JISC/NSF Digital Libraries in the Classroom Programme

Biannual Progress Report

Reporting Period: 1 September 2005 – 28 February 2006

Project Acronym	DIDET (Digital libraries for global distributed innovative design education and teamwork)
Project Title	Accelerating Globally Distributed Team Innovation: Building an Experimental Testbed to Leverage Digital Libraries in the Transformation of Design Engineering Education
Lead Institution	Stanford University (for NSF) University of Strathclyde (for JISC)
Project Director	Professor Larry Leifer Centre for Design Research Department of Mechanical Engineering Stanford University Stanford CA 94305-2232 Voice: (650) 725-1588 Fax: (650) 493 6481 Leifer@cdr.stanford.edu
Project Manager (Strathclyde)	Professor Neal Juster Dean of the Faculty of Engineering Professor of Computer Aided Engineering University of Strathclyde Glasgow G1 1XJ Voice: 0141 548 4849 Fax: 0141 548 4558 n.p.juster@strath.ac.uk
Report produced by	Neal Juster, Caroline Breslin, Hilary Grierson, Ross Suckling Ade Mabogunje, Ozgur Eris

Section One

Grant Statement

I confirm that the project is being conducted under the terms agreed with JISC/NSF in the letter of grant and the terms and conditions attached to it.

1. Aims, Objectives and Methodology

There have been no substantial changes to the aims, objectives and methodology detailed in the updated Project Plan submitted to JISC in September 2005.

2. Overall Approach

There have been no substantial changes to the overall approach in this period. However, as reported by Strathclyde at the meeting with the programme manager and evaluators in September 2005, the project has determined that it will be more effective to run joint *elements* of classes rather than developing a complete new module shared between Stanford and Strathclyde (see WP 10).

3. Workpackages

WP1 – Initial Library Specification:
Completed prior to current reporting period (August 2003).

WP2 – Implement DIDET Library v1:
Completed prior to current reporting period (October 2003).

WP3 – Student Use of DIDET Library v1:
Completed prior to current reporting period (May 2004).

WP4 – Specification of DIDET Library v2:
Completed prior to current reporting period (September 2004)

WP5 – Implement DIDET Library v2:
Completed prior to current reporting period (December 2004)

WP6 – Student Use of DIDET Library v2:
Completed prior to current reporting period (September 2005)

WP7 – Specification of DIDET Library v3:
Completed prior to current reporting period (September 2005)

WP8 – Implement DIDET Library v3:

Commenced August 2005, completed September 2005

Version 3 of the LauLima Digital Library (the LDL) was implemented based on the specification developed as per WP7. A workflow was established for uploading content to the LDL and applying metadata. All LDL content is subject to an approval process by an information specialist to ensure that it complies with relevant legislation and good practice.

WP9 – Student Use of DIDET Library v3:

Commenced October 2005, continuing until February 2008 and beyond.

Students began to use version 3 of the LauLima digital library (LDL) at the beginning of the academic year in October 2005 as scheduled in the project plan. The browse and search facilities are now demonstrated to students in relevant classes and all content submitted by staff so far is made available for retrieval. This will continue as planned and will become increasingly beneficial as the number of resources held in the LDL is expanded. Evaluation of the LDL and its use will also be carried out when there is a sufficient number of resources within.

WP10 – Global Team Design Project:

Commenced July 2005, due to be completed June 2007

This workpackage is now titled Global Team Design *Project* rather than Global Team Design Course. Originally a joint course (module) was planned for the Autumn of 2006, however as reported in September 2005, the DIDET team has concluded that it will be more effective to run a joint project as part of classes in the US and UK rather than a joint course shared between the US and UK institutions. The differences in student learning at Strathclyde and Stanford together with timetabling and credit issues mean that a global design course is not appropriate. The project will be a collaborative global team design project run as an assessed joint element of compatible courses at Strathclyde, Stanford and Olin.

Development of this collaborative global design project is now underway. DIDET team members from the US and the UK met at Olin College of Engineering, Needham, MA, USA on 13-14 February 2006 where constructive progress was made on the nature of the joint project. The US and UK members of the DIDET team are continuing to work together on this. It is currently planned that the collaborative global design project will be part of a new class at Strathclyde and Olin and an existing class at Stanford. Class descriptions are being written for all 3 institutions so that we can confirm their compatibility for their collaborative project element. We have created a dedicated joint working area on the LauLima Learning Environment to progress development work on the collaborative project and continue to communicate with Stanford and Olin by regular videoconference meetings and email.

WP11 – Rollout of DIDET Library:

Commenced August 2005, due to continue until February 2008 and beyond.

Dissemination to promote the use of the LauLima system continues both within and outwith the University of Strathclyde. On leaving the project, Lou McGill honoured commitments to present to the Open University and to the Dublin Institute of Technology. Caroline Breslin and Lou McGill also met with the Spoken Word project team at Glasgow Caledonian University to give an overview of the project and the LauLima system. In addition, Caroline Breslin and Andrew Wodehouse will be presenting at a Learning Enhancement Network Event being held at Strathclyde in March 2006.

