

Looking for fixed stars in the eLearning community: a research on referenced literature in SITE Proceeding Books from 1994 to 2001

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Abstract

This research aims to give an initial answer to the following question: *is there in the eLearning research community a shared body of common knowledge (authors/journals/ etc.)?*, and, in addressing this issue, aims to promote the growing of a common background, condition of main importance for the growing of the discipline itself. To reach this goal the authors analysed the Proceeding Books of the international conference *SITE from 1994 to 2001*. The corpus of data consisted of 21,908 reference items cited in 2,966 papers. The parameters analysed were: the most cited titles, the most cited authors, years in which referenced items were written, the most cited journals and the number of references retrievable online.

Introduction

Research on the use of new information and communication technologies in educational contexts covers a quite wide area, which hasn't well defined boundaries yet; this situation is well represented by the number of terms used to name it: e-Learning, Web Based Training, On-Line Learning, Computer Based Training, Technology Based Distributed Learning, Technology Assisted Learning, etc. (Masie 2000, Bates 2000)¹. In addition, studies in the field range from education to information technology, from management to philosophy, from economics to psychology, and so forth.

Nonetheless, a specific community has been growing up, devoted both to study and to promote eLearning experiences, independently from different points of view and stresses; a common (inter)disciplinary ground is being collaboratively defined and established. Elearning studies are thus moving to becoming a (inter)discipline, with a specific study subject/object, and the same theoretical and practical purpose. (Cantoni & Rega 2003)

The community of research and practice grown (and growing) around eLearning negotiates and builds up a common body of shared knowledge, a process necessary to its strengthening, and to make its research activities both effective and efficient.

The growing of a specific (inter)discipline is showed also by the presence of research organizations, conferences, journals, book series and academic institutes: all of them bear testimony of a common interest and a common field of research and experimentation.

Among the different processes through which a research community better defines itself (Kuhn 1996), there is the recognition of a set of parameters of what is to be meant by "scientific research", together with the identification of a specific hierarchy of sources: authors, journals, organisations commonly taken as "fixed stars" in the field; although new information and communication technologies have challenged every established set of parameters, and have called for new research on it (Lawrence et al. 1999, Lawrence 2001).

Among the different strategies to assess the hierarchy of sources shared by a given research community, the analysis of referenced literature has proven its value. Parameters like "impact factor", "citation index", etc. have been developed, all of which show how a journal/article/author are likely to impact on the knowledge of a concerned community (Evered et al. 1985; Rousseau 2002). Research on cited literature has also focused on accuracy and relevance, especially in medical journals (De Lacey et al. 1985; Hall 1994; Henige 2001, O'Connor 2002).

The study presented here provides elements to answer the following question: *is there in the eLearning research community a shared body of common knowledge (authors/journals/ etc.)?*

¹ According to a poll done by Elliott Masie (2000), organizations used: e-Learning (36%), Web Based Training (11%), On-Line Learning (10%), Computer Based Training (9%), Distance Learning (8%), while learners used: Computer Based Training (21%), On-Line Learning (18%), Web Based Training (16%), e-Learning (13%). In this article we will use – to cover all the related area – the term eLearning, which was consecrated by European Union documents, and defined: "as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration." (CEC 2001: 2).

In doing so, it tries also to promote the construction of a common ground (Clark & Marshall 1981), knowing that it is of the main importance for the healthy growth of the discipline itself; otherwise, every communication is in danger of remaining a fruitless monologue...

Research method²

To address the above question the Proceedings of the international conference *SITE from 1994 to 2001* were selected and analysed.

The SITE conference is organized yearly by the Society for Information Technology & Teacher Education, “an international association of individual teacher educators, and affiliated organizations of teacher educators in all disciplines, who are interested in the creation and dissemination of knowledge about the use of information technology in teacher education and faculty/s taff development. The Society seeks to promote research, scholarship, collaboration, exchange, and support among its membership, and to actively foster the development of new national organizations where a need emerges. SITE is the only organization that has as its sole focus the integration of instructional technologies into teacher education programs” (SITE 2002).

Beside the international conference, SITE promotes the publication of a printed journal: the *Journal of Technology and Teacher Education (JTATE)*, and of an electronic one: *Contemporary Issues in Technology & Teacher Education (CITE)*.

