a video illustrates the magnetic field created by the coil wire superimposed onto the environment's one (Figure 3)

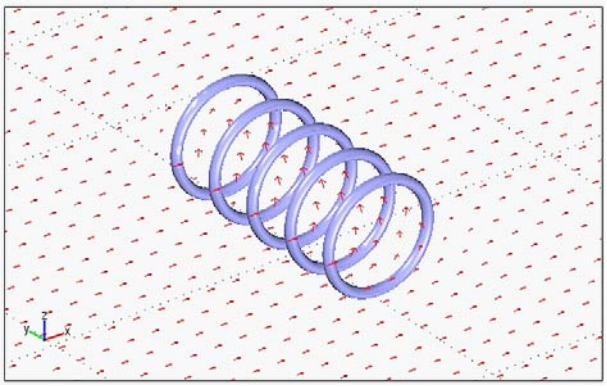

Figure 3. Resultant magnetic field

4.3 Materials

The material necessary to perform the practice is listed together with a photo (Figure 4). Some of the nouns of the components have links to appendixes, where they are defined and additional information is supplied.

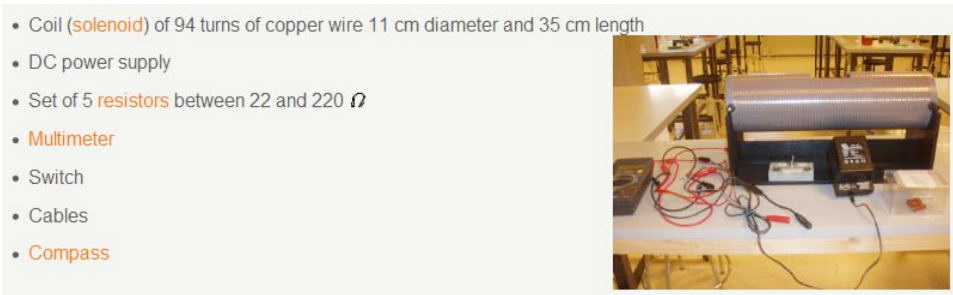

Figure 4. List of materials

4.4 Method

This topic develops the procedure to follow in order to perform the practice. It is subdivided in four sections: Resistors, Magnetic field of the coil, Circuit assembly and Earth's magnetic field. The final objective is to determine the horizontal component of Earth's magnetic field; however it is necessary to carry out some previous analysis. Figure 5 shows a screen shot of the method topic where the procedure is briefly explained using figures and hyperlinks as support.

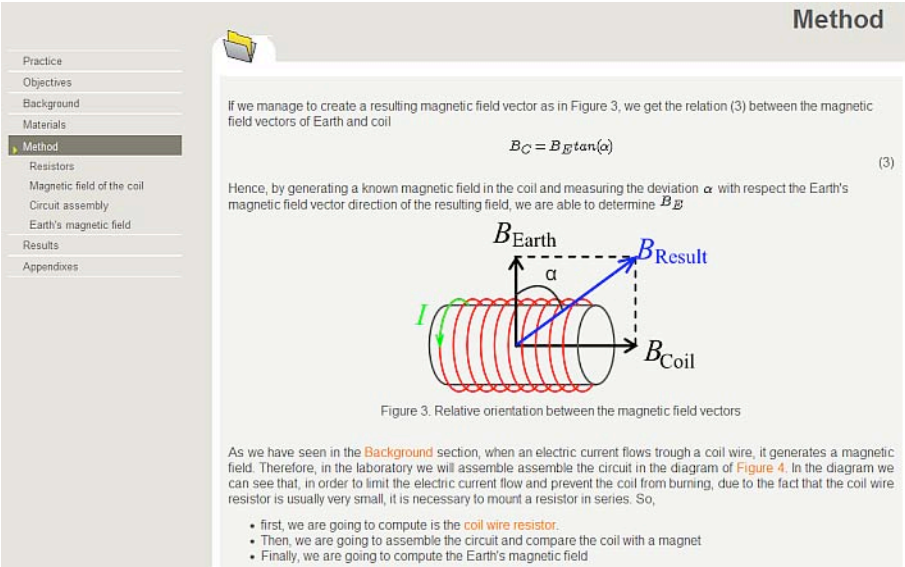

Figure 5. Screen shot of the method topic

4.4.1 Resistors

This section is devoted to compute the resistor of the coil wire resistor and to classify the provided resistors. The coil wire resistor can be computed from the length and section of the wire and the resistivity of copper using the formula

$$R = \eta \frac{l_{wire}}{S_{wire}} \tag{1}$$

The classification of the resistors available in the laboratory can be previously performed using the Image Magnifier tool (Figure 6). Making a zoom of the box with the resistors, the reader can distinguish the color lines that allow assigning a value, using the electronic color code.

