

Leena Norros

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Personal Information

Research professor Leena Norros (born in Helsinki 8.10.1948, married, children born 1979, 1982) is an industrial psychologist working on the problems of cognitive ergonomics in complex industrial systems at the Technical Research Centre of Finland. She leads a human factors research team. She studied at University of Helsinki and prepared her doctoral dissertation on decision theory at the Technical University of Dresden. She took a doctors degree also at the Helsinki University. Currently she acts as docent (adjunct professor) at the Helsinki University and teaches human factors engineering both at the Helsinki University and the Helsinki Technical University. In her work she has focused on the analysis of cognitive systems in context. Work has been conducted in several safety-critical domains like nuclear power plants, aviation (ATC), anaesthesia, maritime. In these studies and development projects she has worked together with experts of automation and reliability engineering, mathematics and information technology, and various domain experts. She has participated as human factors expert in many accident investigations in collaboration with the Finnish Accident Investigation Board. In her scientific work she has developed an original research approach to human performance, labelled the Core-Task Analysis. In this approach she makes use of the cultural-historical theory of activity, systemic work domain modelling and the pragmatist conceptions of human practice. Her current interest is to implement the Core-Task Analysis methodology to design and evaluation of ICT-based objects and environments from a holistic, Systems Usability perspective. She has been actively associated with the European Association of Cognitive Ergonomics, the North-American naturalistic decision-making community and the International Ergonomics Association. She has about 130 scientific publications in international journals, books and conference proceedings.

Languages

Finnish, English, Swedish, German

Education

BA University of Helsinki 22.1.1974

Dr.rer.nat. Technische Universität Dresden 7.12.1978

Fil.lic. University of Helsinki 3.3.1983

PhD University of Helsinki 9.4.1983

Docent in work psychology University of Helsinki 10.11.1987

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Research interests

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Design of intelligent environments

Activity theories

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Work history

Work psychologist at Espoo City Occupational health centre 1.12.74 - 30.9.1975

Acting assistant, Helsinki university Institute of Psychology 1.8.1979 - 31.7.1980

Lecturer in Work psychology, Helsinki university Institute of Psychology 1.9.1980 - 10.11.1987

Docent in Work psychology, University of Helsinki 10.11.1987

Researcher and Senior researcher at VTT Automation 1.8.1981 - 2006.

Research professor at VTT 2006.

Acting senior researcher at Finnish Academy of Sciences 1.1.1988 - 31.7.1988

Human factors expert in the Finnish Accident Investigation Board from 1994, participated as a member of investigation committees (ATC and maritime)

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Publications

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1. Articles in international journals

Nuutinen M., Norros L. (in press). Core-Task Analysis in accident investigation – Analysis of maritime accidents in piloting situations. *Cognition Technology and Work*

Norros, L. Savioja, P. (in press). Validation of NPP's modernised control rooms: what is to be expected from new human factor assessment methods? *Eurosafe Forum*.

Norros, L. (2005) The concept of habit in an activity-theoretical analysis of situated actions. *Theoretical Issues in Ergonomics Science*, Vol.6, 5, 385-408.

Norros, L. & Nuutinen, M. (2005). Performance-based validation of a safety information & instruction panel. *Int. J. Human-Computer Studies*, 63, 328-361.

Klemola, U-M. & Norros, L. 2001. Practice-based criteria for assessment the anaesthetists' habits of action. Outline for a reflexive turn in practice, *Medical Education*, 35, 455-464.

Norros, L. & Klemola, U.-M. 1999. Methodological considerations in analyzing anaesthetists' habit of action. *Ergonomics*, Vol 42, No 11, 1521-1530.

Holmberg, J. Hukki, K. Norros, L. Pulkkinen, U. Pyy, P. 1999. An integrated approach to human reliability analysis. Decision Analytic dynamic reliability model. *Reliability Engineering and System Safety* 65, 239-250.

Hukki, K. & Norros, L. 1998. Subject-centered and systemic conceptualization as a tool of simulator training. *Le Travail Humain*, Vol 61, No 4, 313-331.