SITE is promoted by AACE, the Association for the Advancement of Computing in Education. AACE was founded in 1981 and it has become among the widest and most influential organisations on the use of new technologies in education. The basic aim of AACE is to study how Information and Communication Technologies (ICTs) can enhance the quality of learning and teaching at all levels. To pursue its aim AACE organises four international conferences every year: the SITE one; ED-MEDIA: World Conference on Educational Multimedia, Hypermedia and Telecommunications; E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education; and ICCE: International Conference on Computers in Education. Beside conferences, AACE publishes five quarterly journals on the field plus an annual magazine and two electronic journals.

The research corpus consists of the electronic version (on CD-ROM) of SITE Proceedings Books conferences from 1994 to 2001, which collected 2,966 papers, citing 21,908 references.

Data has been collected from the pdf files containing the proceeding books of SITE Conferences from 1994 to 2001 and compiled into an excel file. Each reference has been divided into three parts: authors of the citation, data of the citation and the citation itself:

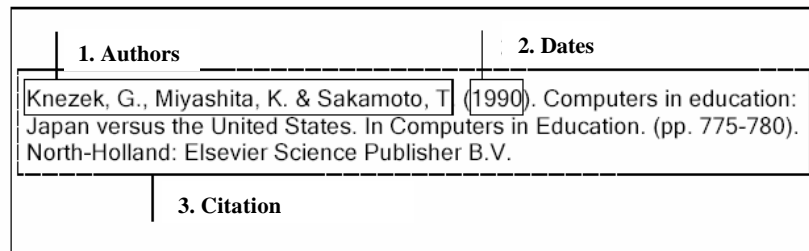


Figure 1: Subdivision of a reference item

The following step consisted in the normalization of the 21,908 references, in order to import data in the MSAccess database used to conduct the analysis. A program has been appositely developed to accomplish this task. The program normalized:

- Dates
- Authors’ names
- Citations
- Journals’ names

Once normalized, data have been imported in the MSAccess database structured in the following way:

² Authors would like to thank and to remark the great help given by Amerigo Oliva, student at the School of Communication Science of the University of Lugano, in implementing tools used in the explained methodology.

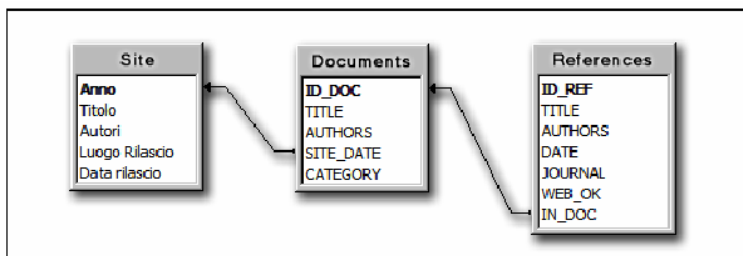


Figure 2: database

Table “Site” contains information about each Proceeding Book: year of publication of the proceeding book, title of the proceeding, editors, place of publication and data of publication.

The table “Documents” focuses on the papers gathered in the proceedings: it stores the title of the paper, authors, the year of the proceeding in which the paper has been published and the category in which it has been placed.

The table “References” collects information about the piece of reference: the title of the cited work, the authors, the date, the possible journal in which the reference appeared, the SITE paper which cited it and a binary field to code whether the work is retrievable online or not.

The goal of the analysis was to find out if some “fixed stars” could be recognised among the cited literature. According to this focus some SQL queries have been set up to find out:

- the most cited (articles’ or books’) titles
- the most cited authors
- years in which referenced items were written
- the most cited journals
- the number of references retrievable online

To understand the way in which results are presented, a specific distinction has to be made between title-type and title-token:

- a title-type is a single reference item (e.g. book X, cited whatever number of times is a title-type), while
- a title-token is one single occurrence of a given item (e.g. the citation of book X in paper Y is a title-token).

Results

Results of data analysis are presented in this paragraph, in the following order: a. *title-types* and *title-tokens*, b. *authors*, c. *publication years*, d. *journals*, e. *documents available online*.

a. Titles

On a corpus of 21,908 title-types, only 591 items have been cited by more than two papers, 1,575 have been quoted twice and 17,157 just once.

