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# Analyzing the Engineering Educational Research in Spain: A Global Vision Through the Awards of CESEI-IEEE

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CESEI is the acronym of the Spanish Chapter of the Education Society of IEEE (the Institute of Electric and Electronics Engineers). Every year, the CESEI awards a prize for the best doctoral thesis and FDP (final (master) degree projects) about education. The thesis or the project must be developed in the areas of electrical engineering, electronics, telecommunication engineering or informatics. The authors carry out research or design technological applications related to education in such areas. During the four editions of the competition, 136 projects have been presented. This number enables to get a general vision about the research in Spain in this field of knowledge. The main objective of this paper is to show the results of the analysis of these 136 documents, for instance, subjects covered or conferences and journals chosen by authors in order to publish their results. This paper tries to provide a complete picture about the educational research in Spain developed in the IEEE areas.

*Keywords:* analysis, doctoral thesis, educational research, master project

## Introduction

Over the past years, the European universities have been involved in a special process in order to define a common area of work (EHEA (European higher education area)). Among the main objectives of this EHEA area, it is possible to highlight (Bologna, 2010):

(1) facilitating mobility of students, graduates and higher education staff;

(2) preparing students for their future careers and for life as active citizens in democratic societies, and supporting their personal development;

(3) offering broad access to high-quality higher education based on democratic principles and academic freedom.

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In the Leuven Communiqué of 2009, the ministers identified these priorities for the coming decade (European Commission, 2010):

(1) social dimension: equitable access and completion;

(2) lifelong learning;

(3) employability;

(4) student-centered learning and the teaching mission of higher education;

(5) education, research and innovation;

(6) international openness;

(7) mobility;

(8) data collection;

(9) multidimensional transparency tools;

(10) funding.

As a direct consequence of this process, the academic staff of the universities started to give more importance to the educational research and innovation. This tendency can be observed in the increased number of research and innovation projects and in the great quantity of published papers devoted to higher education. Also, it is possible to appreciate this effort in the high number of journals and conferences which deal with higher educational research and innovation.

In this context, CESEI (the Spanish Chapter of the Education Society of the IEEE (the Institute of Electric and Electronics Engineers)) aims to become a reference forum for university teachers who intend to improve their teaching in engineering and computing.

Between the different initiatives of the CESEI, it is possible to highlight the creation of the prize for the best doctoral thesis and the final (master) degree project related to educational research or technological applications among the disciplines of the IEEE.

In the present paper, the projects of the candidates are analyzed to provide a global vision of the research developed in Spain. Specifically, in section 2, the CESEI and the prizes are presented. In section 3, an analysis of the subjects covered by authors is showed. Also, the conferences and journals chosen by authors as a vehicle for their research interest are listed. In section 4, other reviews and conferences, not mentioned by the candidates, but of great interest in the field of research of the IEEE Education Society, will be pointed out. Finally, several conclusions and reflections on the results are included in section 5.

An earlier version of this paper was presented at the EDUCON (Engineering Education Conference) 2010 Conference (Annual Global Engineering Education Conference sponsored by the IEEE Education Society) which was held in Madrid, Spain, April 14-16, 2010 (EDUCON, 2010). The present paper tries to inform the researchers, however, not in an exhaustive way. There are other sources of information. For instance, the compilation of titles in the recent publication of David Lopez deserves a special mention (López, 2010).

## Presentation of the CESEI-IEEE Awards

### The IEEE and the IEEE Education Society

The IEEE is a non-profit organization and the world's largest technical professional society. It is designed to serve professionals involved in all aspects of the electrical, electronic and computing fields and related areas of science and technology that underlie modern civilization.

The mission and vision of this organization are explained at its Website. Its mission can be summarized in

the statement that, "IEEE's core purpose is to foster technological innovation and excellence for the benefit of humanity" (IEEE, 2010). In a parallel way, its vision statement is as follows, "IEEE will be essential to the global technical community and to technical professionals everywhere, and be universally recognized for the contributions of technology and of technical professionals in improving global conditions" (IEEE, 2010).

By 2010, IEEE had over 395,000 members in 160 countries. Nowadays, the IEEE includes 38 societies and seven technical councils representing the wide range of technical interests. Also this non-profit organization has 1,952 chapters that unite local members with similar technical interests (IEEE, 2010).