Klemola, U-M. & Norros, L. 1997. Analysis of the clinical behaviour of anaesthetists: recognition of uncertainty as basis for practice. *Medical Education*, Vol 31, pp 449-456.

Hukki, K. and Norros, L. 1993 Diagnostic Judgement in the Control of Disturbance Situations in Nuclear Power Plant Operation. *Ergonomics*, Vol 36, No 11, May 1993, 1317-1328.

Toikka, K. Hyötyläinen, R. and Norros, L. 1986 Development of work in flexible manufacturing. *Nordisk Pedagogik*, 1, 16-24.

Toikka, K. Engeström, Y. und Norros, L. 1985 Entwickelnde Arbeitsforschung. Theoretische und methodologische Elemente. *Forum Kritische Psychologie* 14. Argument Sonderband 121,5-41.

2. Articles in international scientific books or conference proceedings

Savioja, P. and Norros, L. (in press) Systems usability - promoting core-task oriented work practices. In: Law, E. Thora Hvannberg, E. Cocton, G. & Vanderdonckt, J.: *Maturing Usability: Quality in software, Interaction and Value*. Springer.

Laarni, J., Norros, L. & Norros, I. 2007. Affordances of ubiquitous internet. Proceedings of the 8th International Conference on Work With Computing Systems. May 21st-24th, Stockholm Sweden, p. 35-39.

Laarni, J., Salo, L. & Norros, L. 2007. A step towards more agile and adaptive management of nuclear power plant control room renewals – lessons learned from a project in Finland. Enlarged Halden Programme Group Meeting, March 12-15, Storefjell, Norway.

Norros, L. Salo, L. Savioja, P. Laarni, J. 2007. Communicating the meaning of process state information – Comparing operators practices when using three forms of information presentation. Enlarged Halden Programme Group Meeting, March 12-15, Storefjell, Norway.

Nurkka, P. Norros, L. & Pesonen, L. 2007. Improving usability and user acceptance of information systems in agriculture. The European Federation of IT in Agriculture and the World Congress on Computers in Agriculture EFITA/WCCA 2007. Glasgow, Scotland 2-5 July 2007.

Wahlström, B., J. Hämäläinen, K. Juslin, J.-E. Holmberg, H. Harju, L. Norros, U. Pulkkinen, T. Reiman, J. Laarni, K. Simola. (2007). Research in Automation, Risk Analysis, Control Rooms, and Organizational Factors; Applications to Plant Life Management. Second International Symposium on Nuclear Power Plant Life Management to be held from 15 to 18 October 2007 in Shanghai, China.

Laarni, J. Norros, L. & Rinttilä, E. 2006. Control room modernization from an evolutionary point of view – experiences gained at Loviisa NPP. Joint HRP and CSNI SEGHOFF Workshop on Future Control Station Designs and Human Performance ISSUES in Nuclear Power Plants. May 8-10, Halden Pre-proceedings, 6.2, 13 pages.

Norros, L. 2006. Behind accidents – Practices and culture of piloting. Proceedings of Transportforum 2006, 11-12 Jan, Linköping (abstract).

Norros, L. 2006. Core-Task Analysis – a new approach to work analysis and design - Case maritime accident analysis. Key-note paper at an international workshop on “Mobilities in Transit – Rethinking the artefacts, images and surroundings of human motion and movability. Norwegian University of Science and Technology, June 14 -17, Trondheim, Norway. (powerpoint presentation)

Norros, L. 2006. Improving design by understanding usage – outline of an ecological design concept for smart environments. In Scientific Forward Look. Nanoscience and the long-term future of information technology (NSIT). European Science Foundation, 2006.

Norros, L.L. & Savioja, P.J. 2006. Towards a theory and method for usability evaluation of complex human-technology systems. Eds: Pekar, R.N., Koningsveld, A.A.P. and Settels P.J.M. Proceedings of the 16th World Congress on Ergonomics, July 10-14 Maastricht, the Netherlands. Elsevier CD.

Norros, L. Savioja, P. 2006. Integrated validation of complex human-technology systems – development of a new method. In. Rätty, H. & Puska E. K.: Final report of the Finnish Research Programme on Nuclear Plant Safety. VTT Research Reports 2363. Espoo, .275-285.

