Concepts and methods for exploring the future of learning with digital technologies

Kaleidoscope

22 Avril 2003

Network of excellence

List of participants

(FR/1) France Innovation Scientifique et Transfert, (FR/2) Centre National de la Recherche Scientifique, (UK/3) Institute of Education, University of London, (FR/4) Université Joseph Fourier, (BE/5) CampoRosso, (BG/6) Sofia University "St. Kliment Ohridski", (CA/7) Télé-Université du Québec, (DE/8) Universität Duisburg-Essen, (ES/9) Universidad Nacional de Educación a distancia, (FR/10) Laboratoire d'Informatique de l'Université du Maine, (FR/11) Université des Sciences et Technologies de Lille, (GR/12) National Kapodistrian University of Athens, (IE/13) University of Limerick, (IT/14) Università degli Studi di Siena, (IT/15) Istituto Tecnologie Didattiche CNR, (NL/16) University of Twente, (NO/17)University of Bergen, (NO/18) University of Olso, (PT/19) Instituto de Engenharia de Sistemas e Computadores, (SE/20) Göteborg University, (UK/21) Lancaster University, (UK/22) University of Sussex, (AT/23) Donau-Universität, (AT/24) Karl-Franzens-Universitaet Graz, (BE/25) Universite catholique de Louvain, (BE/26) University of Liege, (CH/27) Ecole Polytechnique Fédérale de Lausanne, (CH/28) Université de Lausanne, (CY/29) University of Cyprus, (DE/30) University of Tuebingen, (DE/31) Saarland University, (DE/32) Universitaet zu Koeln, (DK/33) Aalborg Universitet, (DK/34) IT University West, (DK/35) LEGO Company, (ES/36) SchlumbergerSema, (FI/37) Helsinki University of Technology, (FI/38) University of Jyväskylä,, (FI/39) University of Oulu, (FR/40) GIE Recherche Haussmann , (FR/41) Odile Jacob Multimedia, (GR/42)Aristotle University of Thessaloniki, (GR/43) University of the Aegean, (GR/44) Research Academic Computer Technology Institute, (GR/45) Technical University of Crete, (HU/46) Eotvos Lorand University, (HU/47) Hungarian Academy of Sciences, (IT/48) Consorzio Centro di Ricerca in Matematica Pura ed Applicata, (IT/49) University of Salerno, (IT/50) Università degli Studi di Trento, (LV/51) Riga Technical University, (NL/52) Cetis/Hogeschool van Utrecht, (NL/53) Universiteit van Amsterdam, (NL/54) Utrecht University Centre for ICT in Education, (PT/55) CNOTINFOR, (PT/56) Universidade de Coimbra, (PT/57) Universidade do Porto, (PT/58) Instituto Superior de Engenharia de Coimbra, (PT/59)Universidade Católica Portuguesa, (PT/60) Universidade de Trás-os-Montes e Alto Douro, (RO/61) Technical University of Cluj-Napoca, (SE/62) The Royal Institute of Technology, (SE/63) Umeå Universitet, (SK/64) Comenius University, (UK/65) Birkbeck College, University of London, (UK/66) Canon Research Centre Europe Limited, (UK/67) NESTA Enterprises Ltd, (UK/68) The Open University, (UK/69) The Queen's University of Belfast, (UK/70) The University of Bristol, (UK/71) University of Birmingham, (UK/72) University of Warwick, (FR/73) Ecole supérieure d'Ingénierie Léonard de Vinci, (FR/74) Groupe des Ecoles des Télécommunications, (FR/75) Institut National Polytechnique de Grenoble, (FR/76) Université Denis Diderot, (FR/77) Université Pierre Mendès France, (FR/78) Université René Descartes

Co-ordinator name	Nicolas Balacheff
Co-ordinator organisation name	CNRS - FIST
Co-ordinator email	Nicolas.Balacheff@imag.fr
Co-ordinator fax	+33 4 76 57 46 02

Content

Proposal summary

Proposal full title
Concepts and methods for exploring the future of learning with digital technologies

Proposal acronym
Kaleidoscope

Strategic objective addressed
Enhanced Learning Environments (2.3.1.12 Technology-enhanced learning and access to cultural heritage)

Proposal abstract
Very little of the transformation of working and social life that has accompanied digital technologies is reflected in the practice of learning and teaching, or in the quality of research. *Kaleidoscope's* central aims are to fill these gaps in research by:
Integrating existing European initiatives to develop a rich, culturally-diverse and coherent theoretical and practical research foundation for research and innovation
Develop new tools and methodologies that operationalise an interdisciplinary approach to research on learning with digital technologies at a European-wide level
Kaleidoscope will integrate existing research to develop new concepts and methodologies from a multidisciplinary and cross-cultural perspective that includes:

- Foundations in the cognitive and learning sciences, including a sociocultural pespective, to strengthen the development of educational technologies
- Conceptual and methodological bridges between educational, social and cognitive sciences, and emerging technologies
- Principled design for promoting technological development enabling interactive, intelligent and cooperative learning environments
- Structural and organizational models for integrating technology-enhanced learning into organizations
- Novel computational solutions to technology-enhanced learning environments that are adaptive, knowledgeable, cognitively sensitive, pervasive, multi-modal and personalised.

Kaleidoscope seeks to explore the different conceptual frameworks of relevant disciplines in order to delineate the commonalities and differences that frame the research objectives in the field. It will do this by supporting a range of integration actions, including *Joint European Integration Projects, European Research Teams, and Special Interest Groups*. It will establish a *Virtual Doctoral School,* which will act as a common reference point for the development of research and training of new researchers, and a *Technological Platform* to share, build and evaluate artefacts.

B.1 Objectives of the network

B.1.1 Background and Aims

Information and communication technologies have played a major role in the transformation of our societies in the past decade. The dissemination and the expansion of the use of Internet and of the Web, is one of the clearest indicators of this transformation. Yet despite this transformation, very little is reflected in the practice of learning and teaching in formal and informal settings, and much remains to be done in terms of allowing European citizens of the Knowledge Society to take full advantage of the opportunities that these technologies offer to improve their quality of life. *Kaleidoscope* is premised on the assumption that there are two central reasons for this failure. First, research has often failed to build on existing results, and develop a cumulative framework which can inform future research priorities and develop research-based innovation. This failure is compounded by difficulties of cultural and linguistic diversity. Second – and relatedly – there has been a systematic failure to address the intrinsic complexity of research on learning in the context of technology-enhanced environments.

Kaleidoscope's central aims are therefore to fill these gaps in research by:

1. Integrating existing European initiatives to develop a rich, culturally-diverse and coherent theoretical and practical research foundation for research and innovation

2. Develop new tools and methodologies that operationalise an interdisciplinary approach to research on learning with digital technologies at a European-wide level

These aims call for firm theoretical foundations alongside a strong practical orientation in order to strengthen further progress beyond *ad hoc* solutions and casual innovation in the field of digitally-based learning. *Kaleidoscope* will emphasize this priority in its development by elaborating the following themes:

- Foundations in the cognitive and learning sciences, including a socio-cultural perspective, to strengthen the design and development of educational technologies
- Conceptual and methodological bridges between educational, social and cognitive sciences, and emerging technologies
- Principled design for promoting technological development enabling interactive, intelligent and cooperative learning environments
- Structural and organizational models for integrating technology-enhanced learning into organizations
- Novel computational solutions to technology-enhanced learning environments that are adaptive, knowledgeable, cognitively sensitive, pervasive, multi-modal and personalised.

Substantial human and financial resources have been devoted to innovation in services and products, and to the development of the market. Far less attention has been paid to the development of basic research on the specific concepts and methods needed to better understand and strengthen these developments on both the technological and human side. Such research is needed to enhance the design, implementation and use of environments that incorporate digital technologies in significant ways. Instead, basic research has developed in most of the European countries, based on the commitment of isolated groups of researchers,

often limited in size with limited resources and without significant cross-disciplinary input that incorporates adequately the range of sociotechnical issues that need to be addressed to enhance learning. Typically, teams are organised to constitute communities of research, but without the means to maintain this collaboration at a level allowing significant breakthroughs. The challenge facing future development lies in the multidisciplinary character of the research to be carried out, but also in the different understanding in Europe about what knowledge and learning means, how teaching and training should be organised, and a broader conceptualisation of what constitutes research in the domain of technologically-enhanced learning.

A further tension is that between research and development driven by technological innovation, and that driven by learning needs. Dealing with this issue has strengthened awareness that the learner should always be seen as the centre of research on ICT-based learning. But "the learner" is not a single entity: he or she learns in school, in the workplace, at home and at work. Indeed, the learner changes throughout his or her life. Hence, learning in the e-society demands a paradigm shift, which puts people and their communities at the centre of knowledge-construction within mobile and culturally diverse scenarios.

The role of *Kaleidoscope* is to overcome this complexity by addressing it directly in search of a common ground, a shared theoretical and methodological framework beyond disciplinary specificities, but clearly and firmly rooted in the disciplines.

B.1.2 Objectives

> *Kaleidoscope* **will address the future of learning with digital technologies, and integrate existing research to develop new concepts and methodologies from a multidisciplinary and cross-cultural perspective.**

A key set of objectives concerns the creation of human research capacity and infrastructure. In particular, *Kaleidoscope* will aim to:

- Increase the number of researchers at the PhD and PostDoc level in Europe
- Nurture multidisciplinary and transdisciplinary research
- Establish a critical mass of researchers otherwise not achievable in local programmes
- Build an effective and sustainable framework of research collaboration

Kaleidoscope will organise its scientific cooperation in a systematic way in order to construct a community that is simultaneously diverse and aware of its potential richness in both cultural and disciplinary terms. Although lip-service is often paid to the need for multidisciplinary research in practice there has been a strong compartmentalization, which not infrequently leads to human and social science being relegated to the design and evaluation phase of a technological project. Or, reciprocally—and equally unhelpfully—in which computer-science is seen as controlling the technical implementation of a project which is essentially concerned with didactical or cognitive questions.

Much R&D research at both national and European levels, has pointed out this problem and aimed for a more integrated approach by the different disciplines. Yet despite this effort, compartmentalisation has dominated (the 5th Framework Programme was no exception). A key reason is that it is not enough simply to put together researchers from different origins and expect that a genuine multidisciplinary approach will emerge. Such an approach fails to

rise the challenge of recognising the fundamental diversity of the *problématiques*—questions to be considered, conceptual frameworks and methodologies—between the different scientific sectors involved, but also within these sectors. Human and social science, as well as computer science are less homogeneous than one imagines from the outside. The interdisciplinary boundaries between disciplines such as psychology, sociology, pedagogy, instructional science and curriculum development, or between AI, HCI, software engineering and digital multimedia cannot be underestimated. If these differences are not understood, addressed and overcome in some sense, R&D itself will experience serious difficulties in its development.

Kaleidoscope therefore seeks actively to explore the different conceptual frameworks of relevant disciplines in order to delineate the commonalities and differences that impinge on the research objectives in the field.

The issue of European diversity is highly evident in the case of education. Different conceptions and connotations of knowledge and learning are difficult to capture: Words like "knowledge" in British English, and "sapere" and "conoscenza" in Italian, convey very different meanings due to the different philosophical and cultural background. This has a concrete impact on the way we understand and develop models either for the design of learning environments, or to support their use in schools or in the workplace. Further, especially when considering domains close to social and human practices, research itself is conceived of in different ways. For example, the value of a pragmatic approach and a theoretical approach in the United Kingdom and in France, hold important differences which are rooted in the academic and cultural tradition; and so are the different views of the links between academic research and R&D. These differences do have an impact on what we can do collaboratively, what we can value and what we can recognize as an output of research on learning.

Kaleidoscope will therefore:
- Create an active core of researchers that have as a key research goal, the integration of disciplinary approaches to the field, as well as geographical and cultural integration
- Strengthen existing and generate new research initiatives that solve socio-technical learning issues by integrating social and technical approaches
- Facilitate socio-informatic collaboration on issues of learning to promote cultural and technological integration across Europe

B.1.3 Instruments for a scientific policy

Kaleidoscope will establish a common infrastructure, a kind of backbone, which addresses in an operational way the issues raised by networking European research on learning with digital technologies. This common infrastructure will operationalise a *set of instruments* put in place to achieve the objectives set out above:

1. *Building a common reference point for the development of research and training of new researchers.*
   A *Virtual Doctoral School* will be created, which will be the repository of the shared knowledge and scientific consensus build by *Kaleidoscope*. The evaluation of the success of this tool will be measured by its relevance to the research objectives and the evolution of the content offered, as well as the evidence of its use for the training of new researchers.

2. Developing instruments to share, build and evaluate artefacts

A *Technological Platform* will be developed to share outcomes of our research integration actions. This will raise issues of normalization and of reusability, and hence it will itself constitute a research action. This platform will be accessible for the development of research actions in places where the technological resources are difficult to obtain either for technical or financial reasons. The platform will be built up in relation to the establishment of standards and norms developed during the life of the network. The *Kaleidoscope* platform will be both an open source repository and a large instrument in the service of the academic community. The evaluation of this action will be the evidence of its capacity to develop effectively and to be used by the community.

Among the Joint programme activities that *Kaleidoscope* common infrastructure will support, are the activities for the spreading of excellence and content-based activities. The content-based activities are of three types: the *Special Interest Groups* (SIG), the *European Research Teams* (ERT) and the *Jointly Executed Integrating Research Projects* (JEIRP). They are presented in detail in sections B4, B6 and B8 of this document. Their major targets are:

(i.) The sustainability of the network! (especially for SIGs and ERTs), and

(ii.) Stimulation of the development of a collaborative research culture at a European level

The *indicators for further evaluation* of Kaleidoscope are presented in part B6 and B8. They include

Kaleidoscope FP6 network of excellence intends to last *five years*, with a strong commitment to integration and sustainability. This willing underlies its integrating scientific program and its view on financial issues. As concerned the budget to achieve its aims, *Kaleidoscope* establishes at about **12 MEuros** !the needed funding with the following pattern along time: Year1!!*2,8 MEuros*; Year2 *3,5 MEuros*; Year3 *2,8 MEuros*; Year4 *1,8 MEuros*; Year5 *1 MEuros*. A sketch for the first year is presented at the end of PartB8 of this document.

B.2 Relevance to the objectives of the IST Priority

Kaleidoscope Network of Excellence (NoE) targets the IST priority *Technology-enhanced learning and access to cultural heritage* (IST-2002-2.3.1.12). Whereas the *Technology enhanced learning* is clearly our primary target area, due to its multidisciplinary nature there are many lines for contribution to several other IST areas of priority, such as: *Semantic-based knowledge systems, Multimodal interfaces, Mobile and wireless systems beyond 3G, and Networked businesses and governments, Broadband for all, and Networked audiovisual systems and home platforms*.

Kaleidoscope aims at integrating existing European initiatives to develop a rich, culturally-diverse and coherent theoretical and practical research foundation for research and innovation and developing new tools and methodologies that operationalise an interdisciplinary approach to research on learning with digital technologies at a European-wide level. Thus the project would strongly contribute to the main objective of the IST priority by building some stable educational research and technology ground for supporting development of advanced systems and services that help improve access to Europe's knowledge and educational resources and generate new forms of cultural and learning experiences.

Kaleidoscope aims *to ensure European leadership in the area of multidisciplinary research and technology development in e-Learning* which is the 'engine of the Knowledge Economy[1]'. This goal will be achieved by facilitating European wide collaboration of leading research and educational organisations and by developing mechanisms and procedures for sustainable integration of their activities. The consortium existing and accumulated expertise will be networked around three types Joint Programme Activities (JPAs) - *Jointly Executed Integrating Research Projects* (JEIRPs), *Special Interest Groups* (SIGs), and *European Research Teams* (ERTs). For the needs of integration the project will establish a common research infrastructure, technology platform and virtual doctoral school, and a set of tools and services ensuring creation of durable integration of research capacities of network partners and friendly and supportive technology enhanced research environment for upgrading the existing knowledge and manage the knowledge base for the benefits of all partners and EU in general.

The project will *strengthen the scientific excellence* of the NoE by integrating the existing research activities of the partners and by initiating new research and development in areas of special priority (see Part B1), such as: foundations in the cognitive and learning sciences; conceptual and methodological bridges between educational, social and cognitive sciences, and emerging technologies; principled design for promoting technological development enabling interactive, intelligent and cooperative learning environments; structural and organizational models for integrating technology-enhanced learning into organizations; etc. The consortium members demonstrate commitment of their management bodies for full support of project activities and, when necessary, to initiate structural changes. During the project implementation the NoE through its JPAs (e.g. *Virtual Doctoral School*, *Advanced Training Activities*) will gradually evolve into a *virtual research organization* as a part of the European Research Area (ERA). The *International Scientific Committee*, which consists of eminent researchers from all over the world, would be a live channel for *access to the world class research outcomes and teams*.

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[1] [1] Ruttenbur, B., et al, eLearning: The Engine of the Knowledge Economy, eLearning Industry Report, Morgan Keegan, 2000, http://www.masie.com/masie/researchreports/elearning0700nate2.pdf

Kaleidoscope aims at deploying a *Common Technological Platform for Research on Digital Learning* which will be used by the Virtual Doctoral School and Advanced Training Activities. The platform is an *open system* that allows doing research and learning which is *flexible in time and place*, allows individual pace and contextualized learning in a virtual collaborative research and learning communities, provides interactivity and personalization, as well as shareable and reusable material which is convenient to update. This will be related to adopting different XML-based *standards* which are under development, such as IMS, IEEE LTSC LOM, SCORM, and Ariadne.

Kaleidoscope will contribute to the EC objectives for *IST excellence* by putting a focus (in a later stage) on developing technology enhanced learning applications based on the future generation of mobile and ambient intelligence technologies and easy-to-use human interfaces. This goal will be achieved by conducting JPAs in the area of intelligent e-learning multimedia environments, CSCL, Artificial Intelligence in Education and applying up-to-date and emerging enabling technologies, such as mobile technologies, Semantic Web, interactive multimedia and digital TV, advanced HCI solutions, GRID technologies, etc. A special SIG on *Philosophy of Learning* is initiated in order to earlier address the nature of learning in a knowledge based e-society where ambient intelligence technologies, semantic web, intelligent software agents will be widely used.

Kaleidoscope will build a European wide community of best practices for research and development in the area of technology enhanced learning that would become a *significant force for research in e-Learning at regional and national level*. Thus *Kaleidoscope* will substantially support and contribute to the development of the *European Research Area[2]* (ERA) and the *ERA-NET scheme[3]* for cooperation and coordination of research activities in the Member States and Associated States.

The project aims at increasing innovation and competitiveness in emerging European e-Learning industry by, among others, the activities of the JPAs on *Academy-Industry Digital Alliance Strategic Group*, *Advanced Training Activities* and *Dissemination*. Thus the project would contribute to development of this industry as strategic direction of the Knowledge Economy for *strengthening the competitiveness of all other industry sectors*. The emerging e-Learning global education market is a strong driving force for developing of this industry. The IDC[4] predicts that the global corporate e-learning market would exceed \$23.1 billion by 2004 (in 1999 it was \$1.8 billion)[5]. North America will account for 65.2% of the market by 2004 and *Western Europe will be the fastest-growing market*. The shift in the e-Learning market from IT skills training toward the non-IT or business skills segment will open up new markets for e-learning. In 2000 the non-IT segment accounted for 24% of the market but it is expected to capture 53.8% by 2005. Gardner[6] predicts that e-Learning will be the most-used corporate application on the web by 2005. They expect that in 2003 over 50% of all higher education institutions in the world will be offering e-Learning programmes to students.

Kaleidoscope will build a sustainable mechanism for adoption of the research results as they emerge which compliments the activities under the eEurope initiative and Lisbon goals and

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[2] http://www.cordis.lu/rtd2002/era-developments/developments.htm
[3] Provision for Implementing the "Era-Net Scheme" Supporting the Cooperation and Coordination of Research Activities Carried Out at National and Regional Level, Background Document, http://europa.eu.int/comm/research/fp6/era-net.html
[4] International Data Corporation, http://www.idc.com/
[5] Epic News, http://www.epic.co.uk/company_news/press_releases/011002.htm
[6] Gardner, www.gartner.com

thus ensuring *close correspondence between the research and policy initiatives*. The project would contribute to greater benefits for all European citizens by ensuring fundamental and applied research and development activities focused on the differences in the cultural understanding of what are knowledge and learning and thus ensuring better education and training of the citizens in EU and NAS. The JPA *Advanced Training Activities,* in cooperation with *Virtual Doctoral School*, will actively work for shortening the existing gap between advanced research and educational practice and thus improving the benefits of all European citizens. The project aims at building opportunities, models and tools to let researchers from different origins, countries and cultures cooperate in order to adopt appropriate multidisciplinary approach of solving the problems to be addressed. These goals will be achieved by providing a collaborative platform for joint research and activating RTD activities in the area of Collaborative Learning in a multilingual and multicultural learning environment. This research effort will therefore reinforce and complement the eEurope 2005[7] and eEurope+[8] Action Plan objectives and look beyond them to the 2010 goals of bringing IST applications and services to everyone, every home, every school and to all businesses. The EC priority of *Enlargement* will be also addressed by involving partners from NAS, such as Bulgaria, Czech Republic, Hungary, Estonia, Romania, and Slovakia. The consortium will organise the scientific cooperation in a systematic way in order to construct a community still diverse but aware of its diversity and its potential richness.

Kaleidoscope will contribute *to overcome the e-skills gap problem in Europe* by a number of JPAs, such as *Learning and Technology at Work*, *Academy-Industry Digital Alliance Strategic Group, Virtual Doctoral School, Advanced Training Activities,* etc. In order to achieve its goal to become "the most competitive and dynamic knowledge-based economy in the world"[9] by 2010 Europe requires well-educated and highly skilled people to take maximum advantage of the new technologies, not only in the high tech industries but in all other economic sectors[10]. Over the past five years, the knowledge-, skills-intensive and high-tech sectors have accounted for over 60% of total job creation in the EU. Europe still faces a chronic shortage of e-skilled professionals – demand is expected to exceed supply by around 12% per year over the coming years. Information and communication technologies not only create new jobs but they create conditions for change in existing jobs[11]. The commitment of the NAS to the eEurope+ Action Plan poses a great number of questions and problems related to their future role in EU in relation to filling in the e-skills gap. The NAS used to have very good capabilities to educate a substantial number of highly-skilled specialists. Now they should stop being only e-skills suppliers to USA and EU, and start building sustainable educational and training systems and to fully join the efforts of the member states.