Between these organizations, the EdSoc (Education Society) was created with the aim that "shall be scientific, literary, and educational in character. The Society shall strive for the advancement of the theory and practice of electrical and computer engineering of the allied arts and sciences, and the maintenance of a high professional standing among its members and affiliates, all in consonance with the constitution and bylaws of the IEEE and with special attention to such aims within the field of interest of the Society" (IEEE-EdSoc., 2010).

Its fields of interest are: "educational methods, educational technology, instructional materials, history of science and technology, and educational and professional development programs within electrical engineering, computer engineering, and allied disciplines" (IEEE-EdSoc., 2010).

**The CESEI**

The CESEI was created in the year 2004, and its main objective is to develop the aims and the initiatives of the IEEE Education Society in Spain. The CESEI tries to be a reference forum for university teachers that work in the innovation of the engineering and computing teaching (CESEI, 2010).

In April 2010, the new directive board was elected. Currently, the CESEI consists of four committees and six work groups (see its structure in the Table 1):

Table 1

*Structure of the New Directive Board of the CESEI*

| Committee | Work group |
|---|---|
| Technical Committee of Accreditation and Evaluation | Work group "Remote and virtual laboratories" |
| Committee of Members and Relationship with Associations | Work group "Relationship with institutions and enterprises" |
| | Work group "Research and innovation groups" |
| Committee of Educational Resources | Work group "Reusable educational resources" |
| Committee of Activities, Dissemination and Web | Work group "Social networks and Web technology" |
| | Work group "Engineering diffusion and training" |

(1) Technical Committee of Accreditation and Evaluation (CTAE in Spanish)

The objective of this committee is to contribute: (a) to draw up recommendations; (b) to indicate guidelines; and (c) to develop standards, in order to improve the teaching in engineering using ICTs (information and communications technology).

(2) Committee of Activities, Dissemination and Web (CADW in Spanish)

Its main goal is to encourage contacts and relationships with other organizations interested in the education subject. In a parallel way, it tries to reinforce the communication with the global IEEE organization.

(3) Committee of Members and Relationship with Associations (CMRE in Spanish)

This committee aims: (a) to promote membership of the IEEE Education Society; (b) to foster the transition to senior membership in the Chapter; and (c) to announce the best doctoral thesis and final (master)

degree project awards.

(4) Committee of Educational Resources

It tries to encourage the use and development of open educational resources. Teachers can reuse, re-distribute and review this kind of materials in order to adapt them to specific needs. The members of this committee will give recommendations and advices about the use of technology, standards and quality criteria.

During these six years, different initiatives have been undertaken. For instance:

(1) Periodic publication of the IEEE-RITA journal (Latin-American learning technologies journal): This quarterly publication tries to reinforce the Latin-American community and to increase the diffusion of research works written in Spanish or Portuguese (RITA, 2010);

(2) FINTDI annual conference: The goal of the FINTDI conference (in Spanish, "Fomento e Innovación con Nuevas Tecnologías en la Docencia de la Ingeniería, Promotion and Innovation with new technologies in engineering education") is to show and share innovative educational experiences in the field of engineering. In addition, it intends to be a forum to jointly evaluate the consequences of these new educational methods, taking into account that innovation must be subject to education quality. Because the audience of the conference consists of universities and educational institutions in Latin America, the organizing and scientific committees are composed of Spanish, Portuguese and Latin-American teachers;

(3) Publication of the book TICAI (TICs (in Spanish "Information and Communication Technology") applied to learning of engineering). This book is a compilation of the best papers presented in the Latin-American conferences related to education in the areas of electrical engineering, electronics, telecommunication engineering or informatics (TICAI, 2010);

(4) Social Web: In the URLs (Uniform Resource Locator) such as Blog, Facebook, LinkedIn and Twitter, the CESEI publishes its news and tries to communicate with its members and other people (Blog and Social Webs of the CESEI, 2010);

(5) Collaboration with different conferences and workshops related to higher education and engineering. For instance:

(a) CEDI—Congreso Español de Informática;

(b) CITA—Congreso Iberoamericano de Telemática;

(c) CSEDU—International Conference on Computer Supported Education;

(d) EDUCON—Annual Engineering Education Conference;

(e) FINTDI—Fomento e Innovación con Nuevas Tecnologías en la Docencia de la Ingeniería;

(f) ICALT—International Conference on Advanced Learning Technologies;

(g) ICECE—International Conference on Engineering and Computer Education;

(h) JENUI—Jornadas de Enseñanza Universitaria de la Informática;

(i) MPI—World Education Congress–Meeting Professionals International;

(j) SIIE—Simposio Internacional de Informática Educativa;

(k) TAEE—Tecnologías Aplicadas a la Enseñanza de la Electrónica;

(6) The prize of the best doctoral thesis and FDP: "Premios CESEI, CESEI prizes".