Norros, L. & Savioja, P. 2006. Is function-based control room design human-centered? the 5th ANS International Topical Meeting on Nuclear Plant Instrumentation, Controls, and Human Machine Interface Technology, Albuquerque Nov 12-16, 2006.

Norros, L. 2005. Systems Usability: A concept to support the design of smart objects and environments. HOT Topics article, October. Carlton University, Human Oriented Technology Lab, Canada. <http://www.carleton.ca/hotlab/hottopics/Articles/October2005-SystemsUsabil.html>

Norros, L. 2005. Instrumental genesis in ecological design of ICT-artefacts. Proceedings of the First International Society for Cultural and Activity Research (ISCAR) Conference, Seville 20-24 September, 2005 (abstract and powerpoint presentation).

Norros, L. and U.-M. Klemola 2005. Naturalistic analysis of anaesthetists' clinical practice. In: Montgomery, H., Lipshitz, R. and Brehmer, B. (eds). How experts make decisions. Hillsdale, NJ: Lawrence Erlbaum Associates, 395-407.

Norros, L. & Savioja, P. 2005. Theoretical justification of performance indicators for integrated validation of complex systems. Proceedings of the HEPG meeting in Lillehammer, Oct 17-21, 2005

Savioja, P. Norros, L. Salo, L. Kivikunnas, S. & Karppinen, J. 2005. Core-task analysis in requirements gathering for an adaptive batch process control interface. Proceedings of the Annual Conference of The European Association of Cognitive Ergonomics, Chania, Crete, Greece, 29 Sept-1 October, 2005, 19-25.

M. Sipilä, P. Raatikainen, M. Åberg, I. Norros, L. Norros, A. Mämmelä, T. Frantti, J. Holmberg, H. Ailisto, A. Lattunen, J. Latvakoski, S. Horsmanheimo. 2005. Topics in 4G Networks and Hardware. Proceedings of the International Workshop on Optical and Electronic Device Technology for Access Network. Aalborg University - Keio University Joint Workshop for Broadband Wireless Communications, September 15-16, 2005, Aalborg in Denmark.

Norros L., Savioja P. 2004. Modelling of the activity system - development of an evaluation method for integrated system validation. Presented at Enlarged Halden Programme Group Meeting, Sandefjord, C2.9.1-12.

Savioja P., Norros L. 2004. Developing the concept of system usability. Presented at IFAC/IFIP/IFORS/IEA Symposium Analysis, design, and evaluation of human-machine systems, Atlanta, GA.

Savioja P., Norros L. 2004. Evaluation of operator practices as means of integrated system validation. Presented at Forth American Nuclear Society International Topical Meeting on Nuclear Plant Instrumentation, Controls and Human-Machine Interface Technologies, Columbus, Ohio.

Norros, L. 2003. Combining causal and reason-based explanations of actions – Improving learning from accidents. Invited paper at New challenges to understanding system safety, University of Linköping, Vimmerby, Sweden (abstract and power point presentation).

Norros, L. 2003. How does the human actor collect and process information? Abstracts from the 27th Congress of the Scandinavian Society of Anaesthesiology, and Intensive Care Medicine. Acta Anaesthesiologica Scandinavica, 47,116, 84-86.

Norros, L. 2003. Understanding use in the design of smart tools – reflections on the conception of collaborative design. Invited paper at Smart Objects Conference, May 15-17, Grenoble France 21-26.

Klemola, U-M. & Norros, L. 2002. An activity-based analysis of information characteristics of monitors and their use in anaesthetic practice. Bagnara, S. Pozzi, S. Rizzo, A. and Wright, P.

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(eds.) Proceedings of the 11th European Conference on Cognitive Ergonomics, 8-13 September, Catania, Italy, 219-228.

Norros, L. & Nuutinen, M. 2002. The core-task concept as a tool to analyse working practices. In: Boreham, N., Samurcay, R. & Fischer, M. Work Process Knowledge. London: Routledge, 25-39.