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[7] eEurope 2005: An information society for all (COM 2002 263 final)

[8] eEurope+ 2003, A Co-operative effort by the Candidate Countries to implement the Information Society in Europe, http://europa.eu.int/information_society/topics/international/regulatory/eeuropeplus/index_en.htm

[9] Lisbon European Council, Presidency Conclusions, http://ue.eu.int/Newsroom/

[10] European e-Skills Summit Declaration 16–18 October 2002, Copenhagen, http://www.e-skills-summit.org

[11] Diamantopulou, A., Commissioner for Employment and Social Affairs – EC, "Jobs, Skills and People: Building the New Economy", e-Skills Summit organized by Danish Presidency, 17-18 Oct, 2002

B.3 Potential impact

B.3.1 Strengthening excellence in technology-enhanced learning

Kaleidoscope will have a strategic impact on the integration of academic research which is necessary to study the problems of designing and disseminating research on technology-enhanced learning. The network will contribute to the construction of a common language and a framework for integration that reflects the complexity of the knowledge domains involved.

The potential needs for such an impact arise from three sources:
-   In the first place, much research in the field is funded by national research institutions (e.g. CNRS in France, or the Economic and Social Research Council in the UK). As such, they are most often directed at single research groups, where collaborative initiatives – even within the country concerned – are not always straightforward. Furthermore, collaboration across cultures and disciplines are normally difficult, if not – in some cases – impossible.
-   The second source, employed in Europe for over a decade (initiated by the DELTA projects in the late 80's) employed multi-institutional projects, typically involving the collaboration between a variety of types of institutions from academia, industry, educational service and educational administration. This type of action succeeded in reflecting the complexity of the European scene, comprising a diversity of cultures, social and educational systems and paradigms, languages and histories. Nevertheless, it has proved difficult to achieve cohesion, and even more so to find ways in which such collaborative ventures *added value* to existing (national) research initiatives.
-   Thirdly, while it is routine for research studies in the field to claim interdisciplinarity, this seldom has – in practice – meant much more than disciplines speaking past each other, pursuing different agendas, and failing to address the construction of a joint problematic or to incorporate the different disciplinary perspectives and approaches constructively into research design and development.

The *Kaleidoscope* JPAs will seek to impact European research in all three areas, by providing new impetus to achieve genuine integration, that will mobilize culturally-grounded cohesion within the European Research Area. By providing an arena for *reflection* and for *genuine collaboration* early in the study-design-development-implementation-evaluation cycle, the JPAs will seek to change the nature of collaborative work, and to impact the kinds of knowledge that emerges from it. Particularly important in terms of impact will be the strengthening of *research capacity* through the virtual doctoral school, in which we envisage real impact in developing a new generation of researchers that can genuinely exploit the tremendous potential of a European-wide perspective in solving some of the outstanding issues related to technology-enhanced learning.

B.3.2 Spreading excellence beyond the network

This integrated culture of research and development will be made visible and operationally integrated with the wider community of networks (such as the European Schoolnet, the "I Cube" initiative, IST, SOCRATES, FET-Convivio networks and ARIADNE foundation[12]), administrations (Ministries of Education), academic societies (the CSCL, International AI & Ed., and IFIP groups, etc.). The European Schoolnet, for instance, has a steady established link with schools selected through the European Ministries of Education, a network called the

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[12] UNIL, member of the executive committee of ARIADNE, is a partner of Kaleidoscope

European Network of Innovative Schools (ENIS). Many *Kaleidoscope* researchers and their organizations have participated in the Commission-based initiatives "I-3", IST, SOCRATES who have established a networking policy and specific related actions and platforms (e.g. the European Spring Days annual conference, the IST Concertation meetings and INFO-PROACTE initiative). The European CSCL community has had its first conference in 2001 and has since expanded beyond the European scene as manifested in the 2003 conference to be held in Bergen. The *Kaleidoscope* CSCL SIG and JEIRP on collaborative learning will create durable links between this academic community and the network. The International Federation of Information Processing (IFIP) holds a long-standing set of working groups whose domains range from Informatics and education at different levels to research on educational applications of ICT, ICT and educational management and Distance Learning[13].

Kaleidoscope will operationally work with a set of existing academic networks at national level and provide the momentum and motivation for the creation of new ones. In fact, the preparation of the proposal has already catalysed some new and potential durable initiatives. New and more longstanding networks at a national level, that will be impacted by Kaleidoscope include:

- In *France*, the thematic and multidisciplinary network "Learning, education and training"[14] (RTP39, CNRS-STIC, person in charge: Nicolas Balacheff). The RTP39 is shaping a network of 20 research units, with a strategic programme to develop shared resources for research and advanced training.
- In *The Netherlands*, the national research school "Interuniversity Center for Educational Research"[15] (ICO, Person in charge Ton de Jong). ICO houses all the educational research centres and around 125 researchers and 125 PhD students join in ICO. To organise its research ICO has 10 thematic working groups. It also organises a yearly training programme for PhD students including bi-annual international summer schools.
- In *Latvia*, Network of Distance Education Study Centres of Universities, contact person in Kaleidoscope: Atis Kapenieks.
- In *Finland*, the Life as Learning (LEARN) national research programme (funded by the Academy of Finland[16]) and the Graduate School of Multidisciplinary Research on Learning Environments (University of Oulu, University of Turku[17])
- In the *United Kingdom*, support has been received for Kaleidoscope from the "Teaching and Learning Research Programme" of the Economic and Social Research Council (contact via Richard Noss).

The maintenance of Kaleidoscope's visibility and the encouragement of long-standing links to these community networks and scientific groups, will be enhanced by initiatives from the *Kaleidoscope* partners themselves, but also through the *User Advisory Group*, the *Academia-Industry group* and the collaboration with the *International Scientific Committee* evaluating the network described in section B4. A significant role in this will be played by the *Dissemination* JPA described in section B4.3.2. Through this JPA, the impact of *Kaleidoscope* on other audiences will be made more operational. For instance, educational policy makers and research administrators and evaluators will have a means of

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[13] http://www.ifip.or.at/bulletin/bulltcs/memtc03.htm
[14] http://www-RTP39.imag.fr
[15] http://projects.edte.utwente.nl/ico/
[16] http://www.aka.fi/index.asp?id=6592E75D911E4D809C40D7A710131957
[17] http://www.kas.utu.fi/tutkijakoulu/ (in Finnish)

communicating and making use of an aggregated up-to-date picture of research and innovation in the field (for example, the European Network of Teacher Education Policy[18], has expressed interest in collaborating with *Kaleidoscope*). The *Dissemination* JPA will incorporate a special action on developing a set of appropriate language registers and communication channels which will enhance this visibility to divergent audiences from policy makers, to SME's, professional associations, parents and students.

Further dissemination and exploitation plans will be operationalised via the dissemination JPA. Key for the success of this work will be the ongoing dissemination of the network's activities, which we anticipate will focus at least as much on work-in-progress, as on completed actions. This, in turn, will add value to existing initiatives and – at least as important – encourage new actors to join the network when and where it is appropriate for them to do so. Kaleidoscope will seek to engage the widest possible channel of communication, not only to potential researchers and users, but to policymakers and other stakeholders. In doing so, we intend to raise the profile of our integration activities, stimulating further research funding in the national states, and adding value to Kaleidoscope's actions.

B 3.3 Durability and impact

Kaleidoscope will achieve a durable structuring effect on European research in a variety of respects:

1. There will be a direct impact on the integration of academic technology-enhanced learning research. It will allow for new coherent theoretical frameworks to emerge, particularly those that can contribute to a paradigm shift from a technology-driven towards a learner-driven R&D. We anticipate that this will address an apparent *handicap* for European research, (i.e. its contextual, cultural, systemic and linguistic diversity), into an *asset* for the growth of new and more intellectually powerful approaches to technology-enhanced research. Through the various JPA and backbone activities, Kaleidoscope will encourage the construction of new research frameworks, theoretical approaches, and practical implementations.

2. *Kaleidoscope* will impact R&D activity from an organizational perspective. Until now, a researcher or a research group had little opportunity to appreciate or – at best – incorporate alternative approaches and contexts. Even when there was genuine effort to negotiate new kinds of research plans and objectives, it was extremely difficult to do so in the context of proposal preparation or even during the preparation of R&D project deliverables. Some groups simply avoided joining such large consortia reverting to insular work funded by national agencies. *Kaleidoscope* will explicitly aim to create a context, an infrastructure and a culture for the design of joint multi-organizational, multidisciplinary R&D work. This will be achieved by the content JPA's *per se*, but also by the growing community spirit generated from the backbone JPA's. Furthermore, the *User advisory group* and *Academia-Industry group* will contribute to creating new terms of collaboration that is much more explicit, accepted and understood by all parties.

3. *Kaleidoscope* will have an impact on educational policy, on the shaping of methods to generate new markets and on the infusion of innovative activity in formal educational institutions and informal learning environments. In particular, it will begin to close the

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[18] http://www.ypepth.gr/entep/

gap between the level of research in EU and the countries from Central and Eastern Europe (CEE). These countries will potentially benefit considerably from the strengthening of their research capacity in technology-enhanced learning, capacity which might be turned into an instrument for systemic transformation of their society. A further gap-closing challenge for Kaleidoscope is that between research and the existing practice at all level of the educational systems in Europe. This gap is much visible in the CEE countries where EC and other international institutions initiate projects for modernization of their educational systems (e.g. the World Bank project for Bulgaria "Bulgaria: Education Modernization Project"). Building a solid RTD ground for development of the European e-Learning industry can reasonably be considered as one of the strategic directions of the New Economy. This industry could be considered a "meta-industry" since it could positively influence all other industry sectors. *Kaleidoscope* will build on and impact existing evaluation and research initiatives, such as the Second Information Technology in Education Studies[19] (SITES), within the IEA programme, and the OECD/CERI ICT Programme titled: "A Case Study of ICT and School Improvement", 2000 - 2001 research[20].

Kaleidoscope will make these impacts operational, thanks largely to the excellence and international standing of its individual institutions and groups, all of whom have been carefully screened for the strength of their existing research work, and their centrality to developing the network's mission. In addition, through the mechanisms Kaleidoscope will set in place for encouraging and identifying new centres and approaches, it is expected that there will be considerable opportunities not only to add value to existing research, but to stimulate new research directions, possibly bringing to life as-yet hardly-existent fields (see, for example, the *Philosophy and Epistemology of Learning Technologies* SIG).

Beyond Europe, *Kaleidoscope* will stimulate collaboration with non-governmental as well as governmental bodies. In particular, *Kaleidoscope* will build on the already existing *cooperation between EU and the US in Science and Technology in e-Learning*[21]. Through the committee of *International Experts* we expect to disseminate our ongoing work widely. Kaleidoscope will, through the fact of the international presence of its leading researchers, be able to disseminate on the international stage, both in terms of the results of individual actions, and a focussed presence in terms of Kaleidoscope presentations at conferences, seminars, and commercial events.

B 3.4 Contributions to standards

The basic idea of standardization is to enable *open, interoperable systems*, or components thereof. *Kaleidoscope* develops this approach on a more theoretical stance, by taking every initiative to stimulate the development of shared concepts and methods at a theoretical level. Being successful this development will bring a significant contribution to the standardization effort, by informing it by a more coherent and understandable theoretical framework bridging the different disciplines and the different specialities within disciplines, which contribute to research and development on Learning environment.

In the domain of education and training, formal accredited standards bodies include:

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[19] http://SITESM2.org/SITES_Research_Projects/SITESM2/sitesm2.html
[20] http://www.oecd.org/oecd/pages/home/displaygeneral/0,3380,EN-documents-606-5-no-28-no-606,00.html
[21] Pierluigi Ritrovato, Carlos Oliveira, Celia Hoyles, Roberto Carneiro and Nicolas Balacheff are members of the steering group supporting this activity since its launch in Stuttgart in 1999.

- IEEE LTSC (*Learning Technology Standards Committee)*: set up in 1996, its main result to date is the "Learning Object Metadata" standard, based on early ARIADNE work, and finalized in June 2002.
- CEN/ISSS WSLT (*Learning Technologies WorkShop)*: started in March 1999, has for instance, translated LOM into a number of European languages and investigated internationalisation and localisation issues with respect to LOM.
- ISO/IEC JTC1, at the global level, has set up a Subcommittee, or SC, numbered 36, on "Information Technology for Learning, Education, and Training". This group is still very much in its initial stage.

Specifications are developed and experimented with by consortia (which are numerous in our field), who can submit their results for further consensus building to the accredited standardization organisations mentioned above. *Kaleidoscope* will contribute to this activity, in particular with the outcomes of the *Platform and standards* JPA. At a more abstract level, building common resources for the *Virtual Doctoral School* JPA should be the source of new specification and new experimentations relevant to standardization. Also, both *Kaleidoscope* backbone instruments will base their development of the existing standards.

One of the founders and active member of the ARIADNE Foundation, The University of Lausanne, is a *Kaleidoscope* partner and has expressed its strong interest to participate in the *Platform and standards* JPA, and in acting as representative of the ARIADNE Foundation in the *Kaleidoscope* network of excellence.

The ARIADNE Knowledge Pool System will be an excellent test ground for realistic trial experiments and empirical validation against a realistic set of data. The *Platform and standards* JPA will be developed in close relation to it, developing prototype tools based on outcomes of *Kaleidoscope* integration activities at a technological level, in order to validate the standards and specifications against implementations, and, more importantly, against user requirements in realistic experiments.

The basic aim of standards development is to enable interoperability, which can be defined as "enabling information that originates in one context to be used in another in ways that are as highly automated as possible"[22]. This kind of interoperability is a condition to realize the vision of an open, large-scale learning object infrastructure. Standardization can also be understood at a conceptual and methodological, where there is an obvious need to enable concepts and methods to circulate among different disciplines and different research culture. A part from the backbone JPAs, several *Kaleidoscope* JPAs are likely to contribute to standards, as it is the case from the beginning of the SIG *Learning GRID*, the ERT *Production of Educational Format*, or JEIRPs *Personalised and Collaborative Trails of Digital and Non-Digital Learning Objects* and *Semantic web and learning*.

As ARIADNE foundation emphasises, there is a risk with "the fragmentation or balkanisation of incompatible technologies, where the adoption of proprietary solutions effectively locks the end user into a particular platform". *Kaleidoscope* will address this issue at a conceptual and methodological level, as well as a technological level, with a strong commitment to collaborate with Standardization bodies, and primarily with ARIADNE foundation itself.

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[22] Quotation from ARIADNE

B.4 Degree of integration and the joint programme of activities

The following diagram presents an overall picture of Kaleidoscope organisational structure and the main clusters of activities.
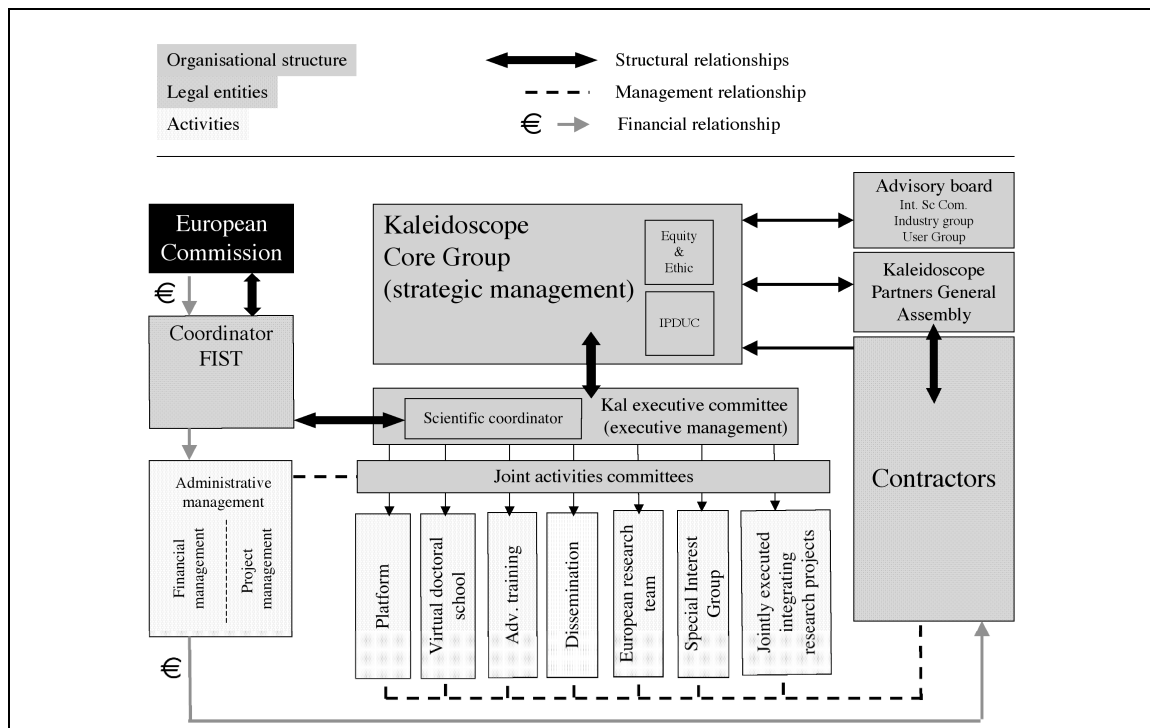
Kaleidoscope overall infrastructure

Kaleidoscope joint programme activities (JPA) is organised in four clusters dedicated respectively (1) to a common instruments to support integration, (2) to the organisation of integrating activities at a scientific and content level, (3) to the spreading of the network outcomes and its interface with key users, (4) to the management activities which include the quality control. The following schema gives an overview of the structure, which is presented in this document.

Before going ahead here after are the explicitations of the meaning of the key boxes of this schema:
   1. The *Virtual Doctoral School* (VDS), a Technological *Platform and Standards* group (PtfS) which are transversal JPAs strategic for *Kaleidoscope* integration,
   2. *Special Interest Group* (SIG), *European Research Team* (ERT) and *Jointly Executed Integrating Research Project* (JEIRP) are content JPAs to support the scientific integration (see below sections B4.1.3, B4.1.4 and B4.2)
   3. Groups in charge of *Advanced Training Activity* and the *Dissemination* will support Kaleidoscope spreading of excellence in the academic world and beyond (see below sections B4.1.1 and B4.1.2)
   4. The management is structured following the different types of management needed by the network: the *Strategic and scientific management* (*Kaleidoscope* Core group), the *Executive management* (Kaleidoscope executive committee), the *Operational management* (JPAs committees) and the *Administrative-financial management* (Coordinator). The management activities include quality control, which relies on the

feedback and evaluation from The *International scientific committee*, the *Academy-Industry digital alliance strategic group* and the *Users advisory group* (See below section B4.4, as concerned the quality control see details in sections B6 and B 8.5).

B.4.1 Integrating activities:

Kaleidoscope instruments for integration are of two categories:

- Instruments to support the construction of a common research infrastructure relevant to the multiple nature of the domain: technological, cognitive and epistemological:
    o a *Virtual Doctoral School* (VDS)
    o a *Technological platform and Standards* (PtfS)
- Instruments to stimulate the building of research communities, focussed on specific sectors of the domain, for the sake of the development of a shared scientific policy:
    o *Special Interest Groups* (SIGs)
    o *European Research Teams* (ERTs)

To that, should be added the *Jointly Executed Integrating Research Projects*, which are presented in section B4.2.

B.4.1.1 *Kaleidoscope* Virtual Doctoral School

Teaching has a property worth to remember: it requires the understanding of the content to be taught and the capacity to articulate it in a comprehensive and rigorous way. As a societal activity, it requires a consensus on the content to be taught and its presentation. The *Kaleidoscope* Virtual Doctoral School has its roots in the recognition of this characteristic of teaching.

The building of the Virtual Doctoral School will require from *Kaleidoscope's* partners a strong commitment in shaping a consensus on what could be accepted as a *common theoretical framework* for research on eLearning, on what are the *results collectively recognised*. This means the acknowledgement of *shared concepts and methods*, as well as of a shared understanding of what "result" means in the field.

At the level of senior researchers and of the search for a common scientific policy, the Virtual Doctoral School will act as a strong lever for integration: Working together on its construction, researchers will have to develop a procedure to acknowledge common understanding beyond disciplinary and cultural differences, and make sense of the differences.

PhD students who constitute the research workforce of tomorrow will benefit from a training based on a coherent and reliable shared resource. Often, it is left to them to find their way in an offer of references heterogeneous if not contradictory. Often, it is left to them to build the bridges between technology and education, or between cognitive and social theoretical frameworks, just to take classical examples. The Virtual Doctoral School will not show one sway to address this complexity. On the contrary it will evidence the convergence and the links, and enlighten the difference where needed by existing conflicts between different approaches.

JPA *Virtual Doctoral School*

Policy objective	Integration through the production of common research training resources and PhD courses
Joint activity leader	Appointed by the Core Group: Pierre Tchounikine (Laboratoire LIUM, Le Mans, FR)
Leading Group	*France Henri* (TéléUninversité du Québec, CA), *Alain Derycke* (University of Lille,FR), *Berner Lindström* (Göteborg University, SE), *Sten Ludvigsen* (InterMedia, University of Oslo, NO), *Roumen Nikolov* (University of Sofia, BG)
Duration	Indefinite (5 years+). Reviewed after 2 years and then every 3 years. To be sustained after the end of the NoE period

B.4.1.2 *Kaleidoscope* **Platform and Standard**

Research on eLearning is technological in different ways: it is technological because one its aim is to produce advanced technology for eLearning purposes, it is also technological because any research on learning, teaching or training in this domain relies on the availability of the related technology based environments. It raises two types of problems that the *Kaleidoscope* platform will address:

- *Mutualisation and interoperability* — Most of the PhD thesis, and a large part of the research carried out in the domain, has as a core product or a side product a piece of software and sometimes even a piece of hardware. The cost in manpower, as well as in money, of this production is very high. All this production is more often than not forgotten and soon not of any use, whatever is it quality and its significant potential. There are many reasons for that: the maintenance cost of the prototypes, the transformation of research prototypes into research tools, the difficulty to reuse prototypes which are not documented enough, and even before that the lack of a common design and implementation references to ensure interoperability.