In the next section, the results of the last activity will be analyzed.

**The CESEI-IEEE Prizes**

As it has been mentioned in the above sections, the CESEI awards are one kind of the periodical activities

promoted by the directive board of the CESEI.

This initiative began four years ago, with the aim to strengthen and foster the Spanish research and innovation in education in the frame of the disciplines of the IEEE: electronics, electrical engineering, telecommunications engineering and informatics.

Specifically, the awards focus on the doctoral thesis and FDP, being the thematic related totally or partially to the research or technological applications in education in such areas.

Since 2006, four editions of the awards have taken place:

(1) First edition: works ended between October 2004 and September 2006;

(2) Second edition: works developed between October 2006 and September 2007;

(3) Third edition: comprises from October 2007 to September 2008;

(4) The last edition: works developed between October 2008 and September 2009.

Figure 1 shows the evolution of the number of doctoral thesis and FDP received as candidates during the four editions of the prizes.

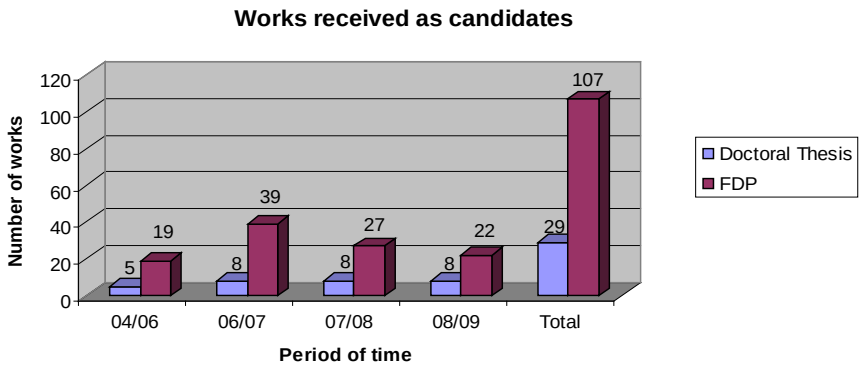


*Figure 1*. Number of doctoral thesis and FDP received as candidates.

The annual average is seven doctoral theses and 27 FDP presented as candidates. During the last two years, a tendency to stabilize these quantities can be observed.

In a global point of view, the CESEI has received 136 works. This quantity enables to analyze and extract several conclusions about the education research developed during the last years in Spain.

## General Vision: Results

In order to present a global vision about the educational research and innovation in Spain, the working areas must be analyzed through the mentioned doctoral thesis and FDP.

In Figure 2, the distribution of the fields of work of the doctoral thesis can be consulted.

According to the data of Figure 2, the researchers of the computer engineering area are more active. This fact can be explained that because in this area, there are lots of technical aspects that can be developed in the use of ICTs in higher education, for instance, e-learning, virtual learning, standardization, platforms, etc.. The following is the telematics and telecommunications area. In this case, the “remote laboratories and virtual instrumentation” line of work plays an important role. On the contrary, in electrical engineering, there are less research activities. Perhaps the researchers of this field are less interested in the CESEI prize. Other reasons can be that in electrical engineering, it is more difficult to find educational topics related to the teaching-learning process or perhaps because it is more difficult to implement virtual laboratories in the electrical engineering field.

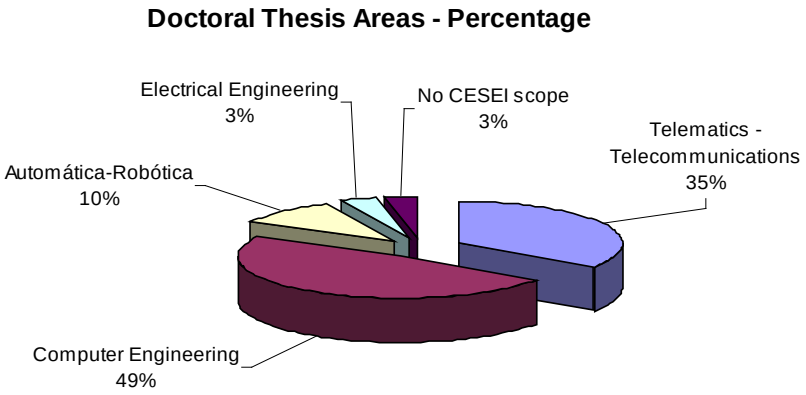


*Figure 2.* Fields of work of the doctoral thesis.