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Reiman, T. & Norros, L. 2002. Regulatory Culture – A case study in Finland. IEEE 7th Conference on Human Factors and Power Plants. Scottsdale, Arizona, USA, 5-15 - 5-20.

Reiman, T. & Norros, L. 2002. Regulatory Culture : Balancing the Different Demands of the Regulatory practice in Nuclear Industry. In: Hale, A.R. , Hopkins, A. Kirwan, B. (eds.) Changing Regulation – Controlling Hazards in Society. Elsevier Science.

Nuutinen, M. & Norros, L. 2001 Co-operation on bridge in piloting situations. Analysis of 13 incidents on Finnish fairways. In: Onken, R. (ed) Proceedings of the 8th Conference on Cognitive Science Approaches to Process Control, 24-26 September, Neubiberg, Germany, 3-14.

Klemola, U-M. & Norros, L. 2000. Logics of anaesthetic practice - outline of interdisciplinary methodology for studying the anaesthesiologists' activity in real life setting. Paper presented at the 5th Conference on Naturalistic Decision Making, How Professionals Make Decisions. 2-28 May, Stockholm.

Norros, L. & Klemola, U.- M. 2000. Situation awareness as a tool in naturalistic analysis of anaesthetists clinical practice. Paper presented at the 5th Conference on Naturalistic Decision Making, How Professionals Make Decisions. 2-28 May, Stockholm.

Reiman, T. & Norros, L. 2000. Regulatory Culture: Balancing the Different Demands of the Regulatory practice in Nuclear Industry. Paper presented at the New Technology and Work - Workshop, 15-17 June, Bad Homburg.

Norros, L. 1999. A framework for analysis of operators' actions in accident or incident situations. An application to Air Traffic Control. The Nordic Accident Investigation Board meeting, August 9-11, 1999, Hanasaari, Espoo.

Norros, L. & Nuutinen, M. 1999. Contextual analysis of the nuclear power plant operators' utilization of a disturbance management system. 7th European Conference on Cognitive Science Approaches to Process Control, Villeneuve d'Ascq, France, 21-24 Sept 1999.

Norros, L. & Nuutinen, M. 1999. Development of an approach to analysis of Air Traffic Controllers' working practices. Human Error, Safety and System Development, June 7-8, Liege, Belgium.

Norros, L. & Nuutinen, M. 1999. Learning in work in different process control environments. Work Process Knowledge and Learning (WHOLE) network symposium, 21-23 June, Lisboa.

Reiman, T. & Norros, L. 1999. Organizational culture at Department of Nuclear Reactor Regulation. A paper at the NKS Sos-1 Workshop on Safety Culture, October 26.-27.10.1999, Olkiluoto.

Norros, L. & Hukki, K. 1998. Utilization of information technology in navigational decision-making. In: Waern, Y. (ed.) Co-operative process management. Taylor & Francis, London, 77-88.

Hukki, K. & Norros, L. 1997. A systemic approach to the modelling of decision making in the control of complex dynamic processes. Proceedings of the 13th Triennial Congress of the International Ergonomic Association, June 29-July 4, Tampere, Finland, Volume 3, 43- 45.

Norros, L. Hukki, L. 1997. Analysis of control room operators' ways of acting in complex process control situations. Proceedings of the 13th Triennial Congress of the International Ergonomic Association, June 29-July 4, Tampere, Finland, Volume 3, 61-63.

Klemola, U.-M. & Norros, L. 1997. Methodological considerations in analyzing anaesthetists' habit of action. Proceedings of Cognitive Science Approaches to Process Control, Sept 23-26, Baveno, Italy.

Holmberg, J., Hukki, K., Norros, L., Pulkkinen, U. & Pyy, P. 1996. A contextual approach to systems safety - analysis of decision making in an accident situation. Proceedings of the Probabilistic Safety Assessment and Management '96 (PSAM III). June 24-28 1996, Crete, Greece. Volume 2. Springer Verlag, Berlin Heidelberg New York, 1030-1035.

Norros, L. 1996. System disturbances as spring-board for development of operators' expertise. In: Engeström, Y. & Middleton, D. (eds) Cognition and communication at work. Cambridge University Press, Cambridge, 159-176.

