

JISC DEVELOPMENT PROGRAMMES

Project Document Cover Sheet

PROJECT PLAN

Project

Project Acronym	CORE	Project ID	
Project Title	Collaborative Orthopaedic Research Environment		
Start Date	01 November 2004	End Date	31 October 2006
Lead Institution	University Of Southampton		
Project Director			
Project Manager & contact details	Dr Gary Wills, Intelligence, Agents, Multimedia Group, School of Electronics and Computer Science, University of Southampton, SOUTHAMPTON, SO17 1BJ		
Partner Institutions			
Project Web URL	www.core.ecs.soton.ac.uk		
Programme Name (and number)	<i>Virtual Research Environments (05/04) Strand III</i>		
Programme Manager	Dr Maia Dimitrova		

Document

Document Title	Project Plan		
Reporting Period			
Author(s) & project role	Dr Gary Wills (Project manager)		
Date	17/12/2004	Filename	CoreProjectPlan0b.doc
URL			
Access	<input checked="" type="checkbox"/> Project and JISC internal		<input type="checkbox"/> General dissemination

Document History

Version	Date	Comments
0a	17 December 2004	Initial Draft of Project Plan
0b	10 February 2005	revised Draft of Project Plan
1a	14 February 2005	Accepted by JISC



JISC Project Plan Template

Overview of Project

1. Background

The Collaborative Orthopaedic Research Environment (CORE) is a 24-month project, which builds on the work carried out under the Virtual Orthopaedic European University (VOEU) project, an EU IST project funded under framework 5. As part of the VOEU project a Dynamic Review Journal (DRJ) was developed, this tightly integrated system allowed surgeons to collaborate on clinical trials. The CORE project will enhance the DRJ by developing and deploying a Web services based Virtual Research Environment (VRE) demonstrator; that will enable researches to design experiments collaboratively, collect the results and disseminate the findings. In the context of orthopaedics, experiments can be multi-centred clinical trials that involve analysis of large data sets, the documentation needs to be written collaboratively and the experiments will need to be managed and co-ordinated for a geographically disperse set of researchers. The CORE project will develop a Grid/Web services based VRE demonstrator for the benefit of the Higher Education and Further Education communities.

2. Aims and Objectives

The project aims to provide integrated computer support across the research and educational cycles, because these activities are intrinsically coupled as a part of the requirements of the surgeon's *Continuing Professional Development*. The CORE will allow surgeons to: create technical material (including non research material for education), analyse data (from their own trials or data entered from journals), investigate hypotheses (from their own work or as meta or thematic reviews), discuss the finding from their or others work, and prepare and submit articles for review.

The specific objectives are to:

- Map the Requirements Specification which will inform the development of the VRE demonstrator.
- Develop a Service Oriented Architecture to support CORE.
- Develop a demonstrator incorporating a number of services that will allow surgeons to create, manage and discuss their clinical trials (experiments).
- Report on the evaluation process and results.

3. Overall Approach

The overall strategy of the project is defined in the proposal and further detailed planning is given in this project plan.

The JISC circular specifically asked for '*lightweight, proof-of-concept VRE demonstrators appropriate to the needs and skills of specific communities.Specific attention should be given to the skills required to ensure effective exploitation within the target community and any associated training requirements.*'

Hence the project teams consist of a surgeon, who will supervise the interactions between the orthopaedic community and the rest of the project team. In addition, the project has secured the services of another surgeon to conduct the requirements elicitation, the end user training and evaluation.

The demonstrator is focused on supporting trainees in the orthopaedic domain. Hence the architecture and services will be developed to support the activities of orthopaedic surgeons developing material to: create technical; analyse data, investigate hypotheses, discuss the finding, and prepare and submit articles for review.

Delivery of a demonstrator in a timely fashion that can be used by the orthopaedic surgeons to:

- create technical material (including non research material for education),

- analyse data (from their own trials or data entered from journals),
- investigate hypotheses (from their own work or as meta or thematic reviews),
- discuss the finding from their or others work,
- prepare and submit articles for review.

Engagement in the project by the orthopaedic community.