The results are similar in the FDP. Figure 3 shows the obtained data. There are three lines of work with a percentage larger than 10%: “tools and strategies applied to education”, “special education” and “remote laboratories—virtual instrumentation”. The interest that Spanish researchers have in order to elaborate educational materials for disabled people (12% of the projects) is very significant. This fact may be due to a new mentality or to the increasing number of subventions or grants (from the European Union and from the Spanish government or particular organizations).

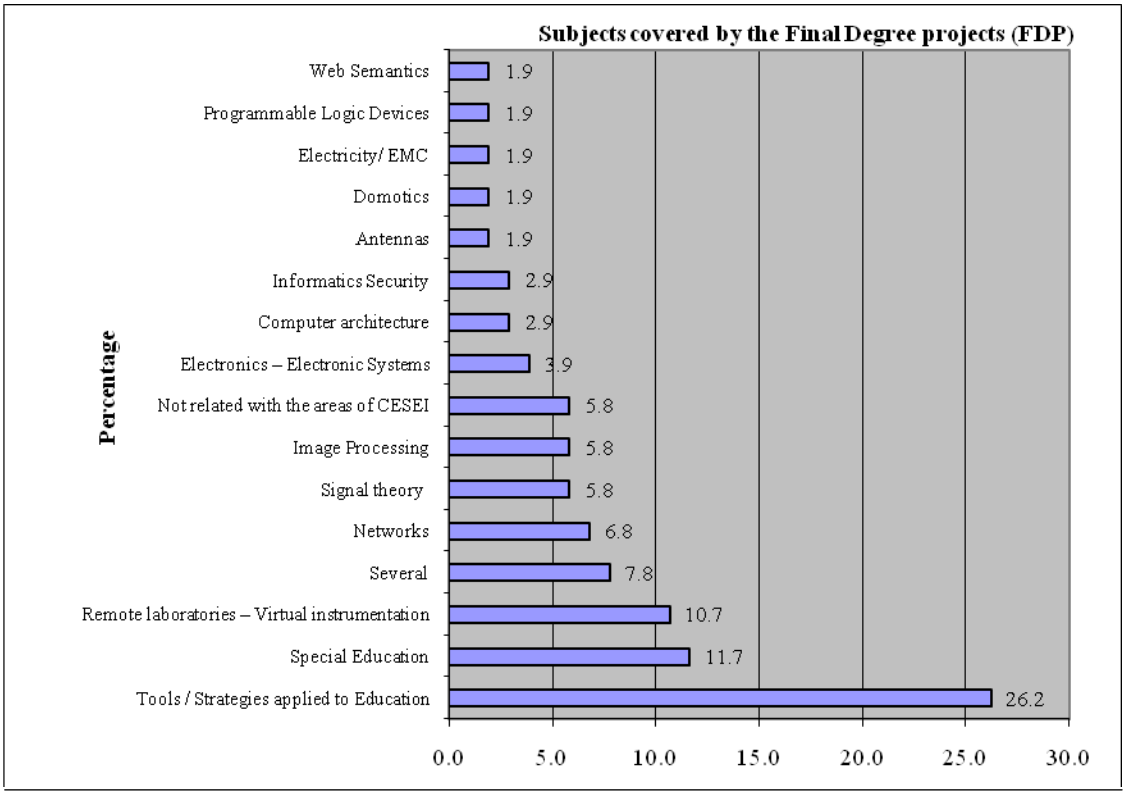


*Figure 3.* Subjects covered by the FDP.

It can also be interesting to know the journals in which Spanish researchers publish their results. Data can be extracted from the publications of the results of the doctoral theses. The information shown in Table 2 will help other researchers know journals to publish their works.