Norros, L. and Hukki, K. 1996. Development of a simulator training method for Nuclear Power Plants. A paper presented at the 2nd International Conference on Human Factors- Research In Nuclear Power Operations (ICNPO 2), Berlin 28-30.11. 1996

Klemola, U-M & Norros, L. 1995. An orientation-based approach to the anaesthetist's activity: Realistic versus objective orientation. Proceedings of 5th European Conference on Cognitive Science Approaches to Process Control, August 30 - September 1, Espoo. VTT Symposium No 158, 213-226.

Norros, L. 1995. An orientation-based approach to expertise. In: Hoc J-M, Cacciabue, P.C. & Hollnagel, E. (Eds.) Expertise and technology: Cognition and human-computer cooperation. Hillsdale, NJ: Lawrence Erlbaum Associates, 141-164.

Norros, L. 1995 (Ed.) Proceedings of the 5th European Conference on Cognitive Science Approaches to Process Control. August 30 - September 1, Espoo. VTT Symposium No 158.

Norros, L. & Hukki, K. 1995. Contextual analysis of the operators' on-line interpretations of process dynamics. Proceedings of 5th European Conference on Cognitive Science Approaches to Process Control, August 30 - September 1, Espoo. VTT Symposium No 158, 182-195.

Valkonen, H., Norros, L., Hukki, K. & Heikkilä, M. 1995. Human factors in the control of risk in navigation. Proceedings of the international seminar on Human Element in Maritime Safety and Marine Pollution Prevention, December 12-13, Osaka, Japan.

Hukki, K. & Norros, L. 1994. A method for analysis of nuclear power plant operators' decision making in simulated disturbance situations. In: Norros, L. (ed) Proceedings of the XIII European Annual Conference on Human Decision Making and Manual Control. VTT Symposium 146, Technical Research Centre of Finland, Espoo.

Norros, L. 1994. Analysis and development of decision making in complex environments. Invitational seminar on Work Process Knowledge, University of Manchester, December 15th - 17th, 1994.

Norros, L. 1994. Analysis and development of process operators' decision making. First International Conference on Human Factors Research in Nuclear Power Operation (ICNPO). Berlin, 31 Oct - 2 November 1994.

Norros, L. & Hukki, K. 1994. Development of an orientation-based approach to evaluation of process operators' expertise. In: Apostolakis, G.E. & Wu, J.S. (Eds) proceedings of the PSAM II, March 20 - 24, San Diego Cal, 026:9-14

Reiman, L. & Norros, L. 1994. Organizational assessment of maintenance department at a nuclear power plant. In: Apostolakis, G.E. & Wu, J.S. (Eds) proceedings of the PSAM II, March 20 - 24, San Diego Cal, 107:7-12.

Heikkilä, M. and Norros, L. 1993. A Simulation study on the format of ship motion display to improve steering accuracy in restricted fairways. MARSIM '93 International conference on marine simulation and ship manoeuvrability, St. John's, Newfoundland, Canada Sept. 26 - Oct. 2.

Hukki, K. & Norros, L. 1993. An orientation-based approach to evaluation of process operators' diagnostic activity. In: Hollnagel, E. & Lind, M. (Eds.) Proceedings of the Fourth European Conference on Cognitive Science Approaches to Process Control, August 25-27, 1993, Fredensborg, Denmark.

Piirto, A., Pyy, P., Norros, L. and Reiman, L. 1992. Low power level safety management of Finnish BWR. Paper to be presented in ANP'92 International Conference on Design and Safety of Advanced Nuclear Power Plants, October 25 - 29, Tokyo.

Wahlström, B., Norros, L. and Reiman, L. 1992. Human factors research in the nuclear power field in Finland. Proceeding of the IEEE 5th Conference on Human Factors and Power Plants, June 7 - 11, Monterey, California.

Norros, L. 1991. Development of operators' expertise in implementing new technologies. In: Enander, A., Gustavsson, B. O., Karlsson J. Ch. and Starrin, B. (eds) "Work and Welfare" papers from the Second Karlstad Symposium on Work. University of Karlstad, Research Report 91:7, 67 - 82.