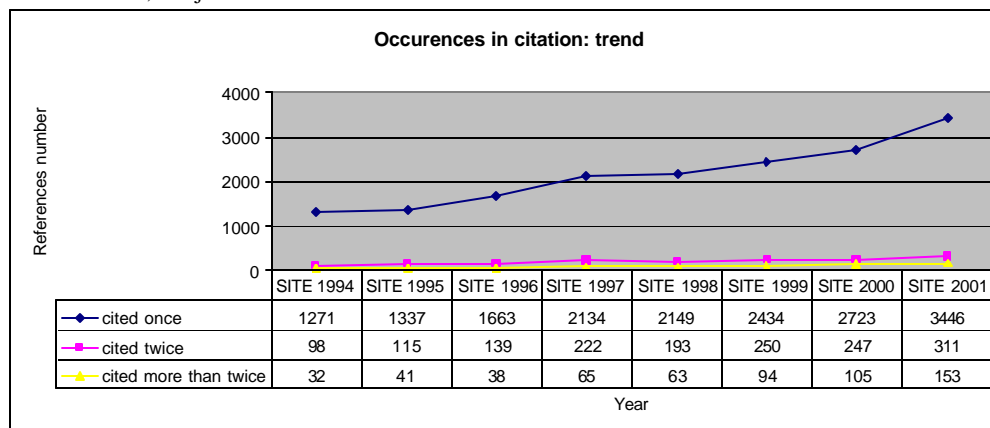


Figure 3: Title-token trend

In the following table, title-types quoted at least 11 times are ranked in descending order:

Title-type	Occurrences
Office of Technology and Assessment. (1995). Teachers and technology: making the connection. Washington, DC: US Congress.	141
Office of Technology and Assessment. (1988). Power on! New tools for technology and learning. Washington, DC: U.S. Government Printing Office. (ERIC Document Reproduction Service No. ED 295 677)	51
National Council for the Teaching of Mathematics (1989). Curriculum and evaluation standards for school mathematics. Reston, VA: NCTM	46
Vygotsky, L. (1978). Mind and Society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.	45
Rogers, E. (1995) Diffusion of Innovations.(4th Edition) NY: Macmillan Publishing.	40
National Council for Accreditation of Teacher Education (1997). Standards procedures and policies for the accreditation of professional education units. Washington, DC: National Council for the Accreditation of Teacher Education.	39
Wetzel, K (1993). Teacher educators' use of computers in teaching. Journal Technology and Teacher Education, 1(4), 335- 352.	34
Papert, S. (1993) . The children's machine: rethinking school in the age of the computer . New York, NY: Basic Books.	33
Fullan, M, & Stiegelbauer, S. (1991). The new meaning of educational change. New York: Teachers College Press.	32
National Council for the Social Studies. (1991). NCSS position statement on testing and evaluation. Washington, DC: National Council for the Social Studies.	30
Brown, J. S., Collins, A, & Duguid, P. (1989). Situated Cognition and the Culture of Learning. Educational Researcher , Jan-Feb., pp. 32-42).	28
Papert, S (1980). Mindstorms: Children, computers and powerful ideas. N.Y.: Basic Books.	26
Handler, M. G. (1993). Preparing new teachers to use computer technology. Computers and Education, 20(2), 147-156.	25
Cuban, L. (1986) Teachers and machines: The classroom use of technology since 1920. New York: Teachers College Press.	25
Moore, M. & Kearsley, G. (1996). Distance education: A systems view. Belmont: Wadsworth Publishing Company.	25
National Council of Teachers of Mathematics. (1989). . Curriculum and Evaluation Standards for School Mathematics. Reston, Va.: National Council of Teachers of Mathematics.	22
Sheingold, K. and Hadley, M. (1990). Accomplished Teachers: Integrating Computers in Classroom Practice. New York: Bank Street College of Education. Center for Technology in,Education.	18
Lortie, D. (1975). School teacher: A sociological study. Chicago: University of Chicago Press.	17
Novak, D. I. & Berger, C. F. (1991). Integrating technology into teacher education. T. H. E. Journal, 18(9), 83-86.	17
Jonassen, D. & Reeves, T. (1996). Learning with technology: Using computers as cognitive tools. In D.H. Jonassen (Ed.), Handbook of research on educational communications and technology (pp. 693 -719) New York: Macmillan.	17
National Research Council (1996). National science education standards. Washington, D.C.: National Academy Press.	17
Clements, D. and Meredith, J. (1993). Research on Logo: Effects and efficacy. Journal of Computing in Childhood Education, 4(4), 263-290.	16
Harris, J. (1994). A model for integration in telecomputing in precollege curricula. Technology and Teacher Education Annual, 1994. J. Willis, B. Robin and D. Willis. Charlottesville, VA, Association for the Advancement of Computing in Education.	16
Hall, G. & Hord. S. (1987). Change in schools: Facilitating the process. Albany, NY: State University of New York Press.	16
Becker, H. J. (1994) Analysis and trends of school use of the new information technologies. Irvine: University of California.	15
Loyd, B. and Gressard, C. (1984). Reliability and validity of the computer attitude scale. Educational and Psychological Measurement , 44(1), 501-505.	14