Table 2

*Journals in Which the Spanish Researchers Have Published Their Results*

| | |
|---|---|
| 1 | ACM Journal on Educational Resources in Computing |
| 2 | ACM SIGPLAN Notices |
| 3 | Advanced Technology for Learning |
| 4 | Artificial Intelligence Review |
| 5 | Automatica |
| 6 | Computer Applications in Engineering Education |
| 7 | Computers and Chemical Engineering |
| 8 | Computers and Education |
| 9 | Computers in Human Behavior |
| 10 | Computer Standards & Interfaces |
| 11 | ETS (Educational Technology & Society) |
| 12 | Electronic Design Ideas |
| 13 | Electronic Notes in Theoretical Computer Science |
| 14 | Expert Systems with Applications |
| 15 | Future Generation Computer Systems |
| 16 | Gests International Transactions on Computer Science |
| 17 | IE Comunicaciones |
| 18 | IEEE Computer |
| 19 | IEEE Internet Computing |
| 20 | IEEE-RITA (Revista Iberoamericana de Tecnologías del Aprendizaje) |
| 21 | IEEE Transactions on Circuits and Systems for Video Technology |
| 22 | IEEE Transactions on Education |
| 23 | IEEE Transactions on Industrial Electronics |
| 24 | IEEE Transactions on Instrumentation and Measurement |
| 25 | IEEE Transactions on Learning Technologies |
| 26 | Informatics in Education International Journal |
| 27 | IJKLO (Interdisciplinary Journal of Knowledge and Learning Objects) |
| 28 | International Journal on Advanced Technology for Learning |
| 29 | International Journal of Applied Science, Engineering and Technology |
| 30 | International Journal of Computer Science & Applications |
| 31 | International Journal of Electrical Engineering Education |
| 32 | IJEE (International Journal of Engineering Education) |
| 33 | IJMIC (International Journal of Modelling, Identification and Control) |
| 34 | JIME (Journal of Interactive Media in Education) |
| 35 | Journal of Process Control |
| 36 | Journal of Universal Computer Science |
| 37 | Lecture Notes in Artificial Intelligence |
| 38 | Lecture Notes in Computer Science |
| 39 | Lecture Notes in Informatics |
| 40 | Lecture Notes in Learning and Teaching |
| 41 | Mathematical and Computer Modelling of Dynamical Systems |
| 42 | Measurement |
| 43 | Novática. Revista de la Asociación de Técnicos de Informática |
| 44 | Pattern Recognition |

(to be continued)

| | |
|---|---|
| 45 | Research in Computing Science |
| 46 | Revista Colombiana de Computación |
| 47 | Revista de la Facultad de Ingeniería, Universidad de Tarapacá |
| 48 | Revista Educación y Ciencia Nueva Época |
| 49 | Revista Iberoamericana de Informática Educativa |
| 50 | Revista Iberoamericana de Inteligencia Artificial |
| 51 | RIED (Revista Iberoamericana de Educación a Distancia) |
| 52 | ReLIME (Revista Latinoamericana de Investigación en Matemática Educativa) |
| 53 | Revista Latinoamericana de Tecnología Educativa |
| 54 | Science of Computer Programming |
| 55 | Second and Foreign Language Teaching and Research |
| 56 | Software-Practice and Experience |
| 57 | The EUROCALL Review |
| 58 | The European Journal for the Informatics Professional |
| 59 | Transactions on Advances in Engineering Education |
| 60 | Upgrade. The European Journal for the Informatics Professional |
| 61 | User Modelling and User-Adapted Interaction |
| 62 | Virtueller Campus |
| 63 | WSEAS Transactions on Systems |

The number of journals is very large (63 different journals are found).

An analysis of Table 2 allows concluding that the dissemination of the educational results has been carried out through specialized education journals and through other kinds of technological journals not related directly with education. The reasons could be different (Plaza et al., 2010):

(1) Several technical publications allow works related with higher education;

(2) Researchers have split the technical aspects of their doctoral thesis from the educational aspects, sending each part of the work to a kind of journal (technological or educational).

In a similar way, it is possible to find a large number of conferences to publish educational research results. It is advisable to divide the list of conferences into two tables: One focused on educational conferences, the other on technological ones.

Table 3 is devoted to educational conferences, while Table 4 to technological conferences. Their titles are showed in the original language.