Norros, L. and Reiman, L. 1991. Uncertainties in the system as a challenge for NPP operators' expertise. Paper presented at the SRNI conference on "Probabilistic Safety Assessment and Management", Beverly Hills, Cal.

Hukki, K. and Norros, K. 1990. Collective control of disturbance situations in nuclear power plant operation. 5th European Congress of Cognitive Ergonomics, Urbino, Italy, September 2 - 6.

Hukki, K. and Norros, L. 1990. Collective Control of Disturbance Situations in Nuclear Power Plant Operation. Presentation of an analysis method. Cognitive Processes in Complex Tasks. Institut für Unfallforschung und Ergonomie des TÜV Rheinland, Köln.

Hyötyläinen, R., Norros, L. and Toikka, K. 1990. Constructing skill-based FMS - a new approach to design and implementation. Proceedings of the 11th IFAC World Congress, 13 - 17 August, Tallinn, USSR.

Norros, L. 1989. Responsibility for system development as an element of process operators' professional expertise. Proceedings of the Second European Meeting on Cognitive Science Approaches to Process Control, October 24 - 27, Siena, Italy.

Norros, L. 1989. Simulation in industrial work training. In: Bainbridge, L. and Ruiz-Quintanilla, A. (eds.) Developing skills with Information Technology. Wiley & Sons, Chichester.

Norros, L., Toikka, K. and Hyötyläinen, R. 1989. Constructing skill based FMS. IFAC/IFIP/IMACS Symposium on Skill Based Automated Production, November 15 - 17, Vienna.

Norros, L. Toikka, K. ja Hyötyläinen, R. 1988. FMS-design from the point of view of implementation - results of a case study. 3 rd IFAC conference on Man-Machine systems, June 14 - 16, 1988, Oulu.

Norros, L. 1987. Human reliability in nuclear power plant operation in the light of simulator experiments. The technological change and work psychology. Proceedings of the second Soviet-Finnish symposium on work psychology, Moscow Dec 9-12 1986, Helsinki 1987.

Norros, L. 1987. Study of human error during simulator training. In: Goodstein, L.P. (ed.) Training diagnostic skills for nuclear power plants. Final Report of the NKA/LIT-4 Project (The Nordic Liaison Committee for Atomic Energy). Odense, 67 - 87.

Hirvonen, J. and Norros, L. 1986. Speech commanded checkpoint. Proceedings of Voice I/O systems applications conference, New York, September 1986.

Hyötyläinen, R. Norros, L. and Toikka, K. 1986. Development of work in flexible manufacturing. In Norros, L. and Vartiainen, M. (eds.) Technical and organizational change in work. Acta Psychologica Fennica XI, Helsinki.

Norros, L. 1986. Expert knowledge, its acquisition and elicitation in developing intelligent decision tools for process control. In Hollnagel, E. Mancini, G. and Woods, D.D. (eds.) Intelligent decision support in process environments. NATO ASI series F, Vol 21, 137-143.

Norros, L. 1986. Some experiences in developing process operation. In Stockman, M. and Wahlström, B. (eds) Människan i komplexa industriella processer. VTT symposium 67, Espoo, 89-100.

Norros, L. and Vartiainen, M. (eds) 1986. Psychological aspects of the technological and organizational change in work. Acta psychologica fennica XI, Helsinki.

Norros, L. Kautto, A. and Ranta, J. 1986. Visualization of process information in improving work orientation. In Klix, F. and Wandke, H. (eds.) Man-computer interaction research, MACINTER I. Elsevier science publishers B.V., 321-329.

Kautto, A. Norros, L. Ranta, J. and Heimburger, H. 1984. The role of visual information in improving the acquisition of adequate work orientation. Ergonomics problems in process operations. The institution of Chemical Engineers, Symposium Series 90, Pergamon Press, 97-114.

Norros, L. 1983. Strategies and mental effort - a discussion on the results of an experimental study to process control activities. Finnish-Soviet Symposium on Psychology of Work and Occupations, Helsinki (Ilmestynyt myös venäjän kielisenä Moskovassa).