4. Project Outputs

Tangible Deliverables

1. WORKPACKAGE 1 Stakeholder requirements: Requirements Specification which will inform the development of the VRE demonstrator.
2. WORKPACKAGE 2 Infrastructure: Report on Design of the SOA, this will include the overview documentation for the software.
3. WORKPACKAGE 2 Infrastructure: Software for implementing the SOA
4. WORKPACKAGE 3 Services: Report on the Design of Services
5. WORKPACKAGE 3 Services: Software for the services
6. WORKPACKAGE 4 Demonstrator: Project Report on Demonstrator and user guide.
7. WORKPACKAGE 5 Evaluation: Final Report

Intangible Deliverables

The main method of dissemination of knowledge gained through the development of the CORE VRE is via the reports listed above. In addition the project team will endeavour to publish the work through conferences and journal proceedings.

5. Project Outcomes

The end users for this VRE will be the higher surgical trainees (HST), who are qualified surgeons training to be consultants. They are not computer specialists, their study is work based, they rarely are co-located with other HSTs. During the six years of training they usually move post twelve times, and they have to keep a logbook. Therefore they typify both the average scientist trying to collaborate on a project and a group of e-learners studying in a collative partner institution, i.e. they require tools that are easy to use for none computer science specialists. It is envisioned that the results of this project will offer direct benefits to the orthopaedic community and to the wider research community, by providing a VRE that enables researchers to collect and analyse experimental results from their own or other people's experiments, organise internal project discussions, and produce appropriate documents. The project should have a major impact on a number of areas which include:

- Being able to keep track of the research administration: trial protocol, ethical approval, and workflow as the trial progress,
- Enabling access to research data from various trials and in formats that allow analysis of the data,
- Allowing easier meta-analysis or thematic reviews,
- Monitoring the effectiveness of surgical interventions,
- Enabling a consortium to write appropriate documents for dissemination (medical reports, journal articles, etc)
- Producing up to date learning and teaching material.

The technology is an enabler. There will be issues common to all introductions of technology, including, buy-in from stakeholders and other cultural barriers. It is intended, however, that this VRE for orthopaedics may be of use in pioneering new or validating current procedures and techniques for orthopaedic surgery.

6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
JISC & Wider UK HE and FE Community	JISC are funding this project to learn lessons in delivering a VRE to a specific community (in this case orthopaedics) and whether these may be applied to the needs of researchers in the wider UK HE and FE community.	High
Higher Surgical Trainees in the Wessex region	They will be our initial users and focus group for the deployment of the system.	High
British Orthopaedic Trainees Association (BOTA)	The system will be rolled out to the Orthopaedic trainees nationally for evaluation through BOTA	Low
Other Clinicians carrying out multi-centred trials	The system has potential benefit to this group in organising, documenting and analysing trails.	Low
Research Groups within the School of Electronic and Computer Science University of Southampton	Can be used to allow other PhD students to carry out investigation of hypothesis without having to build a Web-services infrastructure	Medium

7. Risk Analysis

Risk	Probability (1-5)	Severity (1-5)	Score (P x S)	Action to Prevent/Manage Risk
Non-availability of Project Staffing	2	3	6	The team understands the design principles and no one member of the team has any vital piece of knowledge not understood by the others. The design principles have already been published. The advantage of this approach is that we are not relying on the experienced coders to design.
Non-availability of primarily stakeholders, surgical trainees	3	5	15	We will look to engage a current higher surgical trainee to oversee the evaluation and requirement elicitation. We are also seeking involvement of other orthopaedic organisations (BOTA, and the Royal College of Surgeons of England)
Delay in employing staff;	5	1	5	The requirement to advertise a vacancy for at least 4 weeks and the natural delays in all admin systems means that that it may not be able to get Some of the initial design can be undertaken by the project team; also existing RAs in the research group can be employed to do some of the initial development work.
Technical; What if the methodology doesn't work?	3	3	9	This risk factor has been offset somewhat by ensuring that the design principles have been established and a similar Web based system has already been built, (though in a tightly integrated system).
External suppliers; Unable to get the licensing or IPR agreement required	1	5	5	Alternative methods and software packages have been identified.
Legal issues; Data protection of patient data.	2	3	6	The initial seeding of the project come form a completed VOEU EU funded project. In addition surgeons now get permission from patients for their data to be used for research purposes