Table 3

*Educational Conferences*

| | |
|---|---|
| 1 | Advances in Control Education |
| 2 | ICWL (Advances in Web-Based Learning) |
| 3 | FIE (ASEE/IEEE Frontiers in Education Conference) |
| 4 | CALL |
| 5 | Conference of the International Group for the Psychology of Mathematics Education |
| 6 | IFIP (Conference on Educational Uses of Information and Communication Technologies) |
| 7 | ITiCSE (Conference on Innovation and Technology in Computer Science Education—Inclusive Education in Computer Science) |
| 8 | EAEEIE (Conference on Innovations in Education for Electrical and Information Engineering) |
| 9 | Conference on New Technologies in Science Education |
| 10 | ECTEL (Conference on Technology Enhanced Learning) |
| 11 | TAEE (Congreso de Tecnologías Aplicadas a la Enseñanza de la Electrónica) |
| 12 | RED-U (Congreso de la Red Estatal de Docencia Universitaria) |
| 13 | Congreso Iberoamericano de Informática Educativa |

(to be continued)

| | |
|---|---|
| 14 | Congreso Internacional de Ensino da Matematica |
| 15 | EDUTEC (Congreso Internacional) |
| 16 | CIVE (Congreso Internacional Virtual de Educación) |
| 17 | Congreso Multimedia Educativo |
| 18 | CUIEET (Congreso Universitario de Innovación Educativa en las Enseñanzas Técnicas) |
| 19 | Computers and Advanced Technology in Education |
| 20 | CSCL (Computer Supported Collaborative Learning Conference) |
| 21 | E-ALT (E-Activity and Leading Technologies Conference) |
| 22 | Educational Innovations in Electrical and Information Engineering |
| 23 | EduTech: Computer-Aided Design meets Computer-Aided Learning |
| 24 | Encuentro SCM-FEEMCAT sobre la enseñanza de las matemáticas |
| 25 | EUNIS Congress (European University Information Systems) |
| 26 | EUROCALL Conference—European Association for Computer-Assisted Language Learning |
| 27 | European Conference on Technology Enhanced Learning |
| 28 | EDEN (European Distance and e-Learning Conference) |
| 29 | CELDA (IADIS International Conference on Cognition and Exploratory Learning in Digital Age) |
| 30 | IASTED International Conference on Computers and Advanced Technology in Education |
| 31 | WBE (IASTED International Conference on Web-Based Education) |
| 32 | EDUCON (IEEE Engineering Education) |
| 33 | Fintdi (IEEE Fomento e Innovación con Nuevas Tecnologías en la Docencia de la Ingeniería) |
| 34 | ICALT (IEEE International Conference on Advanced Learning Technologies) |
| 35 | IFIP World Conference on Computers in Education |
| 36 | Informing Science & Education Conference |
| 37 | ICL (Interactive Aided Learning Experiences and Visions) |
| 38 | International Conference on Artificial Intelligence in Education, AIED |
| 39 | International Conference on Computer Supported Education |
| 40 | ICECE (International Conference on Engineering and Computer Education) |
| 41 | International Conference on e-Learning and Distance Learning |
| 42 | ITHET (International Conference on Information Technology Based Higher Education and Training) |
| 43 | m-ICTE (International Conference on Multimedia and Information & Communication Technologies in Education) |
| 44 | International Conference on New Educational Environments |
| 45 | International Conference on Virtual University |
| 46 | International Seminar on Innovative Teaching and Learning in Engineering Education |
| 47 | SIIE (International Symposium on Computers in Education) |
| 48 | INTED (International Technology, Education and Development Conference) |
| 49 | JAC (Jornada sobre Aprendizaje Cooperativo) |
| 50 | EIWISA (Jornadas de Enseñanza a través de Internet/Web de la Ingeniería de Sistemas y Automática) |
| 51 | Jornadas sobre el Aprendizaje y Enseñanzas de las Matemáticas |
| 52 | Modelling in Science Education and Learning |
| 53 | Online Educa |
| 54 | RIBIE (Red Iberoamericana de Informática Educativa) |
| 55 | SITIAE (Seminario de Investigación en Tecnologías de la Información Aplicadas a la Educación) |
| 56 | SIIE (Simposio Internacional de Informática Educativa) |
| 57 | SINTICE (Simposio Nacional de Tecnologías de la Información y las Comunicaciones en la Educación) |
| 58 | SPDECE (Simposio Pluridisciplinar sobre Diseño, Evaluación y Desarrollo de Contenidos Educativos Reutilizables) |
| 59 | Simposio Pluridisciplinar Sobre Objetos y Diseños de Aprendizaje Apoyados en la Tecnología |
| 60 | TELearn (Technology Enhanced Learning Conference) |
| 61 | TICEEX—Educación-Nuevas Tecnologías |
| 62 | UICEE Annual Conference on Engineering Education |
| 63 | Virtual Educa |
| 64 | World Conference on Educational Multimedia, Hypermedia and Telecommunications |
| 65 | E-Learn (World Conference on E-learning in Corporate, Government, Healthcare and Higher Education) |