Norros, L. 1983. Analysis of testing and maintenance errors. Reliability data collection and Validation, VTT Symposium 32, 20-27.

Kautto, A. Norros, L. Ranta, J. Wahlström, B. 1983. Visual information in improving the acquisition of process feel. IFAC-IFIP-AFCET-ANAXT_SELF Research Symposium on New Techniques and Ergonomics, Valenciennes 31.5.-1.6.

Norros, L. Ranta, J. and Wahlström, B. 1982. On the modeling of the human processes operator. IFAC Conference on Analysis, Design, Evaluation of Man-machine Systems. Baden-Baden 27-29.9.1982, 59-65.

Wahlström, B. Heinonen, R. Norros, L. & Ranta, J. 1982. New approaches for automation design and information presentation in power plants. Joint Soviet-Finnish Symposium on Automation in Process Industries, Espoo, 22.25.11.1982.

Norros, L. 1981. Tervetuloa uusi tekniikka. Psykologia 2. 117-120.

Kasvio, L. 1980. Kodierung, Strategie und Aufwandregulation beim Erlernen funktioneller Beziehungen. In: Hacker, W. & Raum, H. (eds.) Optimierung von kognitiven Arbeitsanforderungen. DVW, Berlin, 173-178.

3. Articles in Finnish scientific journals

Norros, L., Nuutinen, M. & Viitaniemi, J. 2005. Human-Technology Interaction – Proactive Human-Centred Perspective for Technology. Industrial Systems Review, 2005, p. 42-47.

Norros, L. & Savioja, P. 2004. Ihmisen ja tekniikan välisen vuorovaikutuksen toimivuuden arviointi monimutkaisissa tietointensiivisissä töissä. Työ ja Ihminen 18, 3. 100-112.

Leppänen, A. & Norros, L. 2002 Teollisten prosessien inhimilliset käyttövarmuustekijät – katsaus alueen tutkimussuuntauksiin ja tutkimuksen kehitystarpeisiin. Työ ja Ihminen 2 /2002, 105-118.

Norros, L. & Leppänen, A. 2000. Inhimilliset tekijät dynaamisten tilanteiden hallinnassa. Työ ja Ihminen 14.

Norros, L. & Nuutinen, M. 1999. Toimintatavat ja turvallisuuskulttuuri - tutkimuksia ja kehityshankkeita ydinvoimalaitoksilla. ATS Ydintekniikka (28) 1/99, 15-17.

Klemola, U-M. & Norros, L. 1998. Klemola, U-M. & Norros, L. (1998). Anestesia- ja lääketieteellisen toiminnan käsitteellinen analyysi - Epävarmuuden tunnistaminen uuden ammattikäytännön ytimenä. Duodecim, 114, 2602-3.

Hukki, K. & Norros, L. 1996. Lajinvaihto paperikoneohjaajien päätöksenteon kohteena. Työ ja Ihminen (10)4, 350-372).

Norros, L. 1986. Inhimilliseen luotettavuuteen vaikuttavat tekijät - Havaintoja Loviisan koulutussimulaattorilta. Ydintekniikka, 2, 22-23.

Norros, L. ja Norros, I. 1985. Tietokone työvälteenä. Professori Seppo Mustosen haastattelu. Tiede ja Edistys 3, 199-208.

Toikka, K., Hyötyläinen, R. and Norros, L. 1985. Työn kehitys joustavassa valmistuksessa. *Aikuiskasvatus* 4, 165-172.

Norros, L. 1983. Koodi, strategia ja voimavarojen säätely funktionaalisten suhteiden oppimisessa. *Lectio Praecursoria* 19.3.1983 Helsingin yliopisto. *Psykologia* 4, 263-266.

Eteläpelto, A. ja Kasvio, L. 1978. Työ- ja insinööripsykologian symposiumi Berliinissä. *Psykologia* 2, 12-15.

Kasvio, L. 1977. Yleinen työ- ja insinööripsykologia - arvio W.Hackerin teoksesta. *Psykologia* 3.

Kasvio, L. 1975. Psykologisen tiedon keskeisen sisällön määrittämisestä. *Psykologia* 1, 7-19.