- *Availability and accessibility* — To carry out a research project on eLearning a major obstacle could be for teams in human and social sciences, to have access to software resources even though these resources are in fact available because they have been developed elsewhere in some research projects. Facilitating this access, and in some cases offering technical services for an adaptation of the existing resources will change the whole dynamic of the research domain. In particular, the availability of open source research resources and technical support, will release significantly the pressure on computer scientist to act as engineers for projects from human and social science, this required contribution from computer science will be significantly supported by the *Kaleidoscope* platform.

- *Standardisation* — Recognising the importance of the need for standardisation in education and training, *Kaleidoscope* has decided to support an important activity focused of this challenge not only to irrigate all the Kaleidoscope Activities in order to favour awareness of the standardisation processes and their impacts on the

JPAs, but also to support actives contributions of the *Kaleidoscope* community to the international standardisation activities.

Hence, the *Kaleidoscope* Platform integrating activity will set a technological environment which will address the needs of eLearning research, in some sense as does large international instruments in the case of Physics. One may make the remark that eLearning does not need instruments at the same scale as Physics do. This is right at first sight. But if one thinks of the complexity of building a research prototype for research an eLearning research project, due to the variety of the expertise required, of the cost of the development and of the maintenance, then it is easier to understand the benefit of taking such an initiative.

Designing and implementing their Technological Platform will require from *Kaleidoscope* partners a strong commitment in producing operational standards for the construction of research prototypes, in accepting to share research resources, and in adopting a common policy for the development of the platform.

JPA *Platform and Standards*

Policy objective	Integration through the design and implementation of a shared technological instrument based on common standards
Joint activity leader	Appointed by the Core Group: *Alain Derycke* (Laboratoire TRIGONE, Lille, FR)
Leading Group	*Gilbert Paquette* (TéléUniversité du Québec, CA), *Pier Luigi Ritrovato* (University of Salerno, IT), *Walter Van de Velde* (CampoRosso, BE), *Manolis koutlis* (University of Athens, GR), *Mark Levene* (Birbeck College, London, UK), *Jean-Michel Adam* (MTAH, CNRS-STIC and University Grenoble 1, FR), *Anne-Marie Sassen* (Schlumberger SEMA , ES), *Maia Wentland-Forte* (Lausanne University, CH)
Duration	Indefinite (5 years+). Reviewed after 2 years and then every 3 years. To be sustained after the end of the NoE period

These Kaleidoscope *backbone activities raise specific IPR issues, which will be explicitly considered (see the IPR workpackage of the "coordinator" and the IPDUC activities in the Core group — section B7).*

B.4.1.3 Special Interest Groups

The dynamic of research in eLearning is such that being pushed by technology innovation or driven by emerging usage, new issues have to be considered, explored and understood before it is possible to address them by specific strategic and scientific policy. Special Interest Groups (SIGs) will gather expertise on these new or strategic issues to be addressed in *Kaleidoscope*. Based on individual commitment they will be the place where will take place of the first exchanges, the place where communication at an individual level will develop. Workshops, conferences and any type of collaborative working tool will support the activities within the SIGs. From the SIGs should emerge new proposals for JERP on specific questions,

or of ERTs on issues mature enough to be addressed by a coherent and comprehensive research programme.

The size of a SIG and its duration are not defined a priori. They are to be decided depending on the topic and the potential community of researchers interested. The key outcome of the SIG is to support the dynamic of the development of the network benefiting from individual expertise and creativity.

The first SIGs, which has been considered in *Kaleidoscope* construction process, corresponded to already existing research communities. The creation of Kaleidoscope has as a first result bridging the AI&Ed community and the CSCL community, by engaging them in the building of the network and the joint programme actions. Very soon new SIGs have been proposed following the first *Kaleidoscope* call for proposals, and the first *Kaleidoscope* general meeting held in Paris in March 2003. The general feature of a SIGs is the following:

JPA SIG

Policy objective	Stimulate the development and the structuring of a research community based on individual commitment of experienced researchers, and PhD students
Joint activity leader	The leader of the proposal
Leading group	A few *Kaleidoscope* partners to pilote and manage the initiative
Duration	Indefinite: reviewed after 12 months, then reviewed and approved/recommended for closing every four years. To be considered for sustainability after the end of the NoE period if successful
Selection process	The proposal for the creation for a SIG is submitted to the Core group, evaluated by one internal referee, one referee from the external scientific committee, and where applicable by one referee of the Users' group or of the Industry/Academy group.

The initial SIGs are precisely described in section B8, here after is presented their synoptic presentation:

JPA SIG *Artificial Intelligence and education*

Policy objective	To integrate and focus the potential of European AI&Ed research.
Joint activity leader	*Andreas Harrer* (Duisbourg University, DE)
Leading group	*Ben du Boulay* (University of Sussex, UK), *Nicola Capuano* (University of Salerno, IT), *Jean-Francois Nicaud* (MTAH, CNRS-STIC and University of Grenoble 1, FR), *Felisa Verdejo* (UNED, ES)

JPA SIG *Computer Supported Collaborative Learning*

Policy objective	To understand collaborative learning in different types of ICT based environments, and to develop the corresponding theoretical frameworks.
Joint activity leader	*Barbara Wasson* (InterMedia, Bergen, NO)
Leading group	*Liam Bannon* (University of Limerick, IE), *Pierre Dillenbourg* (University of Lausanne, CH), *Lone Dirckinck-Holmfeld*, (Aalborg University, DK), *Päivi Häkkinen* (University of Jyväskylä, FI), *Ulrich Hoppe* (University of Duisburg-Essen, DE), *Berner Lindström* (Gothenburg University, SE), *Sten Ludvigsen* (University of Oslo, NO), *Felisa Verdejo* (UNED, ES)

JPA SIG *Computer Supported Inquiry Learning in Science*

Policy objective	To bring together expertise in self-directed inquiry learning and the design of inquiry learning environments
Joint activity leader	*Ton de Jong* (University of Twente, NL)
Leading group	*Angelique Dimitracopoulo* (University of the Aegean, GR), *Luigi Sarti* (CNR-ITD, IT), *Wouter van Joolingen* (University of Amsterdam, NL)

JPA SIG *Context and Learning*

Policy objective	Development of a framework fro the creation and the management of learning communities
Joint activity leader	*António Dias de Figueiredo* (University of Coimbra, PT)
Leading group	*Ellen Christiansen* (IT University West / Aalborg University, DK), *Stavros Demetriadis* (Aristotle University of Thessaloniki, GR), *Rossella Magli* (CampoRosso, BE)

JPA SIG *Learning GRID*

Policy objective	Investigating how to use and extend GRID technology for implementing virtual organisations for emerging learning scenarios
Joint activity leader	*Pierluigi Ritrovato* (University of Salerno, IT)
Leading group	*Rudolfs Gulbis* (Riga Technical University, LV), *Blanca Jordan* (SclumbergerSema,ES), *Agathe Merceron* (Pôle Univ. L. de Vinci, FR), *Fionn Murtagh* (University of Belfast, UK), *Alex Poulovassilis* (London Knowledge Lab, United Kingdom), *Elisa Rubegni* (University of Siena, IT), *Saverio Salerno* (University of Salerno, IT)

JPA SIG *Learning and Technology at Work*

Policy objective	To identify new models for learning and conceptual tools to support work-based learning en eLearning in working contexts
Joint activity leader	*Richard Noss* (London Knowledge Lab, UK)
Leading group	*Mario Allegro* (ITD, IT), *Francoise Decortis* (University of Liege, BE), *Chronis Kynigos* (University of Athens, GR), *Vanda Luengo* (MTAH, CNRS-STIC and University Grenoble 1, FR), *Michael Samarin* (University of Helsinki, FI), *C. Tosunoglu* (The Open University, UK), *Barbara Wasson* (University of Bergen, NO)

JPA SIG *Narrative and Learning Environments*

Policy objective	To bring together expertise in narrative and its application on learning environments, to foster the use of narrative techniques in learning environments
Joint activity leader	*Ana Paiva* (INESC-ID, PT)
Leading group	*Ruth Aylett* (University of Salford, UK), *Françoise Decortis* (Université de Liège, BE), *Giuliana Dettori* (ITD CNR, IT), *Isabel Machado* (INESC-ID, PT), *Karl Steffens* (University of Cologne, DE),

JPA SIG *Participatory Design*

Policy objective	To provide conceptual and collaborative support to teachers and learners as co-designers of multimedia learning environments
Joint activity leader	Jules Pieters (University of twente, NL)
Leading group	Not yet established

JPA SIG *Philosophy of E-Learning*

Policy objective	To address the nature of learning in relation to modern ICT
Joint activity leader	*Don Peterson* (London Knowledge Lab, UK)
Leading group	*Christina Marke Baka* (CTI, GR), *Christina Stathopoulou* (COSET Lab, GR), *Stella Vosniadou* (COSET Lab, GR), *K. Nyiri* (Hungarian Academy of Sciences, HU)

B.4.1.4 European Research Teams

European Research Teams (ERT) are integrating activities, which targets networking European excellence at the level of specific research challenges. The key idea of creating an ERT is on the one hand to stimulate the mutualisation of knowledge and know-how of the best research teams on the identified issues, and on the other hand to favour the construction of a shared scientific policy, building up complementarities and common priorities. These teams must achieve the integration of different disciplinary expertise, of different research approaches and of research efforts with reference to a commonly build research programme.

An ERT structures the field at the level of the research units, they bring together resources from different teams, disciplines and countries to address deadlocks commonly identified,. with significant means. To be efficient, ERTs must engage a limited number of research units.

ERTs must engage in sharing research facilities (tools, prototypes) and promote staff mobility, especially in relation with a systematic programme of PhDs' co-supervision or hosting of post-doctoral researchers of each other team involved in the programme. ERTs will use JEIRPs as privileged tools to implement integrating research activities.

JPA ERT

Policy objective	Construction of a shared scientific policy between, premises of an European e-laboratory
Joint activity leader	The leader of the proposal
Consortium	A limited number of teams sharing the same focus
Duration	Reviewed after 12 months, then reviewed and approved/recommended for closing every four years. To be considered for sustainability after the end of the NoE period if successful.
Selection process	The proposal for the creation for an ERT is submitted to the Core group, evaluated by one internal referee, one referee from the external scientific committee, and where applicable by one referee of the Users' group or of the Industry/Academy group.

To start, the Kaleidoscope core group has decided to establish two ERTs, one on the "Production of Educational Formats" of the and the other on "Technology Enhanced Learning

in Mathematics". Here is their short presentation, a more detailed presentation if given in section B8.

JPA ERT *Production of Educational Formats*

Policy objective	Investigate the historical and actual nature of education format adopted in different institutional and not institutional bodies, and build a digital library of format that could support the design of learning environments
Managed by	*Antonio Rizzo* (University of Siena, IT)
Consortium	*Bristol School of Education* (Rosamund Sutherland, University of Bristol, UK), *CampoRosso* (Rossella Maggli, BE), *Department of Communication Science* (Antonio Rizzo, University of Siena, IT), *Interaction Design Centre* (Liam Bannon, University of Limerick, IE),

JPA ERT *Technology Enhanced Learning in Mathematics*

Policy objective	Develop and integrated research on the ICT based innovation in mathematical education, with a special focus on representational infrastructure, learning context and new key skills
Joint activity leader	*Georgio Olimpo* (CNR-ITD, IT)
Consortium	*Collaborative and Learning Support Systems* (Andreas Harrer, Universität Duisburg, DE), *Educational Technology Lab* (Chronis Kynigos, University of Athens, GR), *Istituto Tecnologie Didattiche* (R. M. Bottino, CNRGenova, IT), *Knowledge Lab* (Richard Noss, London Knowledge Lab, UK), *Modèles et technologies pour l'apprentissage humain* (Jean-François Nicaud, MTAH, CNRS et Université Joseph Fourrier, FR)

B.4.1.5 An integrated vision of *Kaleidoscope* integrating activities

Kaleidoscope backbone, the network common infrastructure, plays a key role in the integration process. It is both a tool to support joint activities and jointly executed research project, and the privileged receptor of their outcomes. It is clear for the Virtual Doctoral School at a conceptual and methodological level, as it is in the case of the Platform and Standard at a technological level. The Standard activity will rely on the outcomes of the other *Kaleidoscope* activities, and will in turn inform them in order to prepare in the best way the expected transfer of research outcomes.

Indeed, *Kaleidoscope* backbone components will collaborate and rely the one on the other. The Virtual Doctoral School will be the first user of the eLearning resources made available by the Platform. The Standard activity will inform the design and the implementation of the

Platform and of the Virtual Doctoral School, but it will in turn use the outcomes of the work done to produce the content of both of them, and to inform the specification of possible standards. The Platform, itself, will benefit for its development from both the theoretical and methodological resources made available for the Virtual Doctoral School and the recommendation from the Standard activity.

Kaleidoscope backbone components will develop within a distributed architecture in order to get the best of the available expertise from the partner teams and facilitate the accessibility and the sense of ownership within the network.

Along *Kaleidoscope* life, the activities carried out in the SIGs and the ERTs are expected to lead to the identification and recognition of centres of excellence on specific domains and competences, which network will form the basis of the a Learning with ICT cluster of the European Research Area.

The following diagram summarises Kaleidoscope scientific organisation, emphasising the different categories of activities.
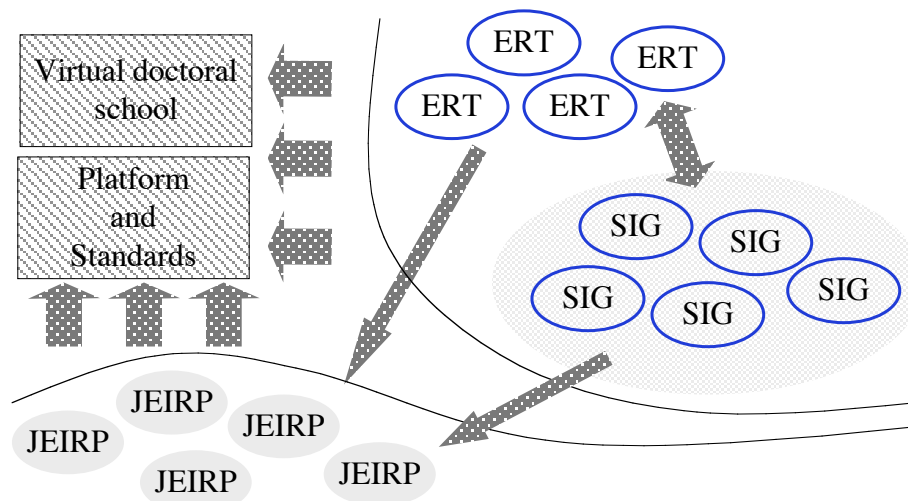
B.4.2 Programme for jointly executed research activities

Kaleidoscope brings together researchers and research teams with rather different background and research traditions, from computer science to human science. The *Jointly Executed Integrating Research Projects* (JEIRP) are meant to favour the cross fertilisation of the partners research focusing on the key issues of the field—issues which are intrinsically multidisciplinary. The basic process to stimulate the emergence of JEIRPs, will be both top down—the Core group defining provisional "topics of integrated research"—and bottom up following calls for proposals to the *Kaleidoscope* membership. Topics to be considered are temporary topics, which fulfil the following conditions:

- They are at that moment at the centre of attention
- They are known to be difficult to tackle and/or promising
- These topics require integrated research
- They involve digital learning
- They relate to the priorities of the 6th framework
- They are neither too broad formulated, neither too narrow.

It is not in the policy of *Kaleidoscope* to develop actual research projects, what requires means and resources out of reach of a network of excellence. But instead, JEIRPs should dive into the core complexity of a key issue in the domain, synthesise what is known and reach a research consensus about the foundational concepts and methods. When and where possible, a JEIRP will support the building of common research instruments to be shared by the teams involved and—under clearly stated IPR—to be added to *Kaleidoscope* platform. JEIRPs will contribute to the shaping of a research programme for which the partner will develop a common strategy to raise funds and find the needed supports. In short, these jointly executed research projects will build on top of the research currently carried out by *Kaleidoscope* partners, and focus on nurturing the integration of their strengths and complementarities.

The following table presents the basic features of a JEIRP:

JPA JEIRP

Focus	Based on existing national research themes and projects, these JPA will search for a consensus about the foundational concepts and methods, common understanding on strategic research questions, build a common research programme to address it — thereby adding value to the existing activities.
Joint activity leader	The leader of the proposal
Membership	An ad hoc group of researchers, with competencies well adapted to the specificity of the issue considered
Duration	To be proposed by the consortium
Selection process	The proposal for the creation for an JEIRP is submitted to the Core group, evaluated by one internal referee, one referee from the external scientific committee, and where applicable by one referee of the Users' group or of the Industry/Academy group.

To verify the concept and make the first move in setting up JEIRPs, the Core Group has organised workshops as part of the programme of the first general meeting, held in March, and invited Kaleidoscope partners to submit proposals based on their understanding of the project statement (of which an advanced version constitute the section B1 of this document). The following provide a first view of the JEIRPs with which *Kaleidoscope* will start its programme of jointly executed integrating research. The duration and the resources ascribed to the different actions account for the first *Kaleidoscope* evaluation exercise. All these actions are described with the needed details in section B8 of this document.

JPA JEIRP *Interaction between learner's internal and external representations in multimedia environments*

Focus	(i) Identify and organize our current level of knowledge—on multimedia, interaction and collaboration—in a way that it highlights and clarifies any implications for instructional design, (ii) Identify the emerging major questions and needs for further research and offer new insights and research evidence by involving the partners into selective case studies or field experimenting to answer specific questions, (iii) Organize the achieved results efficiently in a representative agenda proposing further research projects that at least in part rely on national funding
Joint activity leader	*Stavros Demetriadis* (University of Thessaloniki, GR)
Membership	*Claude Cadoz* (INPG, FR), *Frank Fischer* (University of Tuebingen, DE), *Atis Kapenieks* (Riga Technical University, LV), *Olga Timcenko* (Lego Group, DK), *Marta Turcsanyi-Szabo* (Eotvos Lorand University, HU)
Duration	18 months

JPA JEIRP *Personalised and Collaborative Trails of Digital and Non-Digital Learning Objects*

Focus	To apply new technologies to the challenge of trail-support in eLearning, investigating personalisation and collaboration, how different types of learning objects can be represented, and including in relation to standardisation
Joint activity leader	*Mark Levene* (London Knowledge Lab, United Kingdom)
Membership	*Judith Schoonenboom* (University of Amsterdam, NL), *Fionn Murtagh* (Queen's University Belfast, UK), *Ben du Boulay* (University of Sussex, UK), *Albert Dietrich* (University of Graz, AT), *A.C.Jones* (The Open University), *Lydia Montandon* (SchlumbergerSema Madrid, ES), *Turcsányiné Szabó Márta* (Eotvos Lorand University, HU)
Duration	12 months

JPA JEIRP *Mobile Support for Integrated Learning*

Policy objective	The core of the project is the problem of the design of a scripting language for CSCL environments based on the use of mobile tools. It will focus on specifications and identification of further research to be carried out for such a scripting language.
Joint activity leader	*Pierre Dillenbourg* (Federal Institute of Technology Lausanne, CH)
Membership	*Alain Derycke* (Université des Sciences et Technologies de Lille, FR), *Angeliki Dimitrakopoulou* (University of the Aegean, GR), *Frank Fischer* (University of Tubingen, DE), *Paivi Hakkinen* (University of Jyvaskyla, FI), *Ulrich Hoppe* (University of Duisburg, DE), *Sanna Jarvela* (University of Oulu, FI), *Felisa Verdejo* (UNED, Spain), *Barbara Wasson* (University of Bergen, NO)
Duration	12 months

JPA JEIRP *Conditions for productive learning in network learning environments*

Focus	To develop theoretical concepts and understandings of CSCL emphasizing the use of a cross cultural comparative approach of case studies in different concrete higher educational settings and existing practices
Joint activity leader	*Lone Dirckinck-Holmfeld* (Aalborg University, DK)
Membership	*Berner Lindström* (Göteborg University, SE), *membership to be developed.*
Duration	12 months

JPA JEIRP *Traversing learning space: an activity based approach*

Focus	To produce shared research & design experience related to methods and techniques for user study, concept design, activity-driven technological innovation, etc. The benchmark to produce such experiences will be the Generation of Concepts and Proof of Concepts in constructionist learning/teaching practices in two situations.
Joint activity leader	*Antonio Rizzo* (University of Siena, IT)
Membership	*Liam J. Bannon* (University of Limerick, Ireland), *Secundino Correia* (CNOTINFOR , Portugal), *Françoise Decortis* (Université de

	Liège, Belgique), *Angelique Dimitracopoulou* (University of the Aegean, Greece), *Chronis Kynigos* (University of Athens - ETL, Greece), *Rossella Magli* (CampoRosso, Belgique), *Richard Noss* (University College of London, UK), *Giorgio Olimpo* (ITD CNR, Italy), *Sara Price* (University of Sussex, UK), *Karl Steffens* (University of Cologne, Germany), *Rosamund Sutherland* (University of Bristol, UK), *Olga Timcenko* (Lego, Denmark), *Stella Vosniadou* (University of Athens - COSET, Greece)
Duration	12 months

The remaining JEIRPs count as assessment research project, proposed for a duration of nine months, they may close after evaluation, or be supported for further developments as JEIRPs or under an other of the possible formats offered by *Kaleidoscope* JPAs.