Table 4

*Technological Conferences*

| | |
|---|---|
| 1 | American Control Conference |
| 2 | ACM Symposium on Applied Computing |
| 3 | ICCS (Conference on Computational Science) |
| 4 | TGACEP-CAEPIA (Conferencia de la Asociación Española para la Inteligencia Artificial) |
| 5 | CSCiencia (Congreso Comunicación Social de la Ciencia) |
| 6 | CEDI (Congreso Español de Informática) |
| 7 | CITA (Congreso Iberoamericano de Telemática) |
| 8 | Congreso Internacional de Interacción Persona-Ordenador |
| 9 | CISC (Congreso Internacional de Sistemas Computacionales) |
| 10 | Congreso Nacional Universidad y Discapacidad |
| 11 | Congreso sobre Accesibilidad a los Medios Audiovisuales |
| 12 | Conference of the International Graphonomic Society |
| 13 | JITEL (Conference on Telematics Engineering) |
| 14 | CSITeA (Computer Science, Software Engineering, Information Technology) |
| 15 | CERMA (Electronics, Robotics, and Automotive Mechanics Conference) |
| 16 | EurAsian Conference on Advances in Information and Communication Technologies |
| 17 | PDP (Euromicro Conference on Parallel, Distributed and Networkbased Processing) |
| 18 | European Across Grids Conference |
| 19 | European Conference E-COMM-LINE |
| 20 | European Simulation and Modelling Conference |
| 21 | Free Knowledge Free Technology. The SELF Conference |
| 22 | Frontiers in artificial intelligence and applications |
| 23 | IADIS International Conference Applied Computing |
| 24 | IADIS International Conference WWW/Internet |
| 25 | IASTED Symposium on Visualization, Imaging and Image Processing VIIP |
| 26 | Iberian Conference on Pattern Recognition and Image Analysis |
| 27 | IEEE Data Compression Conference |
| 28 | IMTC (IEEE Instrumentation and Measurement Technology Conference) |
| 29 | IEEE International Conference on Acoustics, Speech and Signal Processing |
| 30 | IEEE International Conference on Image Processing |
| 31 | IEEE International Conference on Information & Communication Technologies |
| 32 | ISIE (IEEE International Symposium on Industrial Electronics) |
| 33 | IEEE International Symposium on Signal Processing and Information Technology |
| 34 | IEEE Multi-conference on Systems and Control |
| 35 | IEEE Picture Coding Symposium |
| 36 | IEEE Visual Communications and Image Processing |
| 37 | IFAC (International Federation of Automatic Control) World Congress |
| 38 | IFIP Conference on Artificial Intelligence Applications and Innovations |
| 39 | IMEKO World Congress Fundamental and Applied Metrology |
| 40 | IECON (Industrial Electronics Conference) |
| 41 | ITS (Intelligent Tutoring System Conference) |
| 42 | INTERACCIÓN—Diseño de la Interacción Persona-Ordenador: Tendencias y Desafíos |
| 43 | International and Interdisciplinary Conference on Modelling and Using Context |
| 44 | ICCIT (International Conference on Convergence Information Technology) |

(to be continued)