Sandholtz, J. H., Ringstaff, C. & Dwyer, D. C. (1997). Teaching with Technology: Creating Student-Centered Classrooms. New York: Teachers College Press.	14
Sheingold, K. (1991) Restructuring for learning with technology: The potential for synergy. Phi Delta Kappan, 73(1), 17-27.	14
Brooks, J. & Brooks, M. (1993). In search of understanding: The case for constructivist classroom. Alexandria, VA: Association for Supervision and Curriculum Development.	14
National Council for Accreditation of Teacher Education (June, 1994). NCATE Standards—1994. NCATE Reporter, 2(2): S1-8.	13
National Council of Teachers of Mathematics. (1991). Curriculum and evaluation standards for school mathematics. Reston, VA: National Council of Teachers of Mathematics.	13
Todd, N. (1993). A curriculum model for integrating technology in teacher education courses. In J.J. Hirschbuhl (Vol. Ed.), Computers in Education (6th. Ed., pp. 119-125). Guilford, CT: Dushkin Publishing Group	13
Collins, A. (1991). Cognitive apprenticeship and instructional technology. In L. Idol & B. F. Jones (Eds.), Educational values and cognitive instruction: Implications for reform. Hillsdale, NJ: Erlbaum.	13
Hadley, M. , & Sheingold, K. (1993). Commonalities and distinctive patterns in teachers' integration of computers. American Journal of Education, 101 (3), 261-315.	13
International Society for Technology in Education (1992). Curriculum guidelines for accreditation of educational computing and technology programs. Eugene, OR: International Society for Technology in Education.	13
Lincoln, Y. & Guba, E.G. (1985). Naturalistic Inquiry. Beverly Hills, CA: Sage.	12
Strudler, N. (1991). Education faculty as change agents: Strategies for integrating computers into teacher programs. Journal of Computing in Teacher Education, 8(2), 5-8.	12
Sheingold, K. & Hadley, M. (1990). Accomplished teachers: Integrating computers into classroom practice, Center for Technology in Education: Bank Street College of Education, September.	12
Willis, J., & Mehlinger, D. (1996) Information technology and teacher education. In J. Sikula, T. Buttery & E. Guyton (Eds.). Handbook of Research on Teacher Education-1996 (pp. 979 -1029). New York, N.Y: Macmillan.	12
Bloom, B. (1956). Taxonomy of educational objectives, Vol. I: The cognitive domain. New York: McKay.	12
Holmes Group (1986). Tomorrow's Teachers. East Lansing, MI: Author.	12
Fulnan M..(1993). Change forces: Probing the depths of educational reform. Bristol,, PA: The Falmer Group.	12

Table 1: Title-types ordered by occurrences.

b. Authors

The second studied factor was the presence of frequently cited authors. In order to ascertain this, a table was compiled, showing title-types and title-tokens for each single author; only first authors were taken into account. The following table presents the top-40 list of authors ranked by title-tokens:

Authors	Title-token	Title-type
U. S. Congress, Office of Technology Assessment	218	18
National Council for Accreditation of Teacher Education	131	29
International Society for Technology in Education	118	45
National Council of Teachers of Mathematics.	114	25
Jonassen, D.	111	35
Hall, G.	101	34
Becker, H.	97	31
Papert S.	85	11
Fullan M.	75	16
Vygotsky, L.	71	13

Sheingold, K.	61	11
Willis, J.	60	13
Cuban, L.	55	11
Harris, J	48	11
Handler, M.	47	8
Wetzel, K	45	7
Means, B	42	16
Clements, D.	41	13
Maddux, C.	40	14
Strudler, N.	38	13
Strang, H. R.	38	18
Thompson, A.	38	17
Johnson, D.	37	17
Harasim, L.	37	8
Collis, B.	37	18
Rogers, E.	36	6
Loyd, B.	36	10
Bruner, J	35	14
Dwyer, D.	34	10
Moore, M.	34	9
Goodlad, J.	33	8
Abate R.	33	14
Davis, N.	33	16

Table 2 : Authors ordered by title-tokens.

c. Publication years

A graph showing the frequency of title-types according to their years of publication follows; years have been divided by five-years periods since 1960, the periods before and afterwards were considered as homogeneous periods.