JPA JEIRP *Semantic web and learning*

Focus	Study the adaptation of Web semantic techniques to the standards which currently are developed for the pedagogical resources
Joint activity leader	*Danièle Hérin* (LIRRM, CNRS and Université de Montpellier 2, FR)
Membership	*Vincent Barré* (LIUM, University of Mans, FR), *Nicola Capuano* (CRMPA, Universita di Salerno, IT), *Weiqin Chen* (University of Bergen, NO), *Cyrille Desmoulins* (MTAH, CNRS et Université Joseph Fourier, FR), *Monique Grandbastien* (AIDA, CNRS et Université de Nancy, FR), *Danièle Hérin* (LIRRM, CNRS and Université de Montpellier 2, FR), *Agathe Merceron* (ESILV – Pole Universitaire Leonard de Vinci, FR), *Carlos Cardoso Oliveira* (University of Porto, PT), *Carsten Ullrich* (Saarland University,DE)
Duration	9 months /Assessment phase

JPA JEIRP *Interaction & Collaboration Analysis' supporting Teachers & Students' Self-regulation*

Focus	Pedagogical and technological tools to support interaction and collaboration via participants analysis of their own activity.
Joint activity leader	*Angeliki Dimitrakopoulou* (University of the Aegean, GR)
Membership	*Michael Baker* (GRIC, CNRS and Uni. of Lyon-2, FR), *Pierre Dillenbourg* (EPFL, Lausanne, CH), *Angeliki Dimitrakopoulou* (University of the Aegean, GR), *Ulrich Hoppe* (University of Duisburg, DE), *Felisa Verdejo* (UNED, ES)
Duration	9 months /Assessment phase

JPA JEIRP *Building Visual Interactive Blocks for Tangible Mathematics*

Focus	To document and analyse partners' national mathematics curricula (grade 8 to 12), identify elementary building blocks, prototype them as interactive, tangible and visual programmable objects and evaluate how they can be used to author learning environments highly interactive and visual
Joint activity leader	*Ivan Kalas* (Comenius University, SK)
Membership	*Secundino Correia* (Cnotinfor, PT), *Celia Hoyles* (London Knowledge Lab, UK), *Richard Noss* (London Knowledge Lab, UK), *Dave Pratt* (University of Warwick, UK) *Marta Turcsanyi* (EL University, Budapset, HU)
Duration	9 months /Assessment phase

B.4.3 Activities to spread excellence

B.4.3.1 Dissemination activities

Kaleidoscope will develop two main levels of communication:
- within the research network
- with the world outside the network – heterogeneous audiences for research findings, and ways of improving learning suggested by them.
- Each of these levels will be further subdivided.
-
- *Kaleidoscope* will set up a JPA to integrate the dissemination activities of different research centres across Europe.

Communication within *Kaleidoscope*
- This will depend essentially on a pan-European *knowledge-managed network* (using the most advanced tools, and developing a policy in coherent with the research arXives initiatives).

-
Facilitating *Kaleidoscope's* internal conversation (a prime justification for having such an integrated research network) will be easy-to-use *computer-mediated communication*, fostering formal and less-formal online communities.

Communication beyond *Kaleidoscope*

Audiences
   In the broad field of learning, we need to consider a number of more-or-less separate audiences across Europe, and probably beyond Europe:
- Research-oriented academics: a group which, while concerned with learning, can be subdivided into, for example, basic research on digital technologies, educationally oriented technical research, social scientific research
- Development-oriented academics, and academic R&D staff (who may be working in liaison with corporations or SMEs)
- Research administrators and evaluators
- Privately funded R&D (eg corporations, non-profits and SMEs)
- Relevant professional associations
- Policy makers
- Workers in the media
- Parents and others with a non-professional interest in education
- Students
-
- Language, language registers and communication channels
      Kaleidoscope will need to decide on its "master languages"–those in which all communications are published; and on its "alternate languages" for which translation facilities (human or machine) will be available. Some of this work may be funded, or carried out, by European publishing companies. A *work package on multilingualism* which might be part of this JPA.

      All of the audience groups noted above should be addressed in appropriate *language registers*, taking "language" to mean any meaningful and appropriate form of communication–not simply words, or text. In some cases one language register will be viable for more than one group; others (policy-makers, for example) will need to be individually addressed in language to which they easily relate.

      Similarly, some *communication channels* will be appropriate for certain groups, but not for others. For example, few parents will read peer-reviewed journals. Few policy-makers will join online communities of researchers. *Kaleidoscope* will need to use all available communication channels, and several language registers, for optimally effective dissemination of the network's research and development work.

      Many *Kaleidoscope* research groups will have *their own project websites or portals*. It will be necessary to make links to these to and from the project's central sites, or to reference them in publications which are not web-based.

      Kaleidoscope will also need *to make its own links with each constituent research project and group*, so that developments which should be disseminated are not overlooked by researchers whose principal interest is elsewhere.

Communication media

> Kaleidoscope will, where appropriate, need to use a range of communication media. These will include!: Central website, or centrally linked sites, Web publications, Email lists, Printed publications, Audiovisual media

Conferences

> As elsewhere, these can be divided into those exclusively for members of the network and those which are also open to public participation (whether free or on a fee-paying basis). *Kaleidoscope* might consider having one or members expert in the specialised art of conference organisation, so that we are not constantly reinventing wheels.

Dissemination overview

Considering the Europe-wide integrating mission of *Kaleidoscope*, and the research network's lifespan, there will be hundreds of dissemination activities. It will be extremely difficult to construct a comprehensive overview. But, since integration and comprehensiveness are part of the network's *raison d'être,* we should try to make communicable sense of the corpus of *Kaleidoscope's* work. This might mean a tightly edited book, or books, on the future of learning with digital technologies, spanning the concerns of most, or all, of the network's members. Such publication/s could be written for both academic / professional and for popular audiences.

A central group

It must be a prime concern, in a network like *Kaleidoscope*, to minimise non-research activities and staff. Yet research makes a difference only to the extent that it is communicated to those who will be influenced by it, or who will implement its recommendations. We need, therefore, to consider the practicalities and costs of *an effective Europe-wide dissemination and training programme* – whether we decide to employ staff, draw on members' resources, sub-contract to commercial firms, or do all of the above.

JPA Dissemination

Policy objective	Dissemination of Kaleidoscope outcomes, inside and outside the network
Joint activity leader	Appointed by the Core Group: *Gérard McDonald* (London Knowledge Lab, UK)
Leading Group	*Carlos Oliveira* (FEUP, PT), *Roumen Nikolov* (Sofia University, BG), *leading group to be established*
Duration	Indefinite (5 years+). Reviewed after 2 years and then every 3 years. To be sustained after the end of the NoE period

B.4.3.2 Advanced training activities

The *Advanced Training Activity* JPA aims to establish a flexible and sustainable training system for providing researchers and practitioners in e-Learning with knowledge and skills at a European and world level of excellence. This will be achieved by developing a *common methodology* and a *set of technology tools* oriented to providing highly specialized tailor-made training courses based on topics that the *Kaleidoscope* NoE member organisations demonstrate excellence in, or on topics that have been especially developed during the project life-cycle. Thus the e-Learning capacity of the participating institutions will be substantially

strengthened and the e-Learning researchers and practitioners would get access to some advanced e-Learning research outcomes and teams.

JPA Advanced Training activities

Policy objective	Establish a training system for providing researchers and practitioners with knowledge and skills at a European and world level of excellence
Joint activity leader	Appointed by the Core Group: Roumen *Roumen Nikolov* (University of Sofia, BG)
Leading Group	*Alain Derycke* (Le Mans University, FR), *Gérard McDonald* (London Knowledge Lab, UK), *Richard Noss* (London Knowledge Lab, UK), *Ton de Jong* (University of Twente,UK), *Barbara Wasson* (Bergen University, NO), *Lydia Montandon* (SchlumbergerSema,ES*)*, *Antonio Rizzo* (University of Siena, IT), *Ulrich Hoppe* (Duisbourg University, DE), *Eric Barchechath* (GIE Haussmann, FR).
Duration	Indefinite (5 years+). Reviewed after 2 years and then every 3 years. To be sustained after the end of the NoE period

B.4.4 Management activities

The NoE activities are defined in a classical structure of work packages and tasks; the NoE management organisation is detailed in part B7. In order to ensure a correct integration and coordination of activities an coordination between the partners, the Consortium has defined four main levels of management activities that can be summarised as follows:

B.4.4.1 Strategic and Scientific management

Kaleidoscope Core Group is in charge of the strategic management of the network, it acts as the *Governing Board* of *Kaleidoscope*. The Core group takes the major decisions of the NoE in phase with the formal reviews with the Commission (initial project kick-off and annual JPA reporting and up-dating).

The Strategic Management activities includes:

- Strategic direction of the NOE (with the advice of advisory committees), including:
- Inventory per topic of: research activities; specialization; research facilities; research tools; research platforms; inventory of needs for research tools and platforms
- Per topic: decision on what kind of activities etc. to include or not: defining the boundaries of the network
- Per topic: devising ways of coordinating the programmes and sharing the research facilities, including electronic ways of doing so
- Per topic: setting up projects in which new research tools and platforms for common use are developed
- Setting up activities to spread excellence

- Decisions about the selection of activities and associated budget, according to the selection processes defined in 4.1.4 (Specific Interest Group activities), 4.1.5 (European Research Team activities), 4.2 (Jointly Executed Research Activities). The selection process and budget decision is made by the Core group with the support of the Advisory Boards (International Scientific Committee, Industry/Academy Group, User Advisory Group)
- Evolution of the Consortium (Core Group): the admission and exclusion of partners
- Ehical issues and gender equality promotion (*Equity and Ethic group* to be established within the Core Group)
- Validation of annual reports to the Commission.
- Search for funding
- Evolution towards a "Network and Network" structure

Scientific Management activities includes:

- Definition and follow up of the Kaleidoscope Scientific Indicators (see section B6)
- Permanent follow-up of the NoE Scientific quality, with the advice of Scientific Committee)
- Evaluation of the quality of the deliverable (with Scientific Committee)
- Valorisation of knowledge and all activities related to Knowledge Management (IPDUC interacting with the leaders of integration activities)

JPA *Strategic and scientific management*

Policy objective	Kaleidoscope strategic and scientific management
Chair persons	*Nicolas Balacheff* (CNRS, FR) *Richard Noss* (London Knowledge Lab, UK)
Members	*Barbara Wasson* (University of Bergen, NO), *Felisa Verdejo* (UNED, ES), *Pierre Tchounikine* (Le Mans University, FR), *Antonio Rizzo* (Siena University, IT), *Ana Paiva* (INESC, PT), *Georgio Olimpo* (CNR, IT), *Roumen Nikolov* (, BG), *Rossella Magli* (CampoRosso, BE), *Sten Ludvigsen* (Oslo University, NO), *Berner Linderström* (Göteborg University, SE), *Chronis Kynigos* (Anthens University, GR), *Ton de Jong* (Twente University, NL), *Ulrich Hoppe* (Duisbourg University, DE), *Peter Goodyear* (Lancaster University, UK), *Ben du Boulay* (University of Sussex, UK), *Alain Derycke* (Lille University, FR), *Jacqueline Bourdeau* (TéléUniversité du Québec, CA), *Liam Bannon* (Limerick University, IE)
Duration	Indefinite (5 years+)

For the evaluation of the content based JPAs, as well as for the monitoring of the activities of the network of excellence and the building of its policy, *Kaleidoscope* will request expertise and advices from two specific groups: the *Academy-Industry digital alliance group*

and the *User advisory groups.* These groups will help to bridge the gap between the academic world and the end-users, teachers or students, in schools and at home, children, employees, and citizens depending on the market segment targeted by the company. Moreover, they will contribute with their experience and knowledge to help to identify existing technologies and to shape emerging technologies according to the mutually defined objectives of the network.

JPA *Academy-Industry digital alliance strategic group*

Policy objective	To understand how exploitation and commercial aspects will be treated in *Kaleidoscope*, to act as an advisory body for the implementation of *Kaleidoscope* Joint Programme of Activities
Joint activity leader	*Lydia Montendon* (SchlumbergerSema, ES)
Leading group	*Walter Van de Velde* (CampoRosso), *Jiri Stetina* (Canon Research Centre Europe, UK), *Pedro Pinto* (CNOTINFOR, PT), *Olga Timcenko* (LEGO Systems, NL), *Paul Ekeland* (Odile Jacob Multimédia, FR), *Richard Noss* (Knowledge lab, UK), *Antonio Rizzo* (University of Siena, IT),*Frank Fischer* (University of Tuebingen, DE)
Duration	Indefinite (5 years+)

JPA *Users advisory group*

Policy objective	To organise mutual attention between the world of researchers, the world of industrialists and the world of users
Joint activity leader	Eric Barchechath (GIE Recherche Haussmann, Groupe Galeries Lafayette, France)
Leading group	*Rossella Magli* (Camporosso, BE), *António Dias de Figueiredo* (University of Coimbra, PT), *Pierre Dillenbourg* (EPFL, CH), *Richard Noss* (London Knowledge lab, UK)
Duration	Indefinite (5 years+)

JPA *International Scientific Committee*

Policy objective	To support *Kaleidoscope* in quality control and help in establishing international links
Chair	Ton de Jong (University of Twente, NL)
Expert group	*Tak-Wai Chan* (National Central University, Taiwan), *Susanne P. Lajoie* (McGill University, CA), *Naomi Miyake* (Chukyo U. (Japan), *Bob Kozma* (SRI, USA), *Lloyd Rieber* (University of Georgia, USA), *Marcia Linn* (University of Berkeley, USA), *Edith Ackermann* (MIT, USA), *Peter Reimann* (University of Sydney, AU), *Gavriel Salomon* (Haifa University, IS), *Bonnie A. Nardi*! (Agilent Laboratories, US), *Dan Suthers* (University of Hawai, USA)
Duration	Indefinite (5 years+)

B.4.4.2 Executive management

Executive committee

Kaleidoscope Executive Committee implements the major decisions taken by the Core group, and reports to it. It manages the JPA, structures it into Groups and activities with their own budget and also monitors the progress on a scientific and technical level. It validates the reports produced to the Commission: activities results provided by the operational management and cost and schedule control documents produced by the Administrative Management. The Executive Committee (associated with Experts if necessary) is also a proposal force to the Core group. It is chaired by the Scientific coordinators

Scientific coordinators

Kaleidoscope Scientific coordinator will be the interface between the Partners' general assembly and the Core group on the one hand, and the Management/financial structure on the other hand. The scientific coordinator will have in charge to implement the policy as it will be shaped by the Core group, and the related decisions. Both the Director and the Core group should be accountable for their actions under a process which should be described soon, and which indeed should ensure the involvement of the *Kaleidoscope* partners in the life of the network and the development of its integrating policy.

JPA *Executive management*

Policy objective	Kaleidoscope strategic and scientific management
Executive committee	*Barbara Wasson* (University of Bergen, NO), *Richard Noss* (London Knowledge Lab, UK), *Roumen Nikolov* (University of Sofia, BG), *Ton de Jong* (Twente University, NL), *Ulrich Hoppe* (Duisbourg University, DE)
Coordinator	*Nicolas Balacheff* (CNRS, FR)
Duration	Indefinite (5 years+)

B.4.4.3 Operational management

Operational Management (JPAs committees): this level reports to the Executive Committee. Its tasks are done at the Activity level. Each Activity is composed of Work Packages. The operational management makes sure that the planned tasks of the corresponding JPA are correctly carried out.

B.4.4.4 Administrative and Financial management

This level reports to the *Executive committee* and the *Core group*. It has two categories of tasks: (i) project management tasks, (ii) financial management tasks.

These tasks are managed by the *Coordinator*, which is the unique interface with the Commission.. This role has been entrusted to *France Innovation Scientifique et Transfert* S.A. (FIST S.A.), an affiliate of CNRS and ANVAR.

FIST has expertise in the administrative and financial management of major R&D programmes coordinated by the CNRS and in implementing intellectual property strategy. FIST has more than a decade of experience as an interface between the academic and industrial sectors, in project management and coordination, in international negotiations and in the transformation of innovative technologies into products, services or new businesses. FIST specializes in structuring the functioning of projects to optimize the exchange and diffusion of information and the efficacy of project activities as well as providing efficient fund allocation.

FIST, as coordinator, is responsible for the Administrative management tasks:

1) Financial / contractual management:
- Receives all payments made by the Commission for the Contractors,
- Dispatches funds for the various WPs to the Contractors in accordance with the Consortium Agreement and the decisions of the Kaleidoscope Core group and Executive management group,
- Manages the funds and accounts for the actions,
- Reports to the Commission and to the Executive management group on the consumption of funds,
- Negotiates the contracts, agreements and annual amendments, including the Consortium agreement. Ensures signatures.

2) Project management. The Coordinator defines *Project Management methodology and tools* to be used in the management of the activities and budgets. These methodologies and tools play a major role in the integration of the activities of the project.

- Checks the project progress against planned schedule,
- Checks manpower consumption pursuant to the reports submitted by the Contractors,
- Checks that milestones are met and deliverable (including audit certificates) properly produced pursuant to the reports submitted by the Contractors,
- Organizes meetings to prepare and finalize reports and submits deliverables and schedules to the Commission,
- Checks that internal audits have been finalized pursuant to the Contractors contractual obligations,

- Organizes the information flow throughout the different participants.

More specially, the *Coordinator* reports to the *Executive Committee* and is especially in charge of informing this body of any eventual modifications in manpower or resource consumption and planning compared to the original contract, so that the *Executive Committee* may take corrective actions in a timely fashion.

Others bodies play consultative roles in management: *Industry-Academy digital alliance strategic group*, *User advisory group*, *International Scientific Committee*, *Ethic and equity group* and *Industrial Property Use and Dissemination Committee.*

B.5 Description of the consortium and the excellence of the participants

This section will provide an overview of existing research, on which the integration effort of *Kaleidoscope* will be developed. Our theme is interdisciplinarity, and any attempt to provide an overview runs the risk of artificially drawing boundaries between research where—ideally—we intend to remove them. For this reason, we will provide a comprehensive description of all partners on *Kaleidoscope* website. Particular attention can be paid to these forms, which provide evidence in themselves of the research currently being undertaken, of which this overview only provide a glimpse (see *Appendix 4* to this document).

Integration involves not simply collaboration where none existed before. It involves an intellectual commitment to address new topics in new ways in the face of substantial complexity. One example will suffice: research methodology. Many studies of the impact of technology on teaching and learning tend to report few significant outcomes of the introduction of technology. At least part of the reason for this lies in the research methods that are used because these methods tend to ignore the crucial situational influences on learning. These factors always shape the processes of teaching and learning, what is learned and how it is learned, and may have still more influence on outcomes in situations that incorporate digital technologies. Methodologies need to take seriously the influence of tools on knowledge and learning, and on teacher-student interactions as well as the way communities spread and share their knowledge. To this end, we see integration within *Kaleidoscope* as a process of building on the research currently undertaken (mainly in isolation) of technologically-oriented educators, educationally-oriented technologists, cognitive scientists, computer scientists, humanities researchers and commercial researchers. We will consider each of these in turn.

B.5.1 *Kaleidoscope*: the network

The following description adopts a classification which is, in many ways, arbitrary, and does not do justice to the breadth of research often undertaken within a single site. Within the limitations of space, it will also—inevitably—ignore some important aspects of this research. Nevertheless, we aim to map the breadth and depth of the research currently undertaken, illustrate the critical mass of this research, and to illustrate the ways in which we might expect participants to contribute to the JPA. Further, we should stress that many, perhaps most, of the groups listed in the following sections stand at the centre of their own national networks, where they exist, of at the intellectual focal point in their field. In this respect, we anticipate that Kaleidoscope will be able to ensure a high quality of integration through its various JPAs, and particularly its transversal actions and SIGs, by harnessing the leadership roles of its participants.

B.5.1.1 Technically-oriented educational research

Kaleidoscope includes some 20 or so partners whose work is oriented towards educational research with a strong technological focus. Many of the labs and institutions involved include focused research on socio-technical fields, including a strong theme around activity-theoretic and socio-cultural approaches. This strong theoretical framework will be invaluable in achieving the aims of the JPA. Some examples (and illustrative topics) include:

- *Dept of Educational Research at the University of Lancaster UK*, (networked learning, virtual ethnography, and work-based knowledge);
- *InterMedia, University of Bergen*, *Norway* (an interdisciplinary group working on topics such as net-based learning, collaboration, pedagogical agents; analysis,

development and evaluation of new media in relation to knowledge and cultural dissemination);
- *The Centre for Educational Technology and Distance Learning, University of Birmingham UK* (mobile and wearable learning, knowledge-based training, VR, HCI)
- *Dept of Informatics, University of Umea, Sweden* (distance learning, mobile internet access)
- *Faculty of Behavioural Sciences, University of Twente, Netherlands* (development of theory for learning design, educational psychology, discovery/experiential learning)
- *ITD, Italian National Research Council* (educational robotics, learning disabilities)
- *GRIC, CNRS Universite Lumière, Lyon* (CSCL, AI and education, Science education)
- *University of Oulu, Finland* (wireless technology for distributed collaboration; 3D worlds for collaboration)
- *Centre of Information Society Technologies, University of Sofia, Bulgaria* (tools for knowledge management; e-learning platforms; application of theories of instructional design)
- *Informatics Division, Eotvos Lorand University*, *Hungary* (multimedia, concept maps; microworlds)
- *IDC, University of Limerick, Ireland* (CSCL, interaction design, innovative evaluation methodologies)

While it is evident that these and other partner institutions bring a corpus of research in common within the field of technically-oriented educational work, they incorporate a broad range of methodological and epistemological foci. We are confident that Kaleidoscope will be able to build on this diversity, and that integration activities will benefit from the theoretical and practical heterogeneity of these laboratories and institutions. In particular, the substantial research base of these educational technology centres has already—through its subscription to the various actions (a salient example is the CSCL SIG)—begun the task of integration, and informal integration activities have been catalysed even by the process of proposal-preparation.

B.5.1.2 Educational-oriented technical research

In this field, we include institutions and research laboratories in which—broadly speaking—the focus is more technically oriented. On the other hand, we should make clear that all of the participants in this theme (there are again, around 20) are closely linked in one way or another to the central theme of *learning* around which *Kaleidoscope* coheres. Examples (and illustrative topics) of current research being carried out include:

- *Dept of Informatics Engineering, Coimbra, Portugal* (knowledge management; actor-network theory)
- *Dept of Information Engineering and Applied Mathematics, Salerno, Italy* (simulative technologies; classical and modern language learning; VLEs for learning electronic engineering)
- *CTI, Patras, Greece* (complexity, communications, parallel and distributed algorithms – and applied research in secondary education throughout Greece)
- *Lab TRIGONE, University of Lille, France* (CSCL, HCI, CSCW, Mobile learning, multi-modality)
- *Models and technologies for human learning, Grenoble Universities and CNRS, France* (AI and Ed, software engineering, LOM and standards, science and mathematics education and training)

-   *LIUM, Le Mans University, France* (Knowledge engineering, distance learning, AI and Ed, CSCL, language learning)
-   *Saarland University, Denmark* (intelligent learning, semantic knowledge representation)
-   *KMI, University of Tuebingen, Germany* (principled design of interactive and collaborative learning environments; ambient intelligent environments for learning)
-   *UNED, Madrid, Spain* (knowledge-based authoring; distributed systems; learning technologies and standards)
-   *Dept of Informatics Education, Comenius University, Slovakia* (AI and education; development of programming tools for learners and learning)
-   *UNIL, University of Lausanne* (standard—representative of ARIADNE, ethical and social consequences of the dissemination of IT in education)

Our intention is that these partners will be able to add value to integration activities by their focus on design and the creation of learning-oriented artefacts. In this respect, we propose that design-based research is a crucial complement to research focussed in the humanities and in educational fields: in many ways it is the missing link of European research, and we see this effort as a crucial component of integration. This is taken still further in the category 4 below.