Outstanding work	2	4	8	There is a risk that the deliverables are not achievable in a Web-services approach. We aim to start by wrapping the present tool as a Web service and breaking it down into small services where appropriate. This reduces the risk of not delivering an effective services and tools.
------------------	---	---	---	---

8. Standards

The CORE VRE will take a Service Oriented Architecture (SOA) approach. The CORE services will be developed using agreed standards such as SOAP, WSDL/OWLS, and JSR-168 for the infrastructure. The CORE project will use the Open Archives Initiative (OAI) Protocol for Metadata Harvesting (OAI-PMH). HTML resources will be produced to W3C html 4.01 strict and to W3C WAI guidelines to double A conformance.

9. Technical Development

The CORE project will follow the development set out in this project plan. All source code will be 'booked' in and out of SourceSafe and on booking in a record of the IDE used to develop the code will be recorded. This will ensure that, should a state arise where the code developed produces an undesirable output; the code can be 'rolled back' to a stable earlier development stage.

10. Intellectual Property Rights

Statistical Package for Social Science (SPSS) is a commercial product used for the analysis of the clinical data, a licence will be purchased for this product. Organisations wanting to reuse the software developed in this project, will also have to purchase a licence for SPSS or an equivalent statistical package.

The architecture from MIAKT may be appropriate and if necessary an agreement will be sort from the project MIAKT director. However, the source code for this part of the architecture will not be made publicly available at the end of the project.

Similarly other products developed on behalf of JISC may be used, for example the Chandler tool, and in each case, agreement will be sort and anyone else wishing to re-use the CORE program code must gain their own agreement.

Project Resources

11. Project Partners

There are no project partners. All members of the project are associated with the School of Electronic and Computer Science (ECS), University of Southampton.

12. Project Management.

Project management will be provided by staff within the Intelligent Agents and Multimedia (IAM) group, and the Learning Technologies Group in the School of Electronics and Computer Science (ECS) at the University of Southampton, and will be achieved as follows.

- The project will begin with an initial project start-up face-to-face meeting with all those taking an academic and clinical lead in the project; Planned for the 17 December 2004.
- A similar term meeting will occur at three monthly intervals to monitor progress against objectives.
- There will be a final, project closure meeting.
- In addition, at the 12 months (halfway) stage, the review will not only monitor progress against objectives, but will also examine the recent developments of tools and services in other projects that may be relevant.
- There will be weekly meetings with the research staff.
- Financial reports will be supplied by the ECS financial management, and a Summary Final Report will be produced at the end of the Project.

Public versions of the minutes of these meetings will be published on the project Website. Each of the workpackages will be led by one of the Investigators. In addition, these will be supported by a dedicated project discussion list.

List of members of the project team.

Project Manager (Principle Investigator)

Dr Gary Wills
Intelligence, Agents, Multimedia Group
School of Electronics and Computer Science
University of Southampton
Southampton
SO17 1 BJ
Direct Tel: +44 (0)23 8059 2831
Fax: +44 (0)23 8059 2865
Email: gbw@ecs.soton.ac.uk
Time on Project 20%

Relevant Expertise: Project management, Software Engineering, Web Technologies, Knowledge Management, Human-Computer-Interaction, Learning Technologies.

Project Team

Mr Lester Gilbert
CORE Project Technical Manager
Learning Technologies Group
School of Electronics and Computer Science
University of Southampton
Southampton
SO17 1BJ
Tel: +44 (0)23 8059 3831
Fax: +44 (0)23 8059 3218
Email: lq3@ecs.soton.ac.uk

Relevant Expertise: Software Development, Learning Content (Instructional Design), Data Analysis, Human-Computer-Interaction.

Dr Les Carr
CORE Co-Investigator
Intelligence, Agents, Multimedia Group
School of Electronics and Computer Science
University of Southampton
Southampton
SO17 1BJ
Tel: +44 (0)23 8059 4479
Fax: +44 (0)23 8059 2865
Email: lac@ecs.ston.ac.uk

Relevant Expertise: Web Services, Digital Libraries, Semantic Web technologies, Knowledge technologies, Ontology-based link services Citation Analysis.