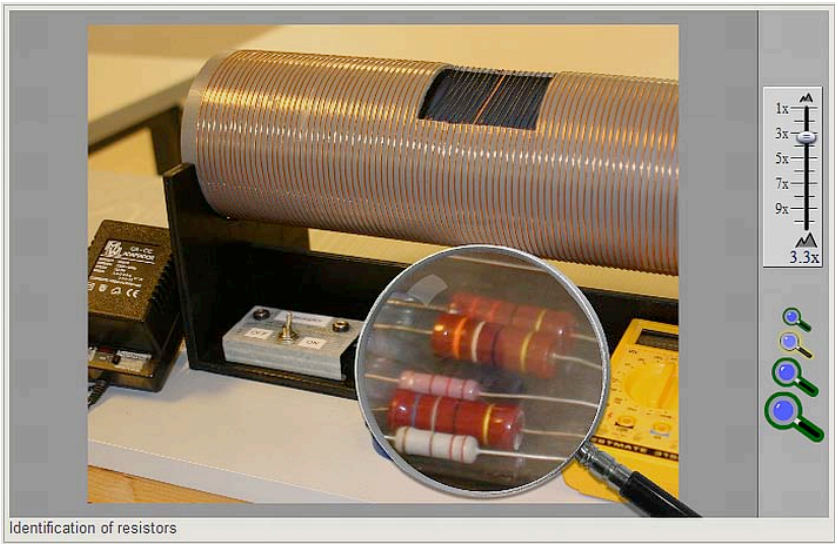

Figure 6. Image Magnifier tool to identify the resistors

4.4.2 Magnetic field of the coil

This section first describes the arrangement of the compass and the coil. Furthermore, it is proposed an activity in the laboratory to demonstrate the equivalence between magnets and coils with an electric current. The differences when changing the direction of the current flow are also asked to be analyzed. A feedback linking to the Background topic is include in order to make the student to relate theoretical concepts

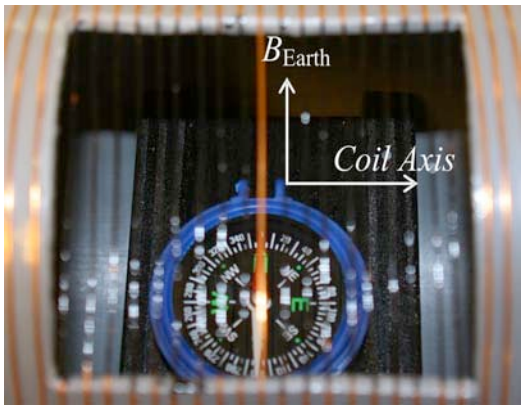

Figure 7. Arrangement of the coil axis with reference to the Earth's magnetic field

4.4.3 Circuit assembly

The section only shows the circuit diagram to mount in the laboratory, as can be seen in Figure 8. An appendix on circuit diagram is also linked.

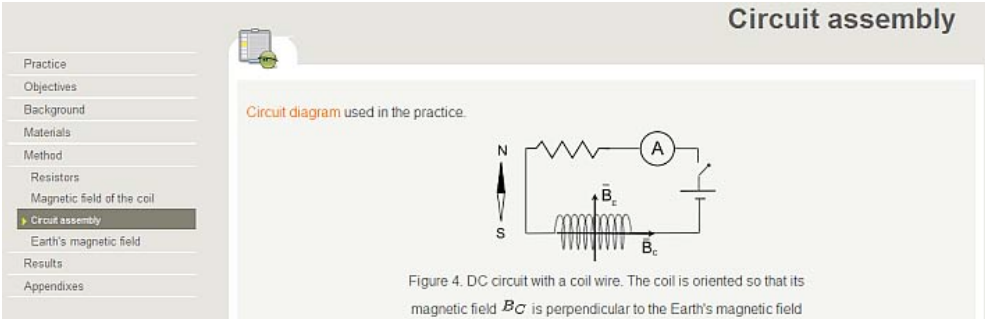

Figure 8. Screen shot of Circuit assembly section

4.4.4 Earth's magnetic field

The last section of the Method topic deals with Earth's magnetic field measurement. Here, the student receive the instructions to perform the measures in the laboratory