B.5.1.3 Basic research on digital technologies

We see the contribution of basic research as essential. It is often conceived as "relevant" but there are few organic links in Europe between research on learning – genuinely informed and theoretically grounded – and basic research. In Kaleidoscope, we intend to forge these links soundly, through, for example, the SIG groups on GRID technologies, and Joint Projects on subjects such as the semantic web, personalised trails through learning objects, and mobile technologies. Current existing research areas within the network is exemplified in the following contributions:

-   *Queen's University Belfast,* (Entropy and information; correspondence analysis)
-   *INESC-ID, Lisboa, Portugal* (IT, electronics and telecommunications; intelligent agents)
-   *Aristotle University, Thessaloniki, Greece* (adaptive hypermedia environments; tools for metacognitive support)
-   *Birkbeck College Department of Computer Science and Information Systems (London Knowledge Lab)* (web interaction and navigation problems; machine learning; semantic web; mobile technologies)
-   *University L. de Vinci, Paris* (formal specifications; databases)
-   *Montpellier University,* (robotics, semantic web; databases)

B.5.1.4 Cognitive scientific research

Cognitive science is one of the key existing fields that bridge social and technical research. Kaleidoscope is fortunate to have secured partners in this field who are leaders within Europe. Many of these partners already collaborate with those from related fields; some (see, for example, the SIG group on philosophy and epistemology) are hoping – through kaleidoscope – to set up an entirely novel field of research. Other actions – particularly the virtual doctoral school – will develop integration by further developing cognitive scientific work as a means to address key problems of research on learning with digital technologies, particularly related to the issues of methodology and modelling.

Key partners in Kaleidoscope include:

- *Human Centred Technology Research Group, University of Sussex, UK* (researching socio-cognitive bases for human-computer interaction; building system architectures; new design and evaluation methods)
- *Dept of Communication Science, University of Siena* (semiotics, cognitive ergonomics, communication design)
- *AIDA, René Descartes University, Paris* (cognitive psychology, didactic situations, AI in education)
- *Tele-university, Quebec* (cognitive informatics and learning environments; cognitive modelling)
- *University of Graz, Austria* (cognitive science and e-learning; psychological testing and evaluation; visual comprehension)

B.5.1.5 Humanities and social science

The social scientific community within Europe has mainly become aware of the need to forge collaboration with those working in the fields of design and artefact creation. In many cases, however, this is an "add-on" to existing research, or a "setting" to study or "evaluate". In Kaleidoscope's JPA, we incorporate – initially and on an ongoing basis – themes that aim to raise this integration from its mainly amateur status at present, to a richer, professional integration that genuinely builds on the reciprocal strengths of social scientific and technical work. For example, the SIG in *context and learning* will draw together humanities researchers with backgrounds in education, cognition, organizational theory, management, psychology, sociology, anthropology, as well as some from the more technically-oriented fields described above.

- *IET, Open University, UK* (CSCL, Activity Theory)
- *Institute of Education University of London (London Knowledge Lab)*
- *University of Bristol* (multidisciplinary approaches; home-based learning)
- *InterMedia, University of Oslo* (sociological approaches, HCI, media studies)
- *Amsterdam University, Netherlands* (tele-learning, innovative pedagogical models for ICT in learning, digital didactics)
- *Athens University, Faculty of Philosophy Pedagogy and Psychology* (design and evaluation of architectures for exploratory learning environments)
- *Centre for Social Innovation, Vienna* (new pedagogical models for online learning; creation of learning communities)
- *IT University West, Aalborg, DK* (learning contexts and new pedagogies for IT-studies)
- *University of Koln, DE* (eLearning, multimedia, multilingual communication)
- *Faculty of Psychology and Educational Sciences, University of Liege* (interdisciplinary studies of situated learning, social ethology and computational modelling of social systems, computerised ergonomics)
- *Institute of Education, University of London (London Knowledge Lab)* (sociotechnical research; applications of activity theory; media education; microworld design; multimodal discourse)

B.5.1.6 Commercial research and development

Kaleidoscope is committed to bringing together Europe's leading commercial research laboratories in order both to enrich the integration effort of existing academic research, and also so that academic research integration will lead to useful and commercially viable applications and products. For example, the *Canon Research Centre Europe Ltd.* (CRE) has

strengths in the areas of multimodal interaction, 3D input and output, document retrieval, natural language processing, speech recognition and visual communications. *SchlumbergerSema, Spain* are bringing a multi-disciplinary and multicultural team, composed of experts in engineering, education science, psychology, philology, linguistics, biotechnology, telecommunications, computer sciences and interface design, who apply all their knowledge to the achievement of balanced solutions.

In the field of artefact design and learning, *Lego Systems (Research Lab, Denmark)* afford *Kaleidoscope* the opportunity to add value to research integration by collaborating with researchers who, for example, are responsible for the programmable Lego brick, used to teach students of many universities about programming and control – as well as introduce young children to the same ideas. Sharing expertise on the design of technology-driven toys will serve to broaden *Kaleidoscope's* actions and encourage innovation on both theoretical and practical levels.

Kaleidoscope also incorporates researchers involved in e-commerce, which involves issues of learning and interaction from a different perspective to educational research. For example, *GIE Recherche Haussmann* are involved in "enlightening the future of electronic commerce", through the initiation of innovation processes, and developing public debate on technology, commerce and society. Kaleidoscope also incorporates software publishers and curriculum deliverers (e.g. *CNOTINFOR, Portugal*) as well as scientific publishers of paper and electronic media (e.g. *Odile Jacob Education, Paris*).

B.5.1 New participants

Without doubt, there are important centres within Europe that are not yet integrated into the proposed network. It is therefore important that we i. have a mechanism by which new participants can be identified, ii. develop a set of criteria by which to evaluate their potential contribution, and iii. a way to integrate any new partners into existing and future actions.

B.5.1.1 Identification of new members

It would be easy for Kaleidoscope, like some previously-created networks, to become a self-perpetuating group that misses important opportunities to identify new participants. Through its core and management groups, and through its dissemination JPA, Kaleidoscope will therefore:
- issue periodic calls for applications to join the network through the website, publicity materials and advertisements in conferences, journals etc.
- encourage JPAs, and particularly the SIGs, to identify potential partners whose participation would strengthen or diversify their work
- specify in JPA reports that identification of potential members be a specific requirement within them, and whether new members are required to achieve a critical mass of researchers within the field
- keep abreast of any new national funding initiatives, and assess whether any recipients of such funding could add value to the integration activities of Kaleidoscope.

B.5.1.2 Criteria for admission

The criteria for admission to Kaleidoscope will mirror the initial methodology employed when setting up the current proposal. In particular, each potential partner will be asked to:
- provide a description of the organisation's strengths with respect to Kaleidoscope's priorities

- list the main publications and other outputs that best summarise the potential contribution to the network
- provide evidence of collaboration with commercial partners or with associated educational or training bodies
- list recent projects and international collaborative links
- provide a description of how the organisation and its researchers will contribute to Kaleidoscope's mission over time.

Final decisions concerning entry will be taken by the core management group.

B5.1.3 Mechanisms for integrating new members

New institutions will be encouraged to join at least one JPA immediately upon entry. This will ensure a smooth integration into the network. Through the various electronic networks available, they and their work will be introduced to existing members, and their expertise made available. In this way, we anticipate that it will be quite normal for a number of JPA organisers to identify potential new participants in their action, and invite new members to participate within them.

In addition, the core group will periodically review the new members who have recently joined the network, and assess the need to invite any to join the core group (there will, of course, have to be a symmetrical procedure for "de-integrating" members as necessary).

B.5.2 Other countries

The LICEF research center from Télé-université in Canada is involved in this NoE both as an institution and as a group of individual researchers (www.licef.teluq.uquebec.ca). Canada has an RTD co-operation agreement with the European Community, and LICEF is an active member of IST-EC, a joint Europe-Canada initiative which promotes collaboration between Europe and Canada under the 6th Framework.

LICEF is a pioneer in the field of cognitive informatics applied to the design of learning environments. Their first model-based virtual campus was presented in 1995 and inspired many researchers in the field. Besides this model-based platform called Explor@, LICEF developed the only existing complete instructional engineering methodology for distance learning, MISA. LICEF has been the co-founder and a pole of excellence in the Canadian network of excellence in Telelearning (1995-2002), and recently received a major grant for a research network called LORNET on interoperability of learning objects repositories. LICEF will initially contribute to this NoE by participating in the JPA Platform & Standards.

A recent research project at LICEF is focussing on the modelling of a virtual campus for doctorate schools and a STREP project will be submitted on this topic. This project will be articulated with the Kaleidoscope JPA Virtual Doctorate School. A sophisticated laboratory, LORIT, installed at LICEF focuses on tests, design experiments, or any research protocol or collection of multimedia data from multiple sources, in the form of a virtual lab. LICEF will contribute to this NoE by sharing this unique experience and by providing access to these virtual facilities.

Finally, several individual researchers (11) from LICEF will participate in various SIGs form the start, and their intention is to get involved in the following initiatives, projects or other initiatives to be generated by the SIGs. Exchange of students will also be encouraged. It is

LICEF's intention to request from Canadian agencies, the financial support needed for collaboration with partners in this NoE.

B.6 Quality of integration

B.6.1 Differentiation of activity types and interplay of activities

As described in B.4, the joint programme of activities (JPA) in *Kaleidoscope* comprises a differentiated spectrum of sub-activities of different types. The following table 6.1 provides a survey and characterisation of these activity types.

Table 6.1: JPA subtypes

JPA Element	Multiplicity	Lifetime	Status	Membership
Virtual doctoral school	one	beyond NoE	built-in part of NoE structure	open
Platforms and standards	one	beyond NoE	built-in part of NoE structure	open, active core group
SIG	several	beyond NoE	to be approved, external & inherent success criteria	open, subscription-based
ERT	several	beyond NoE	to be approved, internal evaluation	limited, admission-based
JEIRP	several	during NoE	to be approved, internal evaluation	limited, selection-based

Several features may need explanation:

- With the exception of JEIRPs, all activity types are expected to last beyond the network's lifetime, i.e. they are supposed to be self-sustainable. There is no strict guarantee that this will be the case for each one of the activities, and the mechanisms will differ considerably for the different types. E.g., successful SIGs will constitute scientific communities with membership fees, regular conferences etc. In contrast, "platforms and standards" could survive as an industry-related activity, possibly under the umbrella of existing standardisation organisations.

- All the activities will be monitored to check their relative success or failure. Evaluation will rely on internal mechanisms and will particularly involve the *international scientific committee*. For some of the activities, there are relatively objective external criteria, such as, e.g., for the SIGs the emergence of a scientific community in terms of membership and regular events. A similar criterion holds for the doctoral school (participation, degrees). For the other activities, we have to rely on content- or product-oriented evaluation criteria.

- Activity types differ considerably in terms of access or membership criteria. The most limited activities are ERTs and JEIRPs. Particularly the latter have to be based on a strict selection for which excellence and existing results or merits in the specific of research are indispensable.

Table 6.1 characterises the different types of networking activities, which all in their way aim at generating synergy and integration. For SIGs, the essence is community building; for JEIRPs it means advancing the state-of-art by joining forces and integrating different pieces of work; for "platforms and standards", the synergy consists in making tools and methods

more interoperable and more easily transferable. Yet, these activities are also connected and integrated among themselves as explained above in B.4.1.6. There is the specific role of the "backbone structure" (Virtual Doctoral School and "Platforms and Standards") which receives input from the other activities and returns services in terms of support, methodologies and tools.

There is also a specific interplay between JEIRPs, ERTs, and SIGs: JEIRPs take up research issues relevant in a specific community (typically a SIG) joining forces between the most advanced groups in this area within the network for a limited time. ERTs coordinate activities around research themes aiming at exchange, joint publication, supervision of theses from a more thematic perspective than this would be done in the Virtual doctoral school. In this sense, ERTs can be constituted as subgroups of SIGs, or they can be "prolongation" of successful JEIRPs.

B.6.2 Interdisciplinarity

The *Kaleidoscope* community comprises different academic fields and a variety of methodological perspectives. The *Kaleidoscope* network is based on the conviction that the best examples of research and innovative practice in applying information and communication technologies to education are truly inter-disciplinary and not just multi-disciplinary in an additive sense. This implies that each one of the activities will *integrate various perspectives*.

The following perspectives are of particular relevance for *Kaleidoscope*:

-   pedagogically inspired design of educational settings or scenarios enhanced with new technologies,
-   design of technology-supported collaborative learning scenarios based on principles from social psychology / sociology,
-   design of technology enriched learning spaces including spatial and physical aspects;
-   development of architectures and tools for innovative IT-supported learning scenarios from a computer science and engineering perspective,
-   development of learner models, task and domain ontologies based on cognitive science and knowledge engineering approaches,
-   qualitative evaluation methodologies, e.g. based on ethnographic approaches,
-   quantitative empirical studies.

Research activities but also individual PhD projects to be supported by the Virtual Doctoral School will typically embrace several of these perspectives. Accordingly, in the project teams as well as in the supervision of academic theses these aspects should not be separated out but dealt with in a closely integrated way.

The composition of the *Kaleidoscope* membership reflects a high degree inter-disciplinarity both considering the various "home grounds" of its individual members and in terms of the members experience in inter-disciplinary teamwork. There are also specific European ingredients in *Kaleidoscope*, e.g., the representation of "Scandinavian approaches" to participatory design and development and the heritage of the i3/ESE programme in its unique combination of technology with social and interaction design.

B.6.3 Mechanisms to foster excellence

On the one hand, the network aims at community building and at the propagation of innovative ICT applications in education, but, on the other hand, it will also foster excellence in research and best practice. There are several mechanisms to ensure highest quality of research:

- The *International scientific committee* gathers top experts in the field which also represent different disciplinary and inter-disciplinary perspectives. This committee will play an important role in selecting new JEIRPs and initiating new ERTs, evaluating the general orientation of the network and of the SIGs in the light of recent international trends, evaluating the backbone activities as well as assessing progress in JEIRPS and ERTs.

  The composition of this committee is presently, the following

  > Tak-Wai Chan (National Central University, Taiwan), Susanne P. Lajoie (McGill University, CA), Naomi Miyake (Chukyo U. (Japan), Bob Kozma (SRI, USA), Lloyd Rieber (University of Georgia, USA), Marcia Linn (University of Berkeley, USA), Edith Ackermann (MIT, USA), Peter Reimann (University of Sydney, AU), Gavriel Salomon (Haifa University, IS), Bonnie A. Nardi! (Agilent Laboratories, US), Dan Suthers (University of Hawai, USA)

- JEIRPs gather the "avantgarde" of *Kaleidoscope* members around a relevant and timely topic of research for which we expect an advancement of the state-of-art from joining forces and combining existing achievements. In this sense, a successfull JEIRP is a potential nucleus for a thematic centre of excellence. In their internal structure, JEIRPs should be centred around very few labs plus a few application sites to demonstrate best practice examples. A JEIRP may involve "satellite" members external to the core laboratories, possibly based on individual membership, which take part in the meetings and workshops and which may spend internships in the labs.

- JEIRPs may be continued as ERTs as an organisational framework to continue the thematic interaction between a group of researchers. Typical activities will be *joint publications*, *joint definition and supervision of theses* and, of course, then *joint elaboration of new research proposals*. ERTs may also be directly initiated as offsprings of SIGs or, particularly in the beginning, on the network level. ERTs will have expert advisory boards involving members of the network and members of the international scientific committee. These advisory boards will assess the quality of research against the criterion of excellence in an international comparison.

The international advisory board will assess the *orientation and quality* of the JPA as a whole, including the Virtual Doctoral School and the Platform and Standards activity in the form of an annual report to the management group. The management group will distribute and discuss the assessment results within the network and initiate adequate actions to overcome deficits. Here, excellence is not the only criterion but a central one.

B.6.4 Sustainability and outreach

Kaleidoscope aims at creating synergy which, in the end, should not expire with the network's funding[23]. I.e., synergy must be organised in a self-sustainable way. A very concrete model for sustainable community building could start with a SIG which is converted into a European scientific association in a specific area. The association will have its income through membership fees and will run regular conferences or workshops. ERTs will have to find new funding sources when the network funding expires. If we can demonstrate a clear benefit, the Virtual Doctoral School may be sustained by a network of academic institutions financed by its member institutions. The Platform and Standards activity could be absorbed by official standardisation activities or it could form a kind of transfer agency between industry and academia. The first alternative is quite likely to come true since some of the network members are indeed already involved in standardisation committees. The second alternative will depend on the quality and practical value added of the integrated solutions.

One of the essential outcomes of the *Kaleidoscope* network will be the formation of a new generation of scientifically educated and highly innovation-aware specialists for ICT in education which will permeate academia and industry. These young specialists will gather their expertise by collaborating with JEIRPs and ERTs and/or by participating in the doctoral school.

Kaleidoscope will have a high visibility in the scientific community through community support and community building activities (associations, conferences, workshops). Beyond the scientific community it will also address other professional target groups in industry and public education through its Advanced Training Activities (ATA). ATA will offer professional training for educational administrators, industry trainers, educational technology consultants, teachers in both schools and academia etc. ATA will exploit a variety of delivery forms ranging from face-to-face seminars over online courses to individual consulting. It will particularly exploit the achievements in Platform and Standards, both as a "message" to shape innovative use of ICT in education and as a tool for learning.

B.6.5 Criteria to assess the quality of integration

Based on the above description of high-level integration procedures, we will apply the following criteria to assess the quality of integration:
- Shared production and use of resources (particularly for the VDS),
- Development of an open source platform and tool set ("Platform and Standards"),
- Jointly executed research documented by
    - Co-authored publications (JEIRPs, ERTs),
    - Co-supervision of PhD theses (ERTs, VDS),
    - Mixed PhD examination boards (VDS),
- Successful joint ventures in new project proposals and R&D activities (SIGs, ERTs),
- Exchange of postdocs, sabbaticals etc. (ATA, JEIRPs, ERTs),
- Formation of innovation-aware young ICT in education specialists with a European perspective (potentially all activities),
- Acquisition of complementary funding from national or international bodies (ERTs, SIGs),
- Subnetworking with national/regional funding (SIGs and other).

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[23] An indication is the significant number of letters of "commitment towards a deep and durable integration continuing beyond the period of Community financial support in the research area of the Kaleidoscope network of excellence". These letters are annexed to this document.

B.7 Organisation and management

B.7.1.Principles

During the preparation of the NoE Kaleidoscope, the Consortium has fully integrated the <u>new vision</u> of the Commission in the FP6. Thus the organisation and management of the NoE have been particularly adapted to meet:

- The vision of the Commission in terms of increased *management autonomy, responsibility and flexibility*, and increased *financial and legal security*;
- The specific purpose of the NoE, in term of *progressive and durable integration* of resources and expertise;
- The financial principle based on receiving a grant according to the researchers implied in the project, and a funding distribution to contractors based on actual eligible expenses at activities level.

Consequently, in addition to the strategic and scientific management organisation, the Consortium has stressed the need for a permanent Administrative Management task, including Project Management and Financial Management, with the associated tools and reporting. A *common management tool* will be adopted in order to ensure transparency at each level of the project organisation for reporting towards the Commission. This organisation will assist the scientific bodies and the scientific manager with the administrative tasks. The follow-up and monitoring by the Project Officer and by the Commission Services will be therefore optimised.

The organisation chart, shown in the diagram below in B 7.2, has been optimised for this *size of NoE*, taking in to account the large number of partners, and anticipating the *evolution of the partnership*.

The organisational, management and governance structure as well as the decision-making mechanisms, based on *autonomy and robust reporting*, will be described in the *Consortium Agreement*.

B.7.2.Operational, decision-making and advisory bodies

The operational, decision-making and advisory bodies are shown in the diagram hereafter.
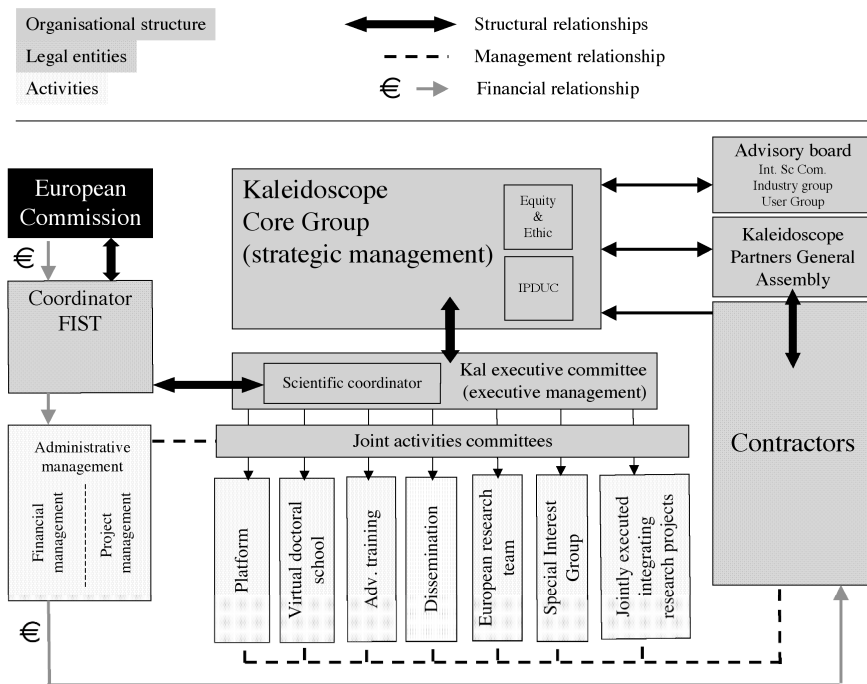
Three layers of structuring are then implemented in *Kaleidoscope*:

> 1) *Organisational structure*: The 3 levels of decision are shown in light Grey

> *Core Group* (governing board, strategic management)

Executive committee

Joint activity committees
> *Kaleidoscope* Core group of the NoE will involve in its monitoring and evalutation tasks an *Advisory board* composed of three entities: *International scientific committee*, and *Industry-Academy digital alliance strategic group*, and a *User advisory group*. The Core group will establish two internal committees: an *Industrial Property Use and dissemination Committee* (IPUDC), and an *Equity and Ethics committee* in charge of gender issues, ethical and social aspects.