Dr Hugh Davis
CORE Co-Investigator
Head of Group
Learning Technologies Group
School of Electronics and Computer Science
University of Southampton
Southampton
SO17 1BJ
Tel: +44 (0)23 8059 3669
Fax: +44 (0)23 8059 3218
Email: hcd@ecs.soton.ac.uk

Relevant Expertise: Learning technologies relating to Grid technology and Web Services, Adaptive Hypertext and Personalisation of Web based systems.

Mr Simon Grange (FRCS)
CORE Co-Investigator
School of Electronics and Computer Science
University of Southampton
Southampton
SO17 1BJ

Tel: +44 (0)23 8059 3255

Fax: +44 (0)23 8059 2865

Email: sg01v@ecs.soton.ac.uk

Relevant Expertise: Orthopaedic surgeon, Medical simulation, IT and Learning Technologies for medicine.

Professor Wendy Hall
CORE Co-Investigator
Head of School
Intelligence, Agents, Multimedia Group
School of Electronics and Computer Science
University of Southampton
Southampton
SO17 1BJ

Direct Tel: +44 (0)23 8059 2388

Fax: +44 (0)23 8059 2865

Email: wh@ecs.soton.ac.uk

Relevant Expertise: Computer Science, Multimedia and Hypermedia systems.

13. Programme Support

The main support beyond the usual programme support, may be in the facility meetings to arrange the use of software developed in other project under JISC programmes.

14. Budget

The budget is as agreed in the project proposal, see appendix A for the budget template.

Detailed Project Planning

15. Workpackages

Workpackage 1 Requirements Elicitation and Gathering

The aim of this workpackage is to ascertain the wider issues and requirements involved with providing Grid/Web services that relate to the storage, access, use and re-use, of research data in repositories, and information from digital libraries and its dissemination. The conclusions from this workpackage will result in the Requirements Specification which will inform the development of the VRE demonstrator.

Workpackage 2 CORE Architecture

The CORE VRE will take a Service Oriented Architecture (SOA) approach. The architecture for the CORE project will build on the lessons learnt from a number of recent projects. The CORE will bring these lesson learnt and where possible the technologies developed into a SOA.

Workpackage 3 Services

The services will focus primarily on assisting an orthopaedic surgeon co-ordinate and run clinical trials, and collected regularly the postoperative assessment results. The collated results are then analysed and discussed by a team of e-surgeons before being disseminated to the wider orthopaedic community. These services are generic in nature and may apply to many disciplines. A number of Grid/Web service based tools will be developed that will allow surgeons to create, manage and discuss their clinical trials (experiments). The CORE services will be developed using agreed standards such as SOAP and WSDL. The main services are:

- Schema Generator for new data into the Data repositories,

- Data repository service,
- Communication service,
- Document creation services,
- Managed e-print service,
- Analysis services.

Workpackage 4 Demonstrator

The demonstrator will use the services developed in workpackage 3 and embed them into the infrastructure developed in workpackage 2.

In addition to the technical aspects of developing the demonstrator, there is the issue of filling the repository with experimental data and the e-print servers with appropriate publications.

Workpackage 5 Evaluation & Training

The demonstrator focuses more on the Human-Computer-Interaction to the system, allowing the users' input to feed back into the design. Standard user evaluation methods will be employed to focus upon the usability of the demonstrator by non-technical users (e.g., can it be used simply and effectively?). A key element of this workpackage will be the training of the end users.

See Appendix B for the detailed work plan

16. Evaluation Plan

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
January - March 2005	Stakeholder requirements	Specification which will inform the development of the VRE demonstrator.	Focus Groups, Questionnaires and Interviews	Scenarios and use cases that are understood by the whole team.
December 2004 - July 2005	Infrastructure	Design and implementation of the SOA	System testing (Black Box) against design	Successfully passing all tests
April - December 2005	Services	Design and Implementation	System testing (Black Box) against design	Successfully passing all tests
June 2005 - March 2006	Demonstrator	Does the demonstrator work in the way it was intended.	Testing against Scenarios and use cases.	Complies with scenarios and uses cases.
June 2005 - March 2006	Demonstrator	Can the end users use the system	Questionnaires, Interviews, Focus groups.	Qualitatively and quantitatively the uses found that the system was easy to use.