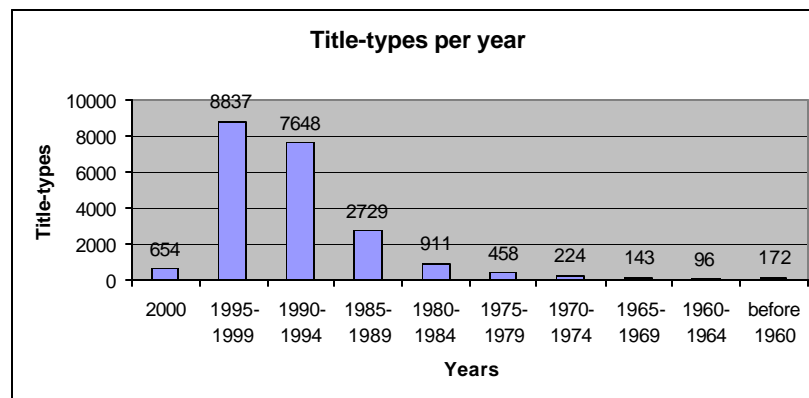


Figure 4: Title -types by publication year.

d. Journals

The following table lists the most cited periodical publications in SITE Proceeding Books.

Journal	Title-token	Title-type
Educational Technology	635	369
Educational Research	343	270
Journal of Technology and Teacher Education	245	104
Educational Leadership	241	165

Journal of research on computing in education	205	96
Phi Delta Kappan	176	98
Computers in Education	174	106
Science Education	164	126
Journal of Teacher Education	162	85
Journal of Educational Computing Research	156	98
Journal of computing in teacher education	154	78
Computers in the Schools	152	81
Educational Researcher	138	64
T. H. E. Journal	108	69
The Computing Teacher	94	58
Electronic learning	91	47
Journal of information technology for teacher Education	80	52
The American Journal of distance education	78	57
Time	77	62
Young Children	67	50
Computers and Education	62	24
Journal of Educational Psychology	59	50
Action in teacher education	50	33
Journal of Educational technology systems	47	37
Education Week	46	21
Language Arts	46	34
Journal of Computer assisted learning	45	25
Journal of computers in mathematics and science technology	42	34
Mathematics teacher	38	32
Review of Educational Research	36	23
Journal of Computing in Childhood Education	36	15
Instructional Science	34	20
Journal of research in science teaching	33	30
American Educational Research Journal	31	23
Childhood Education	30	24

Table 3: Journals cited more than 25 times, by title-tokens.

e. Documents available online

As the table shows, during the 8 years analysed, material available online considerably increased, starting from a percentage of 0.06% retrievable references in 1994 to 13.2% in 2001.

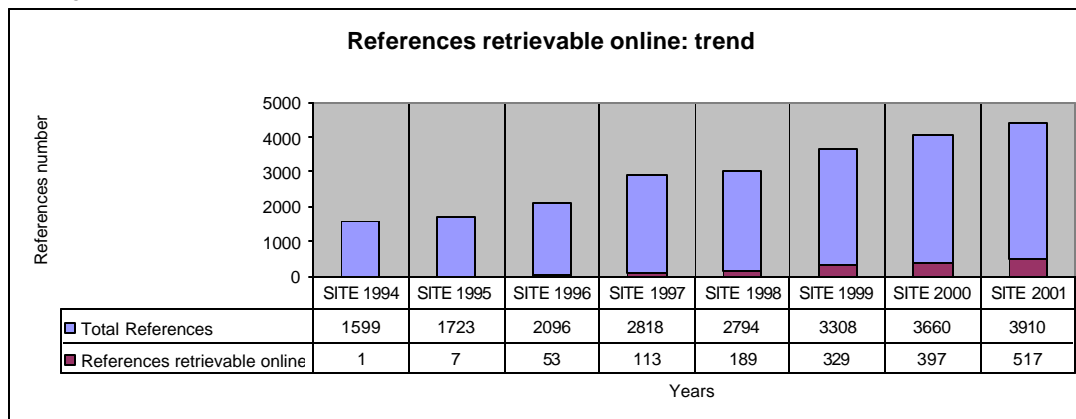


Figure 5: References retrievable online

Brief discussion & conclusion

Results found out from this research show a quite fragmented reality. The different scientific communities, from which presenters come, have not harmonised yet, and this is represented by a little overlapping area when it comes to cited literature, even though some improvement toward the creation of a common background can be perceived through the eight years analyzed.

The study shows that, while only few title-types are shared, governmental, research and professional organisations are known and work towards the building up of an eLearning dedicated community.

Moreover, data show that it is a very young community, whose research “tradition” belongs mainly to the last ten years.

It is to be underlined the fact that the number of title-types available online substantially increased through the years: this makes quite easy their access and circulation, and indicates an effort in the creation of a common ground.

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