> 2) *Legal entities*
>> Contractors
>> Coordinator

> 3) *Activities*
>> Integrating activities
>> Jointly executed integrating research projects
>> Activities to spread excellence
>> Administrative Management activities

These different but complementary activities, presented in details in parts B4, B6 and B8, will be managed with the same methodology.

B.7.3 Roles

The paragraph below describe the roles of the different management levels and entities; the conflict solving and decision-making mechanisms (votes) are precisely defined in the Consortium Agreement.

B 7.3.1 Coordinator

This role has been entrusted to France Innovation Scientifique et Transfert S.A. (FIST S.A.), an affiliate of CNRS and ANVAR. FIST has expertise in the administrative and financial management of major R&D programmes coordinated by the CNRS and in implementing intellectual property strategy. FIST has more than a decade of experience as an interface between the academic and industrial sectors, in project management and coordination, in international negotiations and in the transformation of innovative technologies into products, services or new businesses. FIST specializes in structuring the functioning of projects to optimize the exchange and diffusion of information and the efficacy of project activities as well as providing efficient fund allocation.

The Coordinator is responsible of the Administrative management tasks, which include:
   1) *Financial management*
         - Receives funds from the Commission
         - Makes the dispatching among contractors in accordance with the Consortium
         Agreement and the decisions of the Core Group and Executive Committee.
         holds the accounting of the project
         - Reports to the executive Committee on the consumption of funds
   2) *Project management*
         Checks the project progress against planned schedule
         Checks manpower consumption,
         Checks that milestones are met and deliverable properly produced
               - Organisation of reviews and submission of deliverables and schedules.
               - Organisation of any internal audit.
               - Organisation of information flow throughout the different bodies in
               the NoE.

These tasks are performed by the Coordinator under the supervision and direction of the Scientific Managers. The Coordinator reports to the Executive Committee and is especially in charge of warning this body on possible drift in manpower or resource consumption and planning, so that the executive Committee may be able to take corrective actions.

The Coordinator will define Project Management *methodology and tools* to be used in the management of the activities and budgets. These methodologies and tools are also participating to the integration of *Kaleidoscope* activities.

B. 7.3.2 The Scientific Managers

The role of the Scientific Managers is central in *Kaleidoscope* NoE as they have to maintain the network vision of the NoE scientific activities, and as they have manage the day to day technical activity of the NoE. They are also the main EEC interface for the scientific progress of the NoE.

This role is supported by 2 personalities appointed by their peers, who have played a leading role in the NoE set-up, and more generally in the E-learning area these last 10 years: Nicolas

Balacheff (CNRS, Laboratoire Leibniz), seconded by Richard Noss (London Knowledge Lab).

They are in charge of (in particular):
- Close contact with the Project Officer and the Commission
- Heading and animating the Executive Committee
- Monitoring and maintaining the scientific quality of the NoE
- Heading the Core Group
- Supervision and direction of the Coordinator
- Interface with the leaders of the different joint activities

B.7.3.3 Partners General Assembly (GA)

The partners General Assembly includes one representative from each partner, at a decision level.

The General Assembly is convened at the beginning of the project and each year. The role of the partners General Assembly is to:
- Attend the yearly report of activities presented by the Scientific Coordinator
- Elect the members of the Core Group (each 2 years)
- Elect a new Scientific Coordinator at year 4 if required by the Core Group, in order to ensure a stable future beyond the funding period of Kaleidoscope

B.7.3.4 Core group (Governing Board)

The Core Group (21 partners) will be composed of all the member which have a decision level responsibility in the NoE. Initially, the Core Group Membership has been established by consensus as a result of the merge initial EoI in the domain of "Enhanced learning environments" (see section B5). The Core Group will partly renewed periodically by the Partners General Assembly, according to the Consortium agreement rules.

It is held for the Project kick-off (to validate the activities, the structural methods, the planning and the budget) and at least once a year to update the JPA, and in the case of an emergency situation.

The Core Group decides on political and strategic orientations of the Project and takes the major decisions of the NoE in phase with the formal 18 months rendez-vous with the Commission (initial project kick-off and annual JPA reporting and updating). The decisions concern the activities and the associated budget, the evolution of the Consortium, the sharing of resources, the valorisation of the knowledge, ethical issues, gender equality promotion, research of funding.

The Core Group is the Governing board of Kaleidoscope, in charge of the Consortium's decision-making and arbitration, and of the *overall direction and major decisions* with regard to the Project in particular in term of activities (integrating, research, training...), budget, contract, evolution of the Consortium, and ethics.

The Core group composition as it stands now is given in section B4 of this document.

Management of pre-existing know how and knowledge: Intellectual Property Use and Dissemination Committee (IPUDC)

Each partner has defined its pre-existing know-how, including the one useful for the project. The conditions of access to the knowledge is defined in the Consortium agreement. To handle these specific issues, the Core Group will form an IPDUC committee working closely with the leaders of the different integration activities. This committee is in charge of the updating of the Pre-existing know-how and prepares the plans of protection, use and dissemination for the Executive Committee and Core Group. A member of the IPUDC may assist the Leaders of WPs involved in spreading of excellence.

Equity and Ethic committee

The core group will also designate a specific committee for consideration of gender issues, and ethical and social aspects: the *Equity and Ethics committee*. More particularly a full activity will be devoted to gender issues in order to meet the needs to reinforce and increase the place and the role of women at European level.

B 7.3.5 Executive Committee

The Executive Committee is the operational body of the Core Group; for an effective governance, the number of executive committee representatives will limited (6 people), and renewed periodically by the Core Group, according to the rules defined in the consortium agreement. It is chaired by the Scientific Coordinator.

Either technical or legal experts or representatives of IPUDC, or Advisory Board may attend the Executive Committee meetings according to the agenda on an advisory basis. It is held at least once every 3 months and in the case of an emergency situation.

The Executive Committee shall be in charge of the *Project management* following the orientations given by the Core Group and validated by the Commission, in all the domains of the JPA (legal, financial, scientific, ...) on the one hand, and to *make proposal* to the Core Group (updating of the JPA and budget, new contractors, ...) on the other hand.

Any update of the JPA will be debated in the Executive Committee and proposed to the Core group.

The Executive Committee ensures, in collaboration with the IPUDC and associated WP Leaders, the publication and communication in connection with knowledge issued from the Project.

The current composition of the Executive Committee is given in section B4 of this document.

B 7.3.6 Advisory boards

The Advisory board is composed of 3 groups :
- *The Academy-Industry digital alliance strategic group* including industry organisations from inside and outside the NoE, in charge of advising the Core group on the matching between the NoE strategic directions, and the potential applications
- *The User Advisory Group* The Users Advisory Group within the Kaleidoscope NoE aims at organising mutual attention between the world of researchers, the world of industrialists and the world of users (practitioners in the education and training field, be they involved in the teaching profession or involved as human resources management at company level, higher education or initial education level) in order to

-   *The International Scientific Committee* which advices the Core group and the executive committee on the orientations to maintain the NoE at the forefront of the scientific and industrial competition. The external Scientific advisory committee will also provide an external advice the Core Group on the quality of the NoE Scientific work.

B 7.3.7 Joint activities Committees

They are headed by *Joint activity Leaders*, who are responsible for the *management* of the *Joint Activity* towards the Executive Committee (Joint activities are activities included in the JPAs). These Joint Activities will be composed of Work Packages (WP). The responsibilities between the Core Group, Executive Committee and the Joint Activity leaders are defined following two steps:

Step 1: Top-down kick-off meeting to be set up by the Core Group and involving Joint Activity leaders. The objective will be Organisation of the level of responsibilities delegation from the Core Group up to the Joint Activity leaders and definition of reporting modes.
Step 2: Bottom-up project management based on reporting procedures by Joint Activity leader towards the Management Team.

Nota: each Joint Activity leader may at its own initiative define the same approach with WorkPackages managers.

The JPAs committees for the activities already defined in the NoE are given in section B.4

B 7.3.8 Summary of project organisation

	Administrative Management	Strategic Management	Executive Management	Operational Activities
HOW ?	Following the instructions from the Executive Committee, interacts with Joint Activity leaders for monitoring and reporting	Top down decisions based on Executive Committee proposals	Top-down decisions and bottom-up reporting to the Core Group	Through Joint Activity committees
WHAT ?	Project and financial reports	New orientations, conflicts solving, corrective actions, Budget allocations	Implementations of the JPA through Joint Activities, inputs to Administrative Management	Integration activities, dissemination and training etc…
WHO ?	Coordinator	Core Group	Executive Committee	Joint Activity leaders / Work Packages leaders

B 7.4 Decision-making mechanisms and conflicts solving

The decision-making mechanisms will be precisely described in the Consortium Agreement.

Each decision is associated with indicators and reporting.

Top-down mechanisms
- Major decisions are taken at Core Group level
- The Executive Committee cascades the Core Group decisions to the Joint Activity Leaders in a formal (contractual) structure (activity, planning, budget, indicators, reporting)
- The Joint Activity Leaders manage the decision and report.

Bottom-up mechanisms
- A possible conflict/problem has to be managed first at Joint Activity level with reporting to Coordinator and Scientific manager.
- If necessary the problem will be raised at Executive Committee level. Eventually, if the conflict cannot be solved at this level, the Executive Committee will make a proposal to the Core Group, which will solve it via a decision mechanism described in the Consortium Agreement.

B 7. 5 Conditions for evolution of partnership

The evolution of Partnership is a crucial issue in a NoE. It will be debated in the Executive Committee with different experts if necessary, and will be proposed to the Core Group. If it is approved, the Coordinator will enter in contact with the Project Officer for starting the necessary administrative procedure to update the contract. The conditions for the evolution of Partnership will be precisely described in the Consortium Agreement.

B 7.6 Management of knowledge

The Management of knowledge respects the terms and conditions of the Commission contractual rules. Management of knowledge is described in the Consortium Agreement. The Management of knowledge is a significant part of the Integrating Activities in the NoE and handled by the IPDUC.

B 8 Joint programme of Activities – first 18 months

B 8.1 Kaleidoscope JPA's

The Kaleidoscope network knows several types and levels of JPA's. Together, the transversal JPA's, *Technology Platform and Standards*, and *Virtual Doctoral School*, the dissemination JPA's, *Advanced Training* and *Dissemination*, and the scientific integration JPA's in the form of *SIGs*, *ERT*s, and *JEIRPs*, aim to cover Kaleidoscope's focus area: "technology enhanced learning". Section B4 presented the overall structure of the JPA's and Section B6 gave a description of each type of JPA. In the current section we focus on the content of JPA's, their planning and interdependencies, and the measures taken to monitor progress and to ensure overall integration. This will be done in a detailed fashion for the first 18 months of the project, though an overall structure and ideas on how the network will evolve after 18 months will also be presented. We start with the content structure of the SIGs, ERTs, and JEIRPs and than gradually evolve towards the embedding of these activities in the overall Kaleidoscope JPA structure, at the same time highlighting the monitoring and quality control facilities.

## B 8.2. Overall content structure of SIGs, ERTs, and JEIRPs

The topics of the different JPA's within Kaleidoscope all are part in an overall structure that pictures essential aspects the Kaleidoscope focus: *technology enhanced learning*. In the centre of the structure we find four components that together constitute technology enhanced learning environments. These components summarise the Kaleidoscope priorities as they were outlined in Section B1. The first component concerns the *didactical approach*. Modern citizenship and labour require specific knowledge and skills that can only be reached by new active learning through new didactical approaches that embrace constructivistic, collaborative, and situated learning approaches. The second component concerns the *domain*. Domains of course can vary, but what is common in for the Kaleidoscope area is that new didactical approaches also imply a rethinking of domain contents, structures, and representations. The third component is *assessment*. New didactical approaches combined with renewed views on domains make that assessment techniques need to be reconsidered too. Examples of these are "portfolio assessment", "learning process assessment" etc. . These first three components embrace the Kaleidoscope priorities "foundations", and "bridges" see B1) Finally, technology enhanced learning environments can only be realised using *specific technologies*. Many of these technologies need more fundamental development to ensure a stable and reliable foundation of learning environments. This component is related to the Kaleidoscope priority "novel computational solutions" (see B1). In the Kaleidoscope structure these learning environment components are surrounded by two areas of research and development that precede and follow the learning environment. The first one (that is related to Kaleidoscope priority "principled design", see B1) is the *design* (and production) of learning environments including tools that are needed for this. Specific attention is given to the role of the teacher in the shaping of learning environments. The second (related to Kaleidoscope priority "structural and organisational models", see B1) concerns the *implementation* of the learning environment into organisations. Important aspects here are acceptability and sustainability. The next figure gives an overview of the Kaleidoscope content structure.
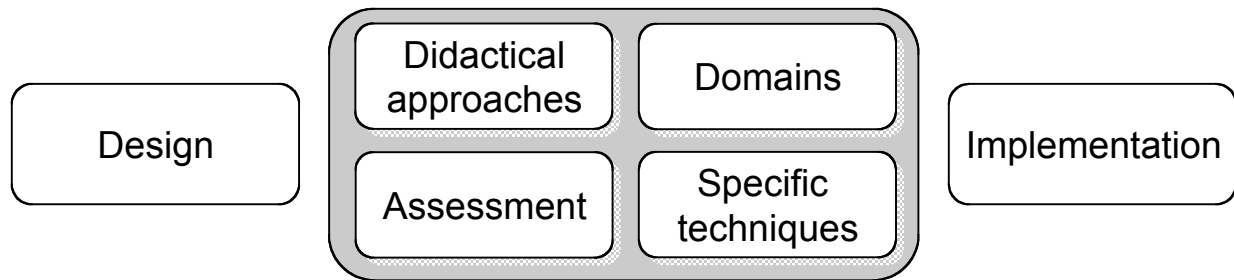
General overview of the Kaleidoscope JPA content structure.

B 8.3 The Kaleidoscope content structure in first 18 months

In its first 18 months Kaleidoscope will know a selected number of SIGS, JEIRPs, and ERTs. In the next figure we have included the SIGs, JEIRPs, and ERTs as they are planned for the first 18 months within the Kaleidoscope content structure. The arrangement of these JPAs within the structure reflects the main of each topic for each SIG, JEIRP, and ERT; naturally there will be cross references between JPA's. The nature of these cross references will be further elaborated while the network develops. All SIGs, JEIRPs, and ERTs are summarised in the next few sections and fully described in the Annexes.
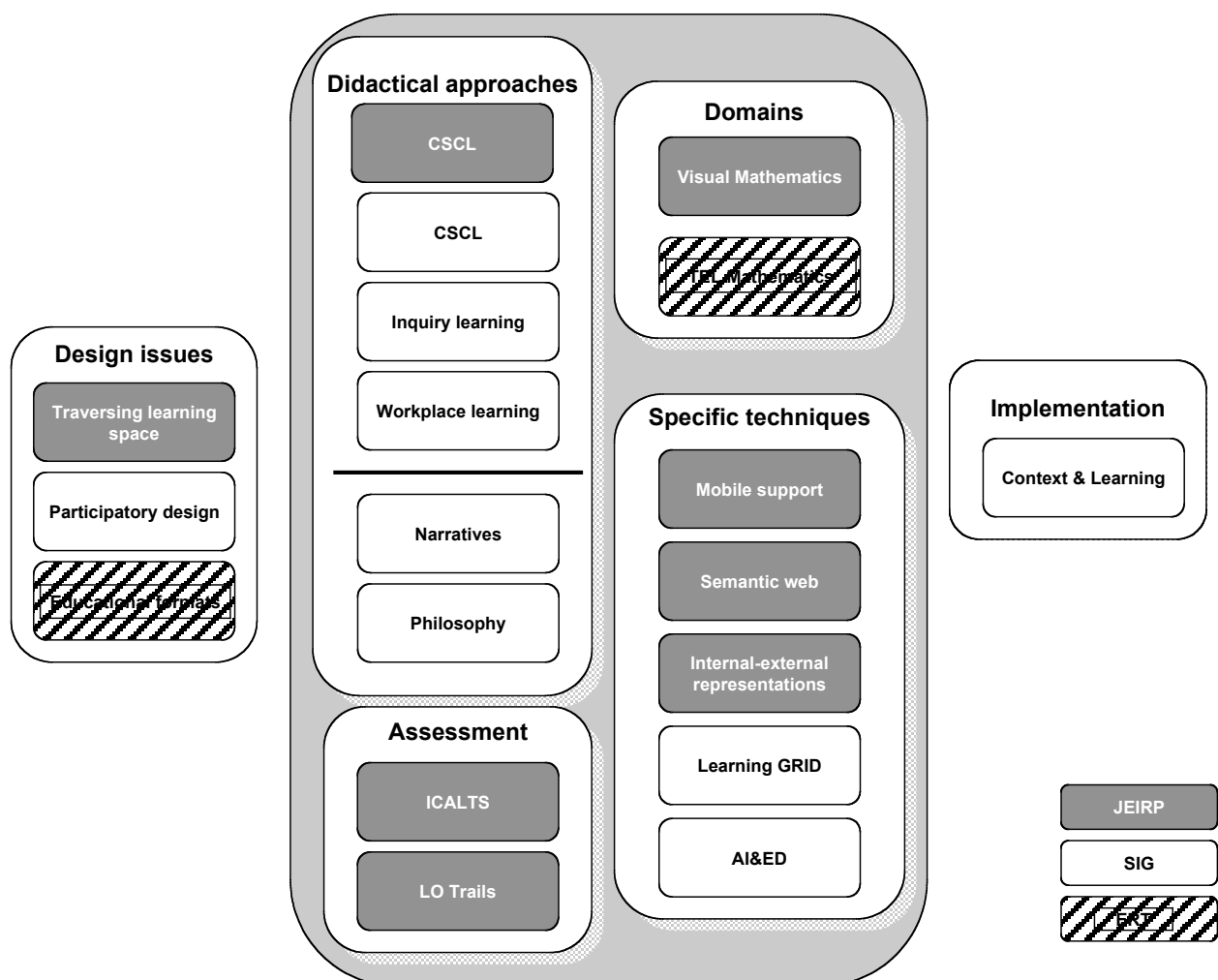
Overview of initial SIGs, JEIRPs, and ERTs within the Kaleidoscope structure

For design issues, we have initially (in the first part of the project) a SIG ("Participatory design"), a JEIRP ("Traversing learning space)", and an ERT ("Educational formats"). For the didactical approaches a division is made between current guiding overall didactical approaches: "Collaborative learning", constructivistic ("inquiry") learning, and contextual ("workplace") learning and one more specific approach ("narratives") and a more overarching theme ("epistemologies"). These topics are covered by a mix of SIGs, JEIRPs, and an ERT. For the implementation (introducing technologies in the school setting) aspect Kaleidoscope has in its first 18 months a SIG ("Context & Learning"). One more specific aspect of the structure is that collaborative learning is addressed by both a SIG and a JEIRP and that Mathematics learning is addressed by both an ERT and a JEIRP. A more detailed description of each SIG, JEIRP, and ERT in terms of topic, activities and goals is given in the next section.

B 8.3.1. Description of SIGs

Artificial Intelligence and Education (AIED)

This SIG will further develop on three line of research: a) fine-grained theories of human learning in different contexts and building on those theories to design educational tools of various kinds; b) the analysis and implementation of expert human teaching and the facilitation of learning via the subsequent realization of such analyses as teaching and facilitating tactics in both collaborative and solo learning environments; c) to drive forward the capabilities of learning technologies by exploiting advances in artificial intelligence, e.g. through natural language processing, through knowledge representation, and through reasoning. The widespread use of new technologies, such as wireless networking, wearable and pervasive computing devices, brings new challenges as well as new potential to the area of AIED. These new developments are the further development of complex distributed systems, advanced modes of interaction and new interaction devices, and learning environments that use collaborative problem solving and distributed classrooms.

The AIED SIG will organise a workshop within the context of the next AIED conference, will produce one or more JEIRP proposals, will share between its participants disseminate tools through the Platform and Standards JPA, and will publish results of the IJAEID journal.

Computer Supported Collaborative Learning (CSCL)

This SIG focuses on the challenges with collaborative learning in co-located and distributed settings, and where the design and the use of artefacts for content, communication and interaction among the collaborating actors are of vital importance. The key issue is "*understanding collaboration*". Understanding collaboration is a challenging endeavour as there are many different perspectives from which we can view collaboration. For example, there can be national differences in our understanding of collaboration, disciplinary differences (e.g., collaboration in science is different than collaboration in the social sciences), organisation differences (e.g., schools/universities, workplaces, general public), setting differences (e.g., classroom, workplace, distributed, co-located, blended), or technology/media differences. Activities in this SIG are focused on integrating researchers interested in CSCL issues. In particular strong emphasis is placed on the integration of collaborative learning methods, computational tools, technologies and new media as well as the integration of the human activities supported by these tools. It is a forum where researchers, developers, and others interested in computer support for collaborative learning can share their ideas and experience, learn from others, help shape our understanding of the

future of the field. Four key areas should be addressed: Networking, Information, Education, and Leadership.

This SIG will examine if, considering its size, a further subdivision is necessary. It will establish an online site to support the SIG community, it will liaison with the new International Society for the Learning Sciences, it will contribute collaboration technologies to the JPA Platform, and it will be involved in the planning of the EUROCSCL 2006 conference.

Computer Supported Inquiry Learning in Science (Inquiry Learning)
The SIG aims to bring together expertise in self-directed inquiry learning and the design of inquiry learning environments. Inquiry learning is the learning process in which learners seek to acquire knowledge by designing theory, conducting experiments, and gathering and interpreting data. This inquiry process is strongly related to processes of modelling and collaboration. In this respect it is important to emphasise that inquiry, modelling, and collaboration are not seen as *ways to learn about science*, but as an *integral part of science* itself. Science is not seen as a set of semi-independent skills or a collection of facts but, following the definition of the AAAS (1994) as a dynamic process of *building* (which can be operationalised as inquiry and modelling) and *justifying* (which is a natural part of collaboration). The goals of the SIG are: to chart inquiry, modelling, and collaboration processes in science domains; to understand the problems learners at different levels of education have in these processes; to understand the factors influencing inquiry learning; to share inquiry learning environments that support learners in the inquiry learning process; to share investigations on learner modelling techniques for inquiry learning; To exchange design assessment techniques for the evaluation of inquiry processes and learning outcomes; to chart the curriculum requirements for a successful integration of inquiry in the curriculum; to investigate methods as issued by publishers to see how they can be extended with inquiry learning facilities.