17. Quality Assurance Plan

Output	Requirements Specification				
Timing	Quality Criteria*	QA Method(s)	Evidence of Compliance	Quality Responsibilities**	Quality Tools*** (if applicable)
Jan, Feb 05	Fitness for purpose	Internal quality Review	Minutes of Meetings	Technical Manager	
Mar 05	Terms of reference	Peer review	Feedback	Technical Manager	
April 2005	JISC Report Guideline	Proof Reading	Sign off	Project manager	Template
Output	Service Oriented Architecture (Java)				
Timing	Quality Criteria*	QA Method(s)	Evidence of Compliance	Quality Responsibilities**	Quality Tools*** (if applicable)
Feb, Mar 2005	Functional Specification (Adherence to standards)	Design Review	Minutes kept and design signed off	Technical Manger	UML
April 2005	Coding/installing MIAKT system	best practice for processes	Logbook update	Research Fellow	CVS repository
June 2005	Test Plan (Adherence to specifications)	Unit test	Sign off testplan (with a record of the results)	Research Fellow	Junit
June 2005	Test Plan (Adherence to specifications)	System test	Sign off testplan (with a record of the results)	Research Fellow	Subversion
July 2005	JISC Open Source Policy	Licence Check	LGPL or GPL Licence and source code published in SourceForge	Technical manger	Subversion
July 2005	JISC Report Guideline	Proof Reading	Sign off	Project manager	Template
Output	Services (.Net)				
Timing	Quality Criteria*	QA Method(s)	Evidence of Compliance	Quality Responsibilities**	Quality Tools*** (if applicable)
April May June 2005	Functional Specification (Adherence to standards)	Design Review	Minutes kept and design signed off	Technical manger	UML
May, June, July August 2005	Coding of VOEU services	best practice for processes	Logbook update	Research Fellow	Code Safe
Sept Oct 2005	Test Plan (Adherence to specifications)	Unit test	Sign off testplan (with a record of the results)	Research Assistant	
Oct Nov 2005	Test Plan (Adherence to specifications)	System test	Sign off testplan (with a record of the results)	Research Fellow	
Dec 2005	JISC Open Source Policy	Licence Check	LGPL or GPL Licence and source	Technical manger	

			code published in SourceForge		
December 2005	JISC Report Guideline	Proof Reading	Sign off	Project manager	Template
Output	Demonstrator: Portal (JAVA)				
Timing	Quality Criteria*	QA Method(s)	Evidence of Compliance	Quality Responsibilities**	Quality Tools*** (if applicable)
June July 2005	Functional Specification (Adherence to standards)	Design Review	Minutes kept and design signed off	Technical Manger	UML
Aug, Sep, Oct, Nov 2005	Coding Portal	best practice for processes	Logbook update	Research Assistant	CVS repository
Dec 2005 Jan 2006	Test Plan (Adherence to specifications)	Unit test	Sign off testplan (with a record of the results)	Research Fellow	Junit
Feb 2006	Test Plan (Adherence to specifications)	System test	Sign off testplan (with a record of the results)	Research Fellow	Subversion
March 2006	JISC Open Source Policy	Licence Check	LGPL or GPL Licence and source code published in SourceForge	Technical manger	Subversion
March 2006	JISC Report Guideline	Proof Reading	Sign off	Project manager	Template
Output	Evaluation & Training				
Timing	Quality Criteria*	QA Method(s)	Evidence of Compliance	Quality Responsibilities**	Quality Tools*** (if applicable)
Oct, Nov, Dec 2005 Jan, Feb, Mar 2006	Training Plan (Fitness for purpose)	Peer review	Feedback	Domain Expert (Orthopaedic Surgeon)	
Jan, Feb, Mar, Apr, May., June, July, Aug, Sep 2006	Evaluation Plan (usability, accessibility, validity)	Design Review	Minutes kept and design signed off	Technical manger	
October 2006	JISC Report Guideline	Proof Reading	Sign off	Project manager	

* **Quality Criteria:** specify the criteria against which the quality of the output will be measured, e.g. fitness for purpose, best practice for processes, adherence to a specific standard or specification, usability, accessibility, validity, etc.