| | |
|---|---|
| 45 | ICCS (International Conference on Computational Science) |
| 46 | ICIS (International Conference on Computer and Information Science) |
| 47 | CIC (International Conference on Computing) |
| 48 | International Conference on Enterprise Information Systems |
| 49 | International Conference on Image and Signal Processing |
| 50 | ISCRAM (International Conference on Information Systems for Crisis Response and Management) |
| 51 | ISDA (International Conference on Intelligent Systems and Applications) |
| 52 | ITI (International Conference on Interface Technology Interfaces) |
| 53 | International Conference on Modelling, Identification and Control |
| 54 | INSCIT (International Conference on Multidisciplinary Information Sciences & Technologies) |
| 55 | UML (International Conference on the Unified Modelling Language) |
| 56 | ICWE (International Conference Web Engineering) |
| 57 | International Conference on Web Information Systems and Technologies WEBIST |
| 58 | International Conference on Work with Computing Systems |
| 59 | International Modelica Conference |
| 60 | EPE-PEMC (International Power Electronics and Motion Control Conference) |
| 61 | ISCE (International Symposium on Consumer Electronics) |
| 62 | International World Wide Web Conference |
| 63 | Jornadas Andaluzas de Software Libre |
| 64 | Jornadas de Automática |
| 65 | Jornadas de Computación Reconfigurable y Aplicaciones |
| 66 | JIISIC (Jornadas Iberoamericanas de Ingeniería del Software e Ingeniería del Conocimiento) |
| 67 | Jornadas de Ingeniería de Software y Bases de datos |
| 68 | JITEL (Jornadas de Ingeniería Telemática) |
| 69 | CAEPIA & TTIA (Jornadas de Transferencia Tecnológica de Inteligencia Artificial) |
| 70 | Power Electronics Specialist Conference |
| 71 | SAAEI (Seminario Anual de Automatica, Electrónica Industrial e Instrumentación) |
| 72 | ENC (Simposio en Ingeniería del Software) |
| 73 | Simposio de Informática y Telecomunicación |
| 74 | URSI (Simposium Nacional de la Unión Radio-Científica Internacional) |
| 75 | User Modelling Conference |
| 76 | ICOSSE (WSEAS International Conference on System Science and Engineering) |
| 77 | WSEAS International Conference on MIV (Multimedia, Internet and Video G-technologies) |
| 78 | World Computer Congress |
| 79 | World Summit on the Knowledge Society |
| 80 | XVRGIIE Grupos de Investigación de Ingeniería Electrica |

The total number of conferences is 145 and it is possible to find that in some of them, English is the official language and for others, Spanish/Portuguese is the language for publication. This double possibility should motivate authors to publish their works.

## Other Publications

The number of listed journals and conferences (63 and 145, respectively) is very large. However, there are still other important sites where educational research can be published. For instance:

(1) Journals

(a) iJET (International Journal of Emerging Technologies in Learning);

(b) International Journal of Technology and Design Education;

(c) US-China Education Review;

(d) REDIE (Revista Electrónica de Investigación Educativa).

(2) Conferences

(a) Congreso Iberoamericano sobre Calidad de la Formación Virtual (CAFVIR);

(b) International Conference of the Learning Sciences (ICLS);

(c) International Conference on Computers in Education (ICCE);

(d) International Conference on Engineering Education & Research (ICEER).

## Conclusions

The main objective of this paper has been to show a general vision about engineering educational research in Spain. The collected data allow for encouraging the academic staff to work in this research field because they have a lot of possibilities to show and discuss the results of their work.

During the last years, it has been possible to observe an increase in the interest for rigorous educational research (Streveler & Smith, 2006; Borrego, 2007), particularly, in areas of engineering (Plaza et al., 2010). The CESEI tries to reinforce this tendency. For this reason, the CESEI promotes different kinds of activities with the aim of strengthening and fostering the Spanish research and innovation in education in the frame of the IEEE disciplines: electronics, electrical engineering, telecommunications engineering and informatics.

Among its activities, special attention is given to the best doctoral thesis and FDP which are awarded. Works should be thematically related to research or technological applications in education in the engineering field.

In total, the CESEI has received 136 works. The quantities enable the analysis and the drawing of several conclusions about educational research developed during the past years in Spain.

The annual average of candidatures is seven doctoral theses and 27 FDP. During the last two years, these quantities tend to be stable. These numbers lead to the conclusion that the research about education has become a reputable field of work.

Most of the doctoral theses belong to the computer engineering area (49%). This fact can be explained by the great number of technological topics involved with education in this area of work. Telematics and telecommunications is the second thematic group (35% of the candidate works).

With regard to the FDP, a great variety of subjects can be found. It is surprising to note the interest in special education in Spain (12% of the candidate projects). “Tools and strategies applied to education” and “Remote laboratories/Virtual instrumentation” are other of the most frequent lines of work.

Spanish researchers publish their educational results in a very large number of journals (63). Also a great number of conferences (145) have been found. Thus, it is possible to observe both educational and technological conferences, as well as conferences with English or Spanish as language for publication. These broad possibilities should motivate authors to publish the results of their work.

The present paper tries to inform the researchers and provide a complete picture about the educational research developed in the IEEE areas of knowledge, however, not in an exhaustive way.

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