The SIG will set-up a web –based communication centre to build the SIG community and to facilitate the exchange of learning materials and technology, it will organise workshops, organise symposia on relevant conferences and produce a book on technology and inquiry. The SIG will work towards one or more JEIRPs in the context of Kaleidoscope. It will provide the JPA platform with technologies on inquiry learning.

Context & Learning
This SIG aims to develop a frameworks for the creation and management of learning communities. At a theoretical level, the view on learning has shifted from cognitive theories that emphasize individual thinkers and their isolated minds to theories that emphasize the social nature of cognition and meaning -- increasing importance is being ascribed to theories that highlight the importance of studying the relationships among individuals, mediating tools, and the social group. This shifted paradigm has different implications for the implementation of effective ICT-mediated learning environments. On one hand, technological tools influence and transform the activities performed with their mediation; on the other hand, practice can deeply influence the technology used. This is particularly true now, when technological progress is constantly opening up new opportunities (for elaboration, representation, communication) whose potential for educational purposes has yet to be fully exploited. In other words, the way in which technology can be used in social practice can prefigure new functions to be included in the technology. These new functions and opportunities can change the models of practice which have inspired the construction of the technology itself. This SIG intends to carry out, based on multiple contributions from consolidated domains such as education, cognition, organizational theory, management,

psychology, sociology, anthropology, consistent experimental work capable of enriching and validating frameworks for the creation and management of learning communities, and to explore the epistemological implications of the resulting findings.

The SIG will organise workshops, create an information portal, and produce a book on "Context and Learning".

Learning GRID

This SIG proposes two different but interrelated research lines. One related to the GRID technology itself aiming at investigating how to use and extend this technology for implementing virtual organisations to support new emerging learning scenario's (collaborative virtual learning communities); the other is related to the innovative learning paradigms based on personalised, experiential based, and contextualised approaches and how to exploit the using GRID technologies and in general by a GRID-like approach for addressing heterogeneous interoperability issues. GRID technologies are rising as the next generation of Internet. In this vision, a customer of the GRID will be able to use his or her private work place (Workstation, PC, UMTS phone,...) to invoke any application from a remote system, use the system best suited for executing that particular application, access data securely and consistently from remote sites, exploit multiple systems to complete complex tasks in an economical manner, or use multiple systems to solve large problems that exceed the capacity of a single one. Another interesting aspect of GRID technologies is their support for resource sharing and problem solving in dynamic, multi-institutional virtual organizations. In this vision, the sharing doesn't mean simply exchange of data or files but rather a concrete access to resources (e.g. computers, software, data, network, etc.). The focus in this SIG will be on the study and design of a learning GRID infrastructure and the evaluation of its effectiveness and on the study and evaluation of how this learning grid infrastructure will support the actualisation of ubiquitous learning environment based on contextualised, personalised, and experiential based learning approaches.

The SIG will organise an international workshop, produce a report on innovative knowledge models, and a handbook for GRID exploitation. It will work towards the proposal of a JEIRP.

Learning and Technology at Work (Workplace learning)

This SIG aims (i) to explore how the practices of learning and the modes of knowledge creation in workplaces, and the knowledge required for work are being transformed by information and communication technologies; (ii) To explore how the design, production and delivery of goods and services is being radically changed by companies' concerns for efficiency, global competitiveness, quality control and productivity; (iii) To identify new models of learning and innovation and new conceptual tools to support work-based learning and e-learning in a range of different contexts. The SIG will make a significant contribution to our understanding of how to develop 'learning environments' and 'learning communities' that foster interdisciplinary inquiry, the creation of new communities of practice involving researchers and the business community and the development of social capital within society.

The SIG host a Europe wide conference on the theme of the SIG, it will create a publication following that conference, it will work on publications in journals and later a monograph, it will create an on-line community, and it will create links with industrial and commercial entities.

Narrative and Learning Environments (Narratives)

This SIG aims to bring together expertise in narrative and its application on learning environments. The goals of the SIG are: foster the use of narrative techniques in learning

environments promote the link between educationalists, narratologists, researchers, and learners under the topic of narrative in learning environments establish a link with other areas with impact for of e-learning such as computer games organise some workshops and scientific meetings to discuss current research and achievements in this area establish a link with existing and new EU projects in the area of narrative in learning environments.

The SIG will organise targeted meetings on the goals of the SIG. It will stimulate exchange of learning environments and the underlying techniques between partners. It aims to compose a book on Narrative in Learning Environments as a result of one or two workshops organised around this topic.

Participatory Design
This SIG addresses providing conceptual and collaborative support to teachers and learners as co-designers of multimedia learning environments. It aims to discuss kinds of support based on current and future research: how to provide design-relevant cultural, cognitive, and technical information through web resources, how to implement and sustain this infrastructure, and how to assess effects of collaborating in designing, i.e. inviting designers to support each other through participatory designing? The main objectives of this SIG are: a) to create communities of reflection on collaboration, culture, and co-designing; b) to exchange solutions and tools to identify the impact of cultural and social constraints on designing learning by teachers and learners as co-designers; c) to discuss the cognitive and affective nature of tools that provide co-designers an effective and culturally co-adaptive environment for learning; and d) to explore and implement communication and information support for participatory design by members of the SIG.

The SIG seeks to establish an on-line SIG-site with communication facilities (e.g. bulletin board, virtual exhibition), to prepare activities on networking, on information and communication, and on education; and to prepare a book publication.

Philosophy of E-Learning (Philosophy)
This SIG aims (i) to address the nature of learning in relation to ambient hardware, the semantic web, software agents, etc. (ii) to address issues of the acquisition, interpretation, representation, management and use of knowledge under these conditions, (iii) to reconsider traditional positions (such as foundationalism, pragmatism, externalism) in relation these conditions, (iv) to produce frameworks which articulate the character of learning in the e-society. The starting position of this SIG is that 'Learning' is one of a cluster of concepts whose conditions are changing under the information revolution. The nature of knowledge, the values which we attach to it, and our methods of obtaining and utilising it have changed, and will change further as the information revolution enters its second phase involving ambient hardware, 'semantic' software, agents, and adaptive and contextualizing systems. Our epistemic conditions are central to high level EU objectives such as integration, expansion, health and education, to prominence in e-commerce, and to the development of an integrated European Research Area. The conditions and tasks of the e-learner in the e-society therefore require new investigation and analysis, and the resources of philosophy should be employed to this end.

After an initial phase in which a website will be set up, a workshop will be organised and a book will be initiated, the SIG should endeavour to run further symposia, create an academic journal, and gain exposure in the media.

B 8.3.2 Description of JEIRPs

Interaction between learner's internal and external representations in multimedia environments (Internal-external representations)

This JEIRP takes up major challenge to develop a better understanding of how learners develop their internal knowledge representations in cases where (a) they perceive information in the form of external representations, (b) they interact with external representations (or, to put it more broader, with instructional technology artifacts) or (c) they collaborate with each other to co-construct knowledge. To work towards this objective the JEIRP will initiate a threefold research scheme, organizing three working groups to deal with each specific research orientation, i.e. multimedia, interaction, and collaboration. The related research foci are: a) to explore the instructional effectiveness of factors related to the design of dynamic external representations (e.g. animated explanations), so that the connection between observable superficial characteristics and deeper conceptualization for the novice learner is better supported; b) to identify specific and refined question-targets, i.e. about the kind of interactivity that would make sense to include into toys, that would enhance learning and fun and would be appropriate both for individual and collaborative learning experiences; c) to investigate the contextual aspects of internal-external representation interaction in collaborative learning activities.

To achieve its goals the JEIRP will set-up a dedicated website, organize workshops, and will initiate joint, small scale, case study type of research projects. Among the results there will be a state-of-the art report, and a research agenda for the future.

Personalised and collaborative trails of digital and non-digital learning objects (LO trails)

This JEIRP takes as its starting point the observation that in the past two decades, the emphasis in education at all levels shifted from emphasis on what students have to *learn* toward what they have to *master*. Indicators of this shift are the growing emphasis on learning goals and the rise of competency-based learning. This shift is accompanied by individualisation of learning paths. If what has to be learned is fixed, there is no inherent tendency toward individualisation. On the other hand, the route towards mastering a learning goal or competency might, and will, be different for individual learners. The result is more individualisation within education. This shift is visible both at the level of a whole curriculum, in which case competencies are involved, and at lower levels, for example within a course, in which students can partly determine their own learning objectives. At the level of the individual course, a recent development is the use of Learning Objects (LOs). LOs are small pieces of learning material. Both the specific LOs to be used in reaching specific learning objectives and the order in which they are studied can be chosen, thereby allowing for individualised learning routes. More specifically, learners engage with LOs in the form of trails. By following and creating trails, the learner navigates through a space of LOs creating an individual and personal trail that can be evaluated and accessed in a structured manner. The main objectives of this JEIRP are: a)To generate a framework for describing, classifying and understanding trails; b) To evaluate and assess methods, which cater for learner needs c) To produce a schema for integrating learner needs with appropriate metadata describing Los: d) to produce a system for mapping the patterns of trails created by learners and for producing a training needs analysis for targeting future learner experiences; e) To specify the requirements which trail-support places on e-Learning systems, and the realisation of these requirements using Semantic Web technology; f) To work towards a standard for LOs in trails which is compatible with current standards such as RDF and LOM.

To achieve its objectives this JEIRP will conduct joint case studies, produce technical reports on the combination of digital and non-digital objects, the specification of Los, and reports on learning an group profiling and personalised and collaborative trails.

Mobile support for integrated learning (Mobile support)
This JEIRP is especially concerned by educational/training activities that include computer-supported collaborative learning (CSCL) phases. The current research in CSCL is focusing on *CSCL scripts* that structure the collaboration process in order to make learning more effective. This JEIRP is based on the assumption that CSCL scripts provide an opportunity to describe integrated learning environments at the level of abstraction required for facilitating dialogue among the JEIRP members. A script is a story or scenario that the students and tutors have to play as actors play a movie script. Most scripts are sequential: students go through a linear sequence of phases. Each phase of the script specifies how students should collaborate and solve the problem. The activities occur at different social planes: a script may include a peer interaction phases, but also individual phases and collective phases. A collective phase involves all students in the class. Scripts contribute to the integrated learning framework as they integrate both face-to-face and computer-mediated activities within one concept. The integration is based on dataflow between the activities of different phases and between the different planes. This JEIRP postulates that a large number of scripts can be built from the combination of a limited number of components, in the same way that a language is made of words and grammatical rules. One of the drawbacks of integrated learning scripts is that they require frequent moves between rooms with PCs and rooms without. Mobile technologies offer opportunities to build *light scripts*. Some activities will still require access to a computer, but other activities may be carried out with a limited access to technology, e.g. to enter a small amount of data or to receive a short notification. Mobile technologies are especially relevant for these phases. *Mobile technology* enables dataflow between activities located in diverse locations, within or outside the school, and thereby to contribute to the integration of multiple forms of activities within a single learning script.

The JEIRP study the use of standards for CSCL scripts and the application and adaptation of these scripts for the use of mobile tools. As one of its activities it will perform joint case studies. As results it will produce a) a framework for integrated learning, b) examples of using existing standards to describe CSCL scripta, and c) examples of CSCL scripts using of mobile tools

Computer Supported Collaborative Learning – Conditions for productive learning in network learning environments (CSCL)
This JEIRP has Computer Supported Collaborative Learning (CSCL) as its focus. In contemporary pedagogical rhetoric flexible and networked based learning environments transcending time and space and allowing for diversity is a common theme for development and research. There are a number of pedagogical/didactical models, drawing on contemporary theories of learning, were communication and interaction, networking, collaboration and cooperation are at the core. In the field of CSCL collaboration or collaborations, as a pedagogical-didactical tool, are objects of inquiry per se or as pedagogical means or tools. Often there is also a more or less hidden assumption that collaboration will improve students' individual learning and with a strong emphasis on success or productivity. The JEIRP builds on the argument that there is a need to get a better theoretical and conceptual understanding of how pedagogical models built on these ideas operate and function in "real" settings; how collaborations takes place in interactions between learners and learners and teachers and how conditions for learning in these kinds of environments are mediated through technological artefacts. The general theoretical framework adopted can be described as socio cultural. The

main objectives of this JEIRP are: a) to develop theoretical concepts and understandings of CSCL emphasizing the use of a cross cultural comparative approach of case studies in different concrete higher educational settings and existing practices; b) to use an action- and social experiential oriented approach to in an iterative process to further develop the network learning environment; c) to carefully study the interventions in order to further develop the theoretical understandings of the conditions.

The JEIRP will take the approach to examine in depth existing continued practices that are institutionally established. This is done with case-study methodology and by design experiments. The work will take as a point of departure CSCL networked learning environments run by the partners. The cases are selected to represent typical conditions and characteristics of CSCL. The cases are all investigated in a systemic perspective looking at the integration and interplay between the social, institutional, technological and didactical conditions. The JEIRP will make cross-cultural comparative analyses, co-ordinate the design for data gathering and analysis; and conduct joint analyses, writing, and peer review.

Traversing learning space
This JEIRP aims to produce shared R&D experience related to methods and techniques for user study, concept design, activity-driven technological innovation, mock-up design and production, and user/stakeholders testing. The benchmark to produce such experiences will be the attempt to produce breakthrough Concepts and Proof of Concepts in constructionist learning/teaching practices in two situations: early education (Primary School) and Higher Education (University). The approach that will be used in this JEIRP combines a parallel user driven and a design driven development, with frequent comparisons of both cycles to compare the results and re-tune the process.

The JEIRP generate design concepts that will be generated through concept design sessions (brainstorming, etc.) based on the analysis of the results of a user involvement. For proving its concepts it will use mock-up techniques. Research will take place in two contexts: primary school and university.

Semantic web and E-Learning (Semantic web)
The goal of this JEIRP is to explore semantic Web techniques for e-learning applications, to look at the impact of e-learning specificities on the design of e-learning web portals and to propose promising research directions that should be further addressed. A variety of pedagogical resources are available on the Web: slides, courses, bibliographies, exercises, FAQs, and other documents which present a pedagogical aspect under various formats (ppt, pdf, html, XML, RDF, etc.). These resources are public or accessed by a restricted community (enterprise, academic organization, etc.). Because of the exponential growth of these resources and their heterogeneity, it is a hard task to access them through Internet in a rational way. It is therefore necessary to develop tools for designing and implementing e-learning Web portals that allow for the integration and a more transparent and pertinent access to pedagogical resources. The semantic Web adds to the current Web, a "semantic" level for the description, indexation, integration and access of documents. To construct the semantic Web, the most frequent approach consists in describing these resources with meta-data, or annotations, using a conceptual vocabulary provided by an ontology.

The JEIRP wants to define a range of learning scenario's and explore one or more e-learning semantic Webs related to these scenarios. In addition it will study the adaptation of Web semantic techniques to the standards which currently are developed for pedagogical resources. It will concentrate on (tools for) the description of metadata, the organisation and storage of metadata, and it will perform research of resources without annotation.

**Interaction & Collaboration Analysis' supporting Teachers & Students' Self-regulation"
(ICALTS)**
ICALTS purpose is to put the accent on the notion of learning support of the participants,
during individual or collaborative interaction. Interaction and Collaboration analysis tools
could support awareness, metacognition, and therefore self-regulation of the participants' own
activity (synchronous or a-posteriori). The present JEIRP provides an opportunity to explore
the complementarities of the current research on analysis tools for students and/or for
teachers, to define ontologies, that take into account various activity contents and contexts, as
well as real school/ education settings, and provide guidelines for studies on related teachers
and students' requirements. This JEIRP is especially dealing with learning environments that
allow exploratory activities, as well as problem solving activities, addressed to young students
in secondary and higher education, as well as to their teachers or assistants. The JEIRP has
two assumptions a) there are complementary aspects of the research work focused on
students' self-regulation and on teachers' interventions, and b) both open exploratory systems
and collaborative problem solving systems, could be envisaged in an unified way. The
specific objectives of this JEIRP are the following: 1) To integrate presently scattered
research activity in Europe, which is relevant to this purpose. To identify and organise our
current level of knowledge in a way that clarifies and highlights any implications for the
design of the interaction and the collaboration analysis tools, as well as for students and
teachers' requirements related to their use. 2) To generate a common framework for
describing, classifying and understanding the various dimensions of basic interaction and
collaboration data, as well as of analysis' perspectives. 3) to define guidelines for further
research in depth, and further developments regarding analysis' tools. Organise the previous
results efficiently in a representative agenda proposing further research projects.

This JEIRP will bring together ongoing research of the participating institutes and will
produce a state of the art, a unified framework for interaction and collaboration analysis
illuminated with examples, and proposals for further joint research programmes.

Building Visual Interactive Blocks for Tangible Mathematics (Visual Mathematics)
The major aim of this JEIRP will be to explore feasibility of interactive computer
environments (microworlds) and its possible impact on learning processes within mathematics
education of all partners' countries. Many of the Kaleidoscope partners' countries have been
making an effort to create interactive computer environments (microworlds), which would
allow children to explore and discover basic mathematical concepts by themselves, or with
peers and teachers. In certain areas of mathematics education – researchers have managed to
build dynamic visual environments with a high level of interaction and visualization. Learners
can formulate conjectures in such environments, test and modify them, building their own
understandings step-by-step, they concretize their mathematics concepts into meaningful,
richly-connected entities.

The JEIRP will study and compare potential of building computer environments in which
children can explore and discover basic mathematics concepts and relations. It will present a
study of all partners' national mathematics curricula (for children aged 8 to 12) and identify
examples of the common building blocks out of which current activities (pages or "screens")
could be constructed. These may include number rods (of various representations), different
visual representations of numbers, distances, angles, relations etc. All building blocks will
then be prototyped and instantiated as interactive, manipulable and visual Imagine objects,
which may – through their interactive features – support and enhance the process of learning.
It will then be examined how these prototypes could be used to author computer environments

in which children learn about mathematics concepts and relations. Within the JEIRP there will be possibilities for exchange of PhD students.

B 8.3.3 Description of ERTs

Production of Educational Formats (Educational Formats)

The basic idea is to build a digital library of educational formats, analyze their rationale and the way they affect how educational activities and settings are designed, in order to promote the development of new formats and the related enabling technologies. Educational formats can be defined as the lay out of an instructional event, the guideline to create the programme content and activities, which includes the definition of the spatial settings and the time duration in which the activities take place.

The five research team will cross-supervision the work of 3 PhD Students. These PhD projects will address different but related aspects of the issue of educational formats. The students will explore and document the way in which educational format apply in four European countries, in different educational settings (School, University, Leisure Centre, etc) and for different content areas (Math, History, Law, Medicine, Tennis, etc.).

Technology Enhanced Learning in Mathematics (TEL Mathematics)

This ERT will focus on three broad themes which appear to be of crucial importance for the ICT based innovation in mathematical education: representational infrastructures intended as a way to ease the access to abstract domains of knowledge; learning context as a key factor for successful technology enhanced learning; and new emerging competencies to be considered in mathematical and scientific education. The activity for the first 18 months aims at strengthening the links among participants teams in terms of reciprocal knowledge of the teams' approaches, identification of common problematic areas, complementary competencies in order to identify and promote common policies, collaborative actions and any possible useful synergy also in connection with the other JPA of the network and especially with Kaleidoscope virtual doctorate. The main instruments will be a) meetings and short workshops; b) internships for PhD students and/or young researchers; c) co-supervision of PhD students; d) on-line collaboration.

This ERT will hold several internal meeting, produce a document outlining the common research program and will deliver a "Guidelines for future activities and lessons learnt" report.

B 8.3.4 Transversal JPA's and SIG's, JEIRPs, and ERT's.

Next to the content specific integration activities *Kaleidoscope* comprises:

> JPA's that aim at an overall integration of research and developments with *Kaleidoscope* (*Technological Platform and Standards* and the *Virtual Doctoral School*);
> JPA's that relate *Kaleidoscope* to the world of organisations (*User Advisory Group*, and *Academic/ Industry Group*);
> JPA's that aim at the dissemination of *Kaleidoscope* results.

The next figure places these JPA's in relation to the Kaleidoscope content structure. The *Technological Platform and Standards* JPA is most closely related to the design activities. Standardisation and re-usability are key issues here. The *User-advisory group* and the *Academic/Industry group* focus on the usage aspects of technology enhanced learning and thus are most closely related to implementation activities. Of course, these two groups also have their input in shaping for example didactical approaches that they need, but their

influence will the run though the implementation stream. The *virtual doctoral school*, the dissemination, and the advanced training JPA's relate to all activities in the network that they disseminate to their relevant user groups.
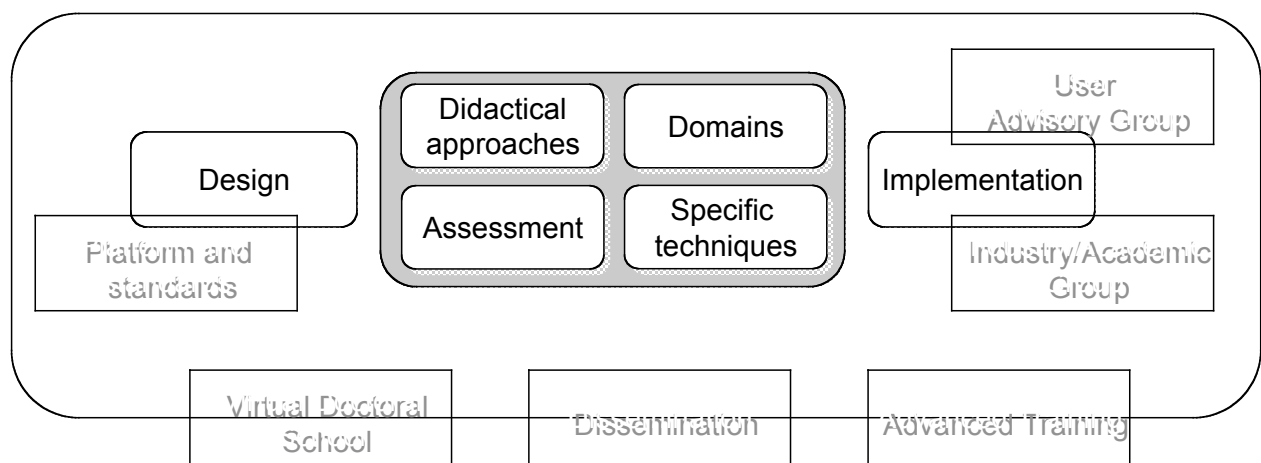
Figure 1. *Overview of transversal and non-transversal JPA's*

Academy Industry digital alliance strategic group (Academy/Industry group)
Complementarily to its role in strengthening quality control and evaluation procedures in *Kaleidoscope*, the *Academy Industry digital alliance strategic group* aims at a better understanding the state of the art of researches in eLearning that can be provided by the network. It expects to be able to conceive and develop new commercial products based on JEIRP's outputs and make business out of it if possible. Another expectation is to be able to spread excellence in local networks and promote integration among end-users (schools, teachers, decision makers, etc.). In this sense, this group will cooperate closely with the JPA *Dissemination group*. Implicitly, industry members may also embody the end-users as they represent their customers. However, in the report "The European eLearning Market[24]", the authors make a distinction between suppliers and users of eLearning. In their survey, they found that in some cases answers differ interestingly between the two, although almost half of respondent were both users and suppliers of eLearning. There will therefore be strong links with the JPA *User advisory group* which is created in the framework of *Kaleidoscope*, and some common activities to take into account users opinion will be envisaged.