** **Quality Responsibilities:** list who is responsible for monitoring and ensuring the quality.

*** **Quality Tools:** list any tools to be used to help ensure the quality.

18. Dissemination Plan

Timing	Dissemination Activity	Audience	Purpose	Key Message
1 st month and continuing there after	Web site	General, medical and technical audience	Awareness, Inform, Engage, and Promote	About CORE and it developments
3 rd month and twice yearly there after	JISC Kick off meetings and subsequent project meetings	Technical Audience	Inform and Engage	CORE developments and feedback
Each mile stone	Deliverable reports	Technical audience, and wider informed research and educational research community.	Inform	CORE developments
Throughout the project (mainly after the first year)	Conference papers, workshops and/or posters	Medical audiences, and wider informed research and educational community.	Engage and Promote	CORE development
Throughout the project	Demonstration to institutions and organisations.	Medical and technical	Awareness, Inform, Engage, and Promote	About CORE and it developments

19. Exit/Sustainability Plan

Project Outputs	Action for Take-up & Embedding	Action for Exit
All Reports	Will remain on the project server for a minimum period of 2 years as stated in the original circular.	<p>Access– The School of Electronics and Computer Science will host the server.</p> <p>Preservation– All reports will be archived in the appropriate JISC repository</p> <p>Maintenance – The server will come under the maintenance policy of the School</p> <p>Intellectual property. All report will be copyrighted.</p>
Software: <ul style="list-style-type: none"> • Implementation the SOA • Implementation of Services • Implementation of Demonstrator 	The programme code will be freely available for any Higher or Further education institution.	<p>Access– The School of Electronics and Computer Science will host the programme code for downloading.</p> <p>Preservation– The programme source code will be archived in the appropriate JISC data centre.</p> <p>Maintenance– The system will be free to use by HE and FE establishments. All supporting documentation (specification, user manuals, and technical manuals) will be freely available via the project website. No on going maintenance will be available fort he project after the closing date.</p> <p>Intellectual property– To install their own version of the demonstrator institutions will need to buy their own licences for 3rd part components. All patient data will be removed from the downloadable version of the demonstrator.</p>

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
CORE Architecture; programme code	Can be used by other project and students	The architecture can be used by other projects and research students. Allowing them to concentrate on the focus of the project and not the architecture.	Ensuring students and staff have access to the code and documentation for the system.
CORE demonstrator	Used by the clinicians and researchers in the Orthopaedic	Clinicians and researchers would use the system either as a tool for developing education material, reports or conducting trials.	Buy in beyond the local community of Orthopaedic surgeons, for example BOA or the RCS.

Appendixes

Appendix A. Project Budget

Template for Project Plan

	JISC Contribution Requested		Institution Contribution		Total
	YR1	YR2	YR1	YR2	
Staff					
<i>Research Fellow 1 FTE</i>	27288	29692	12553	13659	83192
<i>Research Assistant 1 FTE</i>	26288	29692	12553	13659	83192
Project team			7000	7000	14000
Travel & Subsistence <i>(include attendance at relevant programme meetings)</i>	3,000	3,000			6000
Equipment <i>(specify individual items over £10k)</i>					
Dissemination activities			1000	1000	2000
Evaluation activities	3,200	3,200			6400
Other.					
<i>Consumables</i>	800	800			1600
<i>Server plus software</i>	4000				4000
<i>Personal Computers plus software for RAs</i>	4000				4000
<i>Laptop plus software</i>	2000				2000
<i>Equipment for project team</i>			1000		1000
Total	70,576	66,385	34106	35318	206,348
Total requested from JISC		136,961			

Appendix B. Workpackages

WORKPACKAGES	Month	1 Nov	2 Dec	3 Jan	4 Feb	5 Mar	6 Apr	7 May	8 Jun	9 Jul	10 Aug	11 Sep	12 Oct	13 Nov	14 Dec	15 Jan	16 Feb	17 Mar	18 April	19 May	20 Jun	21 Jul	22 Aug	23 Sep	24 Oct
1: Stakeholder requirements																									
2: Infrastructure																									
3: Services																									
4: Demonstrator																									
5: Evaluation & Training																									