4. Articles in Finnish scientific books or conference proceedings

Norros, L. & Savioja, P. 2006. Integrated validation of complex human-technology systems – development of a new method. The Finnish Research Programme on Nuclear Power Plant Safety 2003-2006. Final Report. VTT Research notes 2363. p.275-285

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Public and international activities

Supervisor for students of Academic degrees

Anneli Leppänen, PhD 1993, Työn käsitteellisen hallinnan ja hyvinvoinnin yhteydet ja kehittyminen paperinvalmistuksessa työskentelevillä, University of Helsinki
Hannu Paunonen Dr. Tech. 1997, The roles of process information systems, Tampere Technical University
Jari Kallela Dr.Tech, 1999, Automaation paradigmat . Käyttäjien osallistuminen automaation suunnitteluun, Helsinki Technical University.
Kristiina Hukki, Dr.Phil, Tiedon informatiivisuuden tilannekohtainen määräytyminen University of Helsinki (ongoing work).
Maaria Nuutinen, Dr. Phil, Toimintakyvyn ylläpitämisen keinojen kehittyminen epävarmuuden kohtaamisen kautta, University of Helsinki (August 2006)
Helena Palmgren, Dr.Phil. Leadership and its development in an entrepreneurial, knowledge intensive company TKK, (ongoing work).
Paula Savioja, Dr. Tech. Usability of complex systems (tentative)(on-going work)
Anna-Maria Teperi, Dr.Phil. Development of practices in the Finnish air traffic control (tentative)(on-going work)
Petteri Kaski Dr. Tech. Human factors in aircraft maintenance
Jari Kettunen, MA University of Helsinki 1996
Teemu Reiman, MA University of Helsinki 2000
Paula Savioja, Dipl.Ing., Technical University of Helsinki, 2003

Opponent for dissertations

Anne Seppälä: Turvallisuustoiminta, sen kehittäminen ja yhteydet työtapaturmiin 1992, University of Helsinki (opponent)
Peter Friedrich: Kompetensutveckling vid lokal teknikförändring 1992, Kungliga Tekniska Högskolan, Stockholm (opponent)
Pirjo Korvela: Together and apart – The dynamics of being and acting at home, University of Helsinki, 2003 (opponent)
Vincent Gauthereau: Work practice, Safety and Heedfulness. University of Linköping, Sweden, 2003 (member of the assessment committee)
Margareta Lützhöft: "The technology is great when it works". Maritime Technology and Human Integration on the Ship's bridge. University of Linköping, Sweden, 2004 (member of the assessment committee).
Cato Alexander Björkli: Joint Cognitive Systems at Sea: A Study of High Speed Craft Operation at Norwegian University of Science and Technology, 2007
Bjarte Knappen Roed: Designing for High-speed Ships at Norwegian University of Science and Technology, 2007

Scientific expert tasks

Referee tasks in several international journals
Referee tasks for several Finnish associations regarding evaluation of research proposals
Referee for the Research Council of Norway
Referee for Högskoleverket Sweden
Referee for Chalmers Technical University Assistant professor position

Scientific responsibilities

Psykologia-journal, editor, member of board of editors 1974-1975
Vice president of the Finnish Psychological Association 1980-1984
President of the Finnish Psychological Association 1985-1988
Member of the Working group of psychology in the Scientific-technical co-operation committee for Finland and the Soviet Union 1987-1992
Member of board of editors for Applied Ergonomics 1991-1995
Member of the research commission of the Swedish Nuclear Power Inspectorate (SKI) 1998-2004.
Member of the Core Group of an International Network on New Technology and Work 1996-
Finnish representative in the OECD/NEA Special Expert Group on Human Factors 2002-
Participated in European Science Foundation, Forward look activities.
Member of the editorial board of @activités electronic journal July 4 2004 -
Member of the executive committee of European Cognitive Ergonomics Association September 2007-

Scientific research visits

Laboratoire d'Ergonomi Paris, 1987 (3 weeks)
Centre for activity theory and developmental works research, University of Helsinki 2000-2001 (1 year)
Technical University of Berlin, 2001 (1 month)

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