User advisory group
The *Users Advisory Group* within *Kaleidoscope* aims at organising mutual attention between the world of researchers, the world of industrialists and the world of users (practitioners in the education and training field, be they involved in the teaching profession or involved as human resources management at company level, higher education or initial education level). This objective will be reached through a set of workshops, involving users, industrialist and researchers, prepared methodologically through using creative techniques, and starting from an approach of the different sets of Values of the various stakeholders. An iterative process will be launched in order to organise feedback between the different families of actors. A room for debating on consensus and dissents and their raison d'être will be offered within *Kaleidoscope* forums.

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[24] The European E-learning Market, Report 2002, J. Massy, T. Harrison & T. Ward, Bizmedia 2002.

In addition, the *Kaleidoscope* core group is regarded as a specific JPA that is responsible for overall development, integration, and quality control. The workpackages of the core group are presented in the Annexes. First, we will describe in the next sections the main tasks of the core group: JPA development, JPA integration, and quality control.

B 8.3.5 Development of JPA's within the network

Within Kaleidoscope the relation between SIGs, JEIRPs, and ERTs is regarded as a dynamical one. One of the goals of the Kaleidoscope network is to result in a series of JPA's to ensure cooperation beyond the existence of Kaleidoscope. For example, a success criterion for Kaleidoscope is the evolvement of a series of ERTs that will set up their own (internally or externally funded) JEIRPs to shape and materialise the cooperation. At a less strict level also several SIGs may result from, and beyond, Kaleidoscope. These SIGs will function as meeting places for individual researchers to exchange and integrate research at a European level.

In the lifetime of Kaleidoscope we also expect a development between the different forms of non-transversal JPA's. First, when researchers in a SIGs find a more specific topic on which they can bundle research and do useful integration work (in the form of research, theory or tools) they may propose the set-up of a JEIRP to the network. This then should result in ERT's, but also other movements between JPA's could be possible.

The structure of SIGs, JEIRPs, and ERTs as outlined at the beginning of this section (B8) can be used to identify areas of research and development that need to be covered by Kaleidoscope. Tentative examples of topics that could still be covered are: authoring processes, case based learning, experiential skill learning, language learning, science learning, modelling languages, and remote laboratories.

One of the tasks of the Kaleidoscope core group is to monitor the developments of JPA's, for example to be alert to new developments on technology enhanced learning that warrant the creation of a new SIG, to initiate the creation of JEIRPs from SIGs, and to search at a multi-national level for structures that can help to start and maintain ERTs.

B 8.4 Integration over SIGs, JEIRPs, and ERTs

One of the main mechanisms for integration within Kaleidoscope are the content related integration activities: SIGs, JEIRPs, and ERTs. Through these JPA's a whole set of joint activities between researchers and institutes will result. However, also integration over these JPA's should be achieved. One of the main mechanisms in the Kaleidoscope network for this overarching integration are the JPA's Virtual Doctoral School and Technological Platform and Standards, and also through the Advanced Training Activities.

B 8.4.1 Virtual Doctoral School (VDS)

The general objective of this JPA is to work out and put into practice a common framework to support PhD students involved in the Kaleidoscope research domains. "Virtual" denotes the fact that most actions will be based on IT and Web technologies ("addressing e-learning issues by e-learning means"). The VDS will be articulated with existing Doctoral Schools in order to propose a non-constraining additional offer of high quality activities and materials. It will benefit from the added value of the intrinsic notion of Network of Excellence (European context and international perspectives) to establish and maintain an international quality doctoral research program and modernize curriculum for PhD studies in Kaleidoscope related

research areas. The main activities of VDS are to organise facilities for cooperation between PhD students (e.g., peer-to-peer reviewing of manuscripts) and to organise (virtual) courses for PhD students. All SIGs and JEIRPs contribute to the VDS.

B 8.4.2 Technological Platform and Standards (Platform)
This JPA will be first a set of tools and services for the researchers, either involved into design processes or in experiment processes. This tool suite would support reusing of a set of common software components and the inter-operability of the different prototypes, produced by the Kaleidoscope partners or outside, at a more higher semantic level. Emphasis will be put on the support of meta-modelling as a way to achieved this goal, following, in its particular field Digital Learning Environments, the movement toward Model Driven Architectures, such as proposed by the OMG consortium for the enterprise integration, or by the Human-Computer Interaction community in order to support more plasticity at the interface level. This technological platform will be also a exchange place for the rapid dissemination of software productions by its portal features, in the spirit of the community of software developers in the Open-Source movement. The JPA will achieve its objectives by creating a portal that will function as a common tool to share work. This will also integrate the different portals that are being developed within SIGs and JEIRPs. Next, the JPA will create a common platform and standards to facilitate the exchange of tools. All JEIRPs will deliver technologies that can be embedded in the JPS.

B 8.4.3 Advanced Training Activities (ATA)
This JPA aims to establish a flexible and sustainable training system for providing researchers and practitioners in technology enhanced learning with knowledge and skills at European and world level of excellence. This will be achieved by developing a *common methodology* and a *set of technology tools* oriented to providing highly specialized tailor-made training courses based on topics that the *Kaleidoscope* NoE member organisations demonstrate excellence in, or on topics that have been especially developed during the project life-cycle.

Creating courses that are not necessarily bound to a specific SIG, JEIRP, or ERT, both in the VDS and the ATA enhances the integration over these activities. The Platform by nature is an integrating activity, results from all kind of JPA's come together here and the Platform will also put requirements on the input from other JPA's, thus developing the conditions for further exchange and integration. VDS, Platform, and ATA are described in detail in the Annexes.

B 8.5 Quality control for JPA's

A crucial activity for the Kaleidoscope core group will be the quality control over Kaleidoscope's JPA's. This quality control does not only refer to individual JPA's but also involves the overall structure and integration of Kaleidoscope as such. In this task there will be a central role for the International Scientific Committee.

Quality control will mainly affect three area's:
> Assessment of new JPA proposals
> Assessment of ongoing JPA's
> Overall development of the NoE

For all three aspects the Core group will, together with the International Scientific Committee, create a document outlining and grounding the criteria. This document will then serve as a guideline for leaders and proposers of JPA's. A number of initial and to be considered criteria

are listed below (see also Section B6). These criteria should further evolve, differentiate between the different types of JPA, and result in the above mentioned document.

Criteria for new JPA's
       Fit of the subject of the JPA into the overall Kaleidoscope structure;
       Innovation level of the subject of the JPA;
       Structure of the workplan;
       Adequate use of resources;
       Significant involvement from different institutes;
       Number of researchers involved;
       Multi-disciplinarity of the team involved;
       Proposed exchange of researchers;

Criteria for ongoing JPA's
       Realisation of the foreseen result in terms of the content (e.g., the quality and success of the delivered platform);
       Number of realised co-authored publications;
       Number of active members of the JPA;
       Number of conferences organised;
       Number of co-supervised PhD projects;
       Number of externally funded shared projects.

Overall development of the NoE
       Number of proposals for new JPA's;
       Number of proposals for JPA's that meet the quality standards;
       Number of participants in courses of the VDS and the ATA;
       Number of shared projects funded from outside Kaleidoscope.

B 8.6 Overall workplan first 18 months

The workplan of *Kaleidoscope* is described in detail in the WP descriptions in the Annex 1 to this document, a detailed presentation of JPAs content is given in Annex 2. Each JPA has its own dedicated time schedule and deliverables for the first 18 months. Each JPA will be subject to a regular review and quality assessment, organised by the Core group in cooperation with the components of the Advisory boards (*Academy-Industry group*, *Users advisory group* and *International Scientific Committee*).

The timing of these reviews was given in Section B6.

For some JPA's, where the development is also dependent on output from other activities (e.g., the Platform JPA), the review may be later in time, for other JPA's, e.g., JEIRPs that initially were only awarded an assessment phase, the review will take place after 9 months. In addition, the core is also responsible for working out an overall content structure and development in the NoE. This is a to be updated document of which the first version is planned for month 12.

B 8.7 First budget outline for year 1

In the frame of the budget for integration we evaluated for the first *Kaleidoscope* year, i.e. *2,8 Meuros* (see B1), we have made the exercise of establishing a possible distribution among the

different JPAs. We reproduce here the result of this exercise as an indication of the feasibility of the presented programme. The following is given in Keuros:

Transversal JPAs
	Platform and Standard	150
	Doctoral school	150
	Advanced training	130
	Dissemination	130
	Academy/Industry	!!90
	Users group	!!90
SIGs		650
ERTs		200
JEIRPs		
	For the one planed	445
	For a year1 call	170
Other business		
	Core	300
	General assembly	!!80
	Scientific committee	40
Scientific management		60
Other management		125

B 9 Other issues

Kaleidoscope believes that all educational research should be conducted within an ethic of respect for persons, respect for knowledge, respect for democratic values, and respect for the quality of educational research.

Responsibility to the research profession[25]
1. *Kaleidoscope* partners should aim to avoid fabrication, falsification, or misrepresentation of evidence, data, findings, or conclusions.
2. *Kaleidoscope* partners should aim to report their findings to all relevant stakeholders and so refrain from keeping secret or selectively communicating their findings.
3. *Kaleidoscope* partners should aim to report research conceptions, procedures, results, and analyses accurately and in sufficient detail to allow other researchers to understand and interpret them.
4. *Kaleidoscope* partners should aim to decline requests to review the work of others when strong conflicts of interest are involved or when such requests cannot be conscientiously fulfilled on time. Materials sent for review should be read in their entirety and considered carefully, with evaluative comments justified with explicit reasons.
5. *Kaleidoscope* partners should aim to conduct their professional lives in such a way that they do not jeopardize future research, the public standing of the field, or the publication of results.

Responsibility to the participants
6. Participants in a *Kaleidoscope* JPA have the right to be informed about the aims, purposes and likely publication of findings involved in the research and of potential consequences for participants, and to give their informed consent before participating in research.
7. Care should be taken when interviewing children and students up to school leaving age; permission should be obtained from the school, and if they so suggest, the parents.
8. Honesty and openness should characterize the relationship between researchers, participants and institutional representatives.
9. Participants have the right to withdraw from a study at any time.
10. Researchers have a responsibility to be mindful of cultural, religious, gendered, and other significant differences within the research population in the planning, conducting, and reporting of their research.

Responsibility to the public
11. Informants and participants have a right to remain anonymous. This right should be respected when no clear understanding to the contrary has been reached. *Kaleidoscope* partners are responsible for taking appropriate precautions to protect the confidentiality of both participants and data. However, participants should also be made aware that in certain situations anonymity cannot be achieved.

Kaleidoscope partners should communicate their findings and the practical significance of their research in conformity to the consortium IPR frame.

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[25] This text is adapted from the British Educational Research Association set of ethical guidelines (28 August 1992).

Ethical issues form

A. Proposers are requested to fill in the following table

Does your proposed research raise sensitive ethical questions related to:	YES	NO
- Human beings	Yes	
- Human biological samples		No
- Personal data (whether identified by name or not)	Yes	
- Genetic information		No
- Animals		No

B. Proposers are requested to confirm that the proposed research does not involve:

- Research activity aimed at human cloning for reproductive purposes,
- Research activity intended to modify the genetic heritage of human beings which could make such changes heritable[26]
- Research activity intended to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer;
- Research involving the use of human embryos or embryonic stem cells with the exception of banked or isolated human embryonic stem cells in culture[27]
-

	YES	NO
Confirmation!: the proposed research involves none of the issues listed in section B	Yes	

Further information on ethics requirements and rules are given at the science and ethics website at http://europa.eu.int/comm/research/science-society/ethics/ethics_en.html.

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[26] Research relating to cancer treatment of the gonads can be financed

[27] Applicants should note that the Council and the Commission have agreed that detailed implementing provisions concerning research activities involving the use of human embryos and human embryonic stem cells which may be funded under the 6th Framework Programme shall be established by 31 December 2003. The Commission has stated that, during that period and pending establishment of the detailed implementing provisions, it will not propose to fund such research, with the exception of the study of banked or isolated human embryonic stem cells in culture.

B 10 Gender issues

B 10.1 Gender Action plan.

The plan includes three elements: 1) taking special action to bring more women into the project, and with significant responsibilities, 2) hiring gender experts to review/audit/monitor the gender dimension of the project; 3) conducting surveys and analysis that are gender-sensitive and take into account the gender dimensions in as many ways as possible.

1) the network has already included a large number of women into the project – professors, researchers, engineers, students, and all other categories of members. Actions will be taken to ensure that the students of professionals hired include at least 50% of women. Yearly headcounts will be brought to the attention of the Core group and of the Core management group, with recommendations to eventually improve the situation.

2) The network has also ensured the collaboration of Professor Diane-Gabrielle Tremblay, from Canada, who will act as gender expert for the *Equity and Ethic group* and review/audit/monitor the gender dimension in the various actions inside the network (JPAs, JEIRPs, SIGs, etc), as they are planned today, and as they will evolve along the five years. Her background in labour economics and sociology of work, as well as her experience in international projects ensure that she is well prepared to take this responsibility. A taskforce will be formed from the beginning, with representatives of the main actions in the network, and will prepare a detailed plan with her for five years. This plan will pay special attention to the gender issues in the new models for digital learning that will be elaborated, in the forming of multidisciplinary work, as well as to the multicultural dimensions.

3) A series of surveys and analysis will be undertaken under the responsibility of the gender expert, and also research on the gendered dimension of digital learning. This research will study the differences among men and women in terms of needs, aspirations, attitudes, practice of study, etc. A special attention will be given to the variations that are specific to PhD students in the various disciplines, and to the impact of a virtual community of practice on their evolution. Original tools will be produced to conduct these surveys, and will eventually be revised accordingly to new initiatives inside the network!; they will be based on existing tools developed by the gender expert and available on the Web. Yearly results will be produced to be used as feedback by the network in its evolution, and an ongoing analysis will bring more light on issues, formely existing or emerging.

A technique called Gender-Differentiated Analysis will be applied, as it allows to predict different effects on women or men that a policy or program can have, based on socio-economic differences (Frohn, Guberman *et al.*, 2001). This technique can be used in the elaboration phase as well as for evaluation-revision. In that sense, it is solution-oriented and well adapted to reality. This technique accounts for different consequences, disparities or discriminations. GDA is based on equity as a fundamental right, that is equal civic rights for women and men, also economic, political, and social.

B 10.2 Gender issues.

Several gender issues are specific to the Kaleidoscope network, its members, it actions, and its topics of study.

Digital Learning as a recent reality — still under construction — raises questions related to gender, and for two reasons. It is well accepted that women and men, girls and boys, do not learn the same way, nor do they use technologies the same way. What will be the differences in their respective way to see and access Digital Learning in its various forms, such as mobile learning, telepresence, etc? We need to anticipate and understand the possible appropriation of Digital Learning modalities by women and girls, taking into account the cultural variations.

The building of a European research space on Digital Learning means the building of a community of individuals where the number and roles of women cannot be predicted. Gender-sensitive actions can be put in place in order to avoid discrimination. Several options could be thought of and offered to women for example to participate in virtual mentoring or tutoring of young women.

Some actions of the network need special attention such as the Virtual Doctorate School, since this instrument will support the training of a highly qualified workforce for the future and will be rich in social interactions. Questions are raised about the motivation for women to start PhD studies or not, the reasons for dropping out, the needs for women to conciliate their studies with eventual maternity leaves, attitudes towards female students and researchers, sexual harassment, role models, etc.

The Gender-Differentiated Analysis technique (see B.10.1) will be applied to this JPA and allow for comparison of the personal and professional experience of women and men, its effect on their participation to the Virtual Doctorate School.

As a conclusion, gender issues will be present in the life of the network in many aspects, and the action plan that will be elaborated at the start of the network will provide ways to monitor a series of actions all along the life of Kaleidoscope. The task force members and the gender expert (see B.10.1) will exert their vigilance, provide high level understanding of social phenomena, and give the network an opportunity to improve itself constantly.

NOE List of activities

Full duration of project

Nota: according to the high number of partners, the table is presented as follows: column 1 lists the activities, column 2 lists the partner which leads the activity, column 3 lists the leading partners

Kaleidoscope -

	Activity Leader	Activity participants (partner number + partner short name): Leading group
Integrating activities		
Virtual Doctoral School	LIUM (P10)	SU (P06), LICEF (P07), USTL (P11), UiO (P18), GU (P20)
Platform and Standards	LIUM (P10)	LICEF (P07), CRMPA (P48), Campo Rosso (P05), ETL (P12), Birkbeck (LKL) (P65), GET (P75), CNRS (P02), UPMF (P77), SLBSema (P36), UNIL (P28)
SIG Artificial Intelligence	UDE (P08)	HCT Sussex (P22), CRMPA (P48), CNRS (P02), UUPMF (P77), INPG / ICA (P75), UNED (P09)
SIG collab. learning	UiB (P17)	UL (P13), EPFL (P27), AAU (P33), JYU/IER (P38), UDE (P08), GU(P20), UiO (P18), UNED (P09)
SIG Inquiry Learning	UT (P16)	ITD-CNR (P15), UVA (P53), LTEE (P43)
SIG Context and Learning	FCTUC (P56)	AAU (P33), CSD-AUTH (P42), Campo Rosso (P05)
SIG Learning GRID	CRMPA (P48)	RTU (P51), SLBSema (P36), ESILV/GI (P74), QUB (P69), IoE (P03), UNISI (P14), CRMPA (P48)
SIG Learning and tech.	IoE (P03)	ITD-CNR (P15), ULG (P26), ETL (P12), CNRS (P02), INPG/ICA (P75), UPMF (P77), HUT (P37), OU (P68), UiB (P17)
SIG Narrat. and Learn.	Inesc-ID (P19)	ULG (P26), ITD-CNR (P15), Inesc-ID (P19), UniKoeln (P32)
SIG Participatory design	UT (P16)	UT (P16), LICEF (P07), UoB (P71), OU (P68), CTI (P44), FCTUC (P56), RTUU (P51), ELTE (P46)
SIG Phil. Of E-learning	IoE (P03)	CTI (P44), ETL (P12)
ERT prod. of educ. Formats	UNISI (P14)	UNIVBRIS (P70), Campo Rosso (P05), UNISI (P14), UL (P13)
ERT techn. Enhanced Learning in Math.	ITD-CNR (P15)	UDE (P08), ETL (P12), ITD-CNR (P15), IoE (P03), CNRS (P02), UJF (P04), INPG / ICA (P76), UPMF (P77)
Joint research programme		
JEIRP Interaction between learners	CSD-AUTH (P42)	INPG/ICA (P76), KMRC (P30), CTI (P44), LEGO Company (P35), ELTE (P46)
JEIRP Pers. And Collab. Trails	IoE (P03)	UVA (P53), QUB (P69), HCT Sussex (P22), UG (P24), OU (P68), SLBSema (P36), ELTE (P46)
JEIRP Mobile Support	EPFL (P27)	USTL (P11), LTEE-UoAegean (P43), KRMC (P30), JYU / IER (P38), UDE (P08), Uoulu (P39), UNED (P09), UiB (P17)
JEIRP Productive learning	AAU (P33)	AAU (P33), GU (P20)
JEIRP Traversing Learning Space	UNISI (P14)	UL (P13), CNOTINFOR (P55), ULG (P26), LTEE-UoAegean (P43), Campo Rosso (P05), IoE (P03), ETL (P12), ITD-CNR (P15), HCT Sussex (P22), UniKoeln (P32), UNIVBRIS (P70), LEGO Company (P35), ETL (P12)

Joint research programme		
JEIRP Semantic Web	CNRS (P02)	LIUM (P10), CRMPA (P48), UiB (P17), CNRS (P02), UJF (P04), INPG/ICA (P76), UPMF (P77), Paris 5 (P78), ESILV/GI (P74), FEUP (P57), UNI-SB (P31)
JEIRP Interaction & Collaboration	LTEE-UoAegean (P43)	LTEE-UoAegean (P43), CNRS (P02), EPFL (P27), UDE (P08), UNED (P09)
JEIRP Visual Interactive Bloacks	edi Comenius (P64)	CNOTINFOR (P55), IoE (P03), Warwick (P72), ELTE (P46)

Spreading of excellence activities		
Dissemination	IoE (P03)	
Advanced training	SU (P06)	LIUM (P10), IoE (P03), UT (P16), UiB (P17), SLBSema (P36), UNISI (P14), UDE (P08), GIERH (P40)

Management activities		
Strategic and Scientific management	CNRS (P02)	FIST (P01), CNRS (P02), IoE (P03), UJF (P04), CampoRosso (P05), SU (P06), LICEF (P07), UDE (P08), UNED (P09), LIUM (P10), USTL (P11), ETL/COSET/Uathens (P12), UL (P13), UNISI (P14), ITD-CNR (P15), UT (P16), UiB (P17), UiO (P18), Inesc-ID (P19), GU (P20), CSALT-Lancs (P21)
Executive management	CNRS (P02), IoE (P03)	FIST (P01), CNRS (P02), IoE (P03), SU (P06), UDE (P08), UT (P16), UiB (P17)
Admin. And Financial Management	FIST (P01)	