Project start date: 01-11-2004

Project completion date: 31-10-2006

Duration: [24] months

Workpackage and activity	Earliest start date	Latest completion date	Outputs (clearly indicate deliverables & reports in bold)	Milestone	Responsibility
YEAR 1					
<p>WORKPACKAGE 1: Stakeholder requirements</p> <p>Objective: ascertain the wider issues and requirements involved with providing Grid/Web services that relate to the storage, access, use and re-use, of research data in repositories, and information from digital libraries and its dissemination.</p>	January 2005	April 2005			
1. Using the DRJ system and storyboards, elicited and gathered the views of clinicians involved in research their requirements of the a VRE. Possibly using focus groups, interviews and questionnaires.	January 2005	March 2005	Internal Report to be made available on the project Web site		Lester Gilbert Simon Grange Gary Wills
2. Literature review of the areas	January 2005	March 2005	Internal Report to be made available on the project Web site		Lester Gilbert Simon Grange Gary Wills
3. Interview other professionals including librarians/information scientists, instructional designers/learning technologists, and content providers.	January 2005	March 2005	Internal Report to be made available on the project Web site		Lester Gilbert Simon Grange Gary Wills
4. Report findings	March 2005	April 2005	Requirements Specification which will inform the development of the VRE demonstrator.	1	Lester Gilbert Simon Grange Gary Wills

YEAR 1 & 2					
WORKPACKAGE 2: Infrastructure					
Objective: <i>implement a Service Oriented Architecture (SOA).</i>	December 2004	July 2005			
5. Literature review of related architectures	December 2004	June 2005	Internal Report to be made available on the project Web site		Hugh Davis Lester Gilbert
6. Investigate how to integrate the CORE-SOA with existing data repositories: distributed e-print, discussion, and analysis services	December 2004	June 2005	Internal Report to be made available on the project Web site		Leslie Carr Lester Gilbert
7. Design of the SOA	December 2004	July 2005	Report on Design of the SOA, this will include the overview documentation for the software.	2	Leslie Carr Lester Gilbert
8. Implemented the SOA as a toolkit of generic components.	December 2004	July 2005	Software for implementing the SOA, newly developed code published in SourceForge	2	Leslie Carr Lester Gilbert
WORKPACKAGE 3: Services					
Objective: The development of CORE services using agreed standards.	April 2005	December 2005			
9. Literature Review to identify current standards and a gap analysis of existing services	April 2005	June 2005	Internal Report to be made available on the project Web site		Leslie Carr Gary Wills
10. Design of Service (API)	June 2005	December 2005	Report on the Design of Services	3	Leslie Carr Gary Wills
11. The main services to be implemented are: <ul style="list-style-type: none"> • Schema Generator for new data into the Data repositories, • Data repository service, • Communication service, • Document creation services, • Managed e-print service, 	April 2005	December 2005	Software for the services	3	Leslie Carr Hugh Davis Wendy Hall Gary Wills

Analysis services.					
WORKPACKAGE 4: Demonstrator Objective: Build a Demonstrator specifically for the Orthopaedic Surgeons.	June 2005	March 2006			
12. Integration and system testing of the demonstrator: .Use scenarios and test plans developed in the requirements	June 2005	March 2006	Test Plan and Internal Report to be made available on the project Web site		Lester Gilbert Gary Wills
13. Design of the Portal (instructional Design)	June 2005	March 2006	Design Report to be made available on the project Web site		Lester Gilbert Simon Grange Gary Wills
14. Filling the repository with experimental data and the e-print servers with appropriate publications	June 2005	March 2006	Database populated		Leslie Carr Simon Grange
15. Report on Demonstrator	Febuary 2005	March 2006	Project Report on Demonstrator	4	Lester Gilbert Gary Wills
YEAR 1 & 2					
WORKPACKAGE 5: Evaluation & Training Objective: Evaluate the CORE-VRE	October 2005	October 2006			
16. Training of Surgeons	October 2005	March 2006			Simon Grange
17. User evaluation:- qualitative	October 2005	August 2006			Lester Gilbert Simon Grange
18. User evaluation:- quantitative	October 2005	August 2006	Evaluation Report		Lester Gilbert Simon Grange
19. Final Report	September 2006	October 2006	Final Report	5	Gary Wills