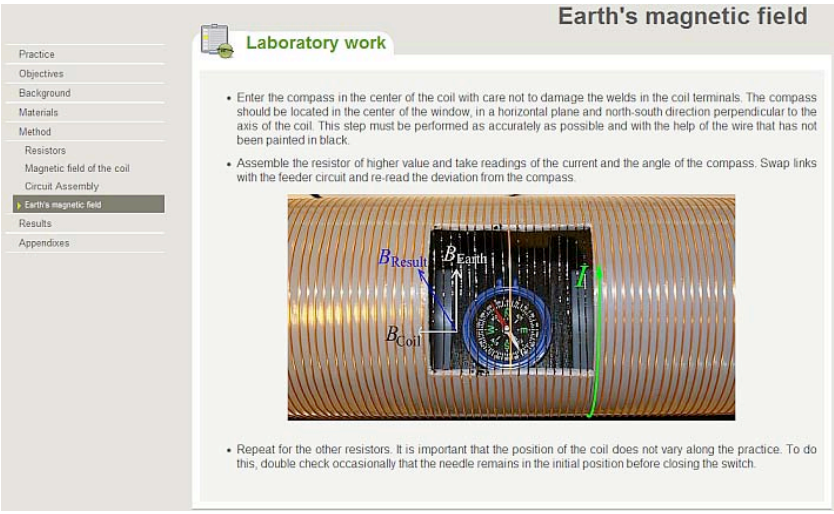

Figure 9. Screen shot of Earth's magnetic field section

4.5 Results

Results of the practice have to be represented in a graphic from which the horizontal component of Earth's magnetic field is obtained. By means of a spreadsheet (Figure 10), a straight line is fitted to the representation of the magnetic field of the coil versus the tangent of the deviation angle. The slope of the straight line is directly related with the Earth's magnetic field according to (2)

$$B_C = B_E \tan(\alpha) \tag{2}$$

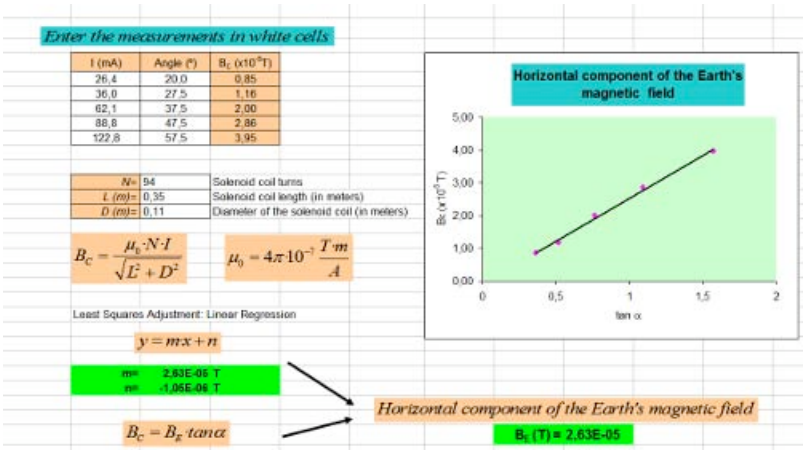

Figure 10. Spreadsheet appearing in the Result topic

4.6 Appendixes

The eLearning XHTML editor allows easily enclosing Wiki articles retrieved from Wikipedia [8], just by performing a search of a topic. This tool has been used to construct the Appendixes topic. It is compounded of a series of sections consisting of articles from [8] that have been modified to suit better the practice contents

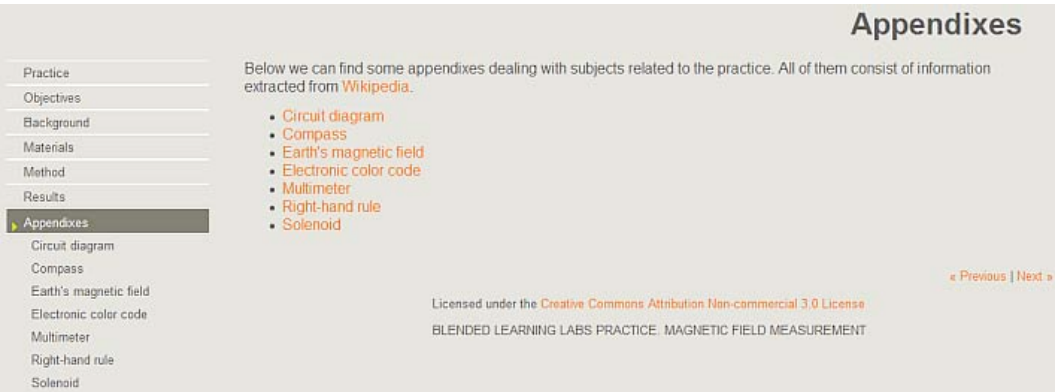

Figure 11. Screen shot of Appendixes topic

5 CONCLUSIONS

The authors are convinced that the results obtained by this project during its short duration, are highly satisfactory to all involved parts. It is interesting that, in general, students receive satisfactorily Physics laboratory practices and consider the time spent helpful.

In future work, we intend to incorporate in this blended learning format to the rest of practices carried out in Physics Laboratory, covering topics such as resistors, voltage and electric current, sound wave resonance, viscosity, density, etc. Furthermore, it is expected extending the proposal to other subjects taught in first year of the Degree in Optics and Optometry that are also conducted by some of the authors of this work like Geometrical Optics

ACKNOWLEDGEMENTS

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