Internally at Strathclyde, the Hotel School has registered an interest in using LauLima, we will continue to liaise with them as required to support their potential implementation of the system. The DIDET team is also supporting staff in the Information Resources Directorate who are now using LauLima as part of an ESRC funded project to establish a multi-disciplinary knowledge network to study the impact of higher education institutions on regional economies. This project is being led by

the Centre for Public Policy for Regions [1] who are working collaboratively with the Universities of Strathclyde and Glasgow. A version of the LauLima system has now also been installed in the Department of Mechanical Engineering at Strathclyde. It will be used to support a help facility for WebCT users at the university.

All potential users of LauLima are asked to assist with the development of use case scenarios, these will be developed when the individual use cases are at a suitable stage.

The LauLima system will shortly be made available for download via the DIDET website. (See the list of objectives for the next reporting period in Section 9) It is still intended to record details relating to downloading of the software so that we can analyse how many downloads are made, from where, and so on. We will also request that those using the system cooperate with the production of use case scenarios so that we are able to use this information in our final 'roll-out' of models of use of the tools.

WP12 - Evaluation:

Commenced March 2003, continuing until February 2008

Evaluation continues in the classroom through observation, class questionnaires and polls, reflective blogs, examination of student material on the LLE, student and staff debriefing sessions and student team interviews. For details of evaluation undertaken in this reporting period, please see Section 11. The DIDET team is also currently reviewing its evaluation strategy – see objectives for the next reporting period in Section 9. This review is being undertaken by both US and UK team members.

WP13 – Digital Libraries in the Classroom Dissemination:

Members of the DIDET team attended the joint dissemination meeting for the Digital Libraries in the Classroom Programme on 25 October 2005. The dissemination contact for DIDET is Caroline Breslin who will attend the next joint meeting scheduled for 28 and 29 March 2006 at Ross Priory along with others from Strathclyde. In addition, DIDET will be represented at the recently accepted workshop at the European Conference on Research and Advanced Technologies for Digital Libraries (ECDL) in September 2006. See Section 15 for a full list of dissemination activity.

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[1] http://www.cppr.ac.uk/

4. Project Management

At Strathclyde Lou McGill left the project to join JISC on 30 September 2005. She was replaced on 14 November 2005 by Caroline Breslin (at 0.8 FTE) who took on Lou's responsibilities for project management, dissemination coordination and information specialist support.

Andrew Wodehouse, although still engaged fully in DIDET is now wholly funded by the University of Strathclyde.

There were no changes to project management arrangements during the period.

A successful request was made by Strathclyde to re-profile their budget in September 2005.

5. Programme Support

Contact is being maintained with Steve Griffin (NSF) and Susan Eales (JISC).

Strathclyde is involved with the dissemination activity across all four digital libraries in the classroom projects and is helping to organise the meeting at Ross Priory near Glasgow on 28/29 March 2006.

Strathclyde is involved in a large (£3m) EPSRC funded Grand Challenge project entitled *Immortal Information and Through Life Knowledge Management* involving 9 UK Universities. The project is led by the University of Bath. Strathclyde's input to the project is focused on the use of preserving useful information in digital libraries within a distributed team environment.

Stanford are still in regular discussion with the SMETE team at UC Berkley and the Informedia Team at CMU.

Informal discussions continue with a wide range of design educators in the US, Europe and Japan.

6. Risk Analysis

The risk analysis submitted as part of the project plan in September 2003 remains valid. No substantial problems have occurred during the reporting period.

The project has developed a good understanding of legal issues related to its work. We have liaised effectively with JISC Legal [2] for advice and confirmation of good practice.

Strathclyde continues to expend considerable effort in educating students of the law on digital copyright. There continues to be a reduction in inappropriately scanned and copied material used in the LLE. In any case, resources accepted for inclusion in the (more formal and permanent) LDL are subject to a strict approval process.

7. JORUM

DIDET currently has no plans to deposit any outputs of the project in the JORUM repository. The main output of the project is not learning and teaching materials but the infrastructure (i.e. the LauLima system) which will be made available from the DIDET website. It could be possible to

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[2] JISC Legal Information Service
http://www.jisclegal.ac.uk/

provide links from LauLima to items deposited by others in JORUM should this be of benefit to users. The progress of JORUM following its launch at the end of January 2006 will be monitored by the DIDET team and should any of our teaching and learning materials be considered to be of value to the wider higher and further education community then we will aim to use JORUM as a repository tool for sharing them.

8. Budgets

Strathclyde

Stanford

Section Two

9. Project Outcomes

9.1 Progress against key objectives

Progress is reported below for each key objective as proposed in the last 6 monthly report.

▪ Investigate options to integrate and embed LauLima and other software tools to support collaborative team based project design work into the wider University of Strathclyde electronic learning environment, which includes the Pegasus Student Management system and the WebCT virtual learning environment. Contribute to the development of the University of Strathclyde's e-learning strategy and ensure that DIDET activities inform and complement the direction of the strategy.

Andrew Lynn has worked successfully with the Applications Division of IT Services to integrate LauLima with Strathclyde's staff and student information system, 'Pegasus'. Functionality has been developed to allow users who are logged into Pegasus to link directly to LauLima without having to re-authenticate. This functionality has been tested extensively and is successful for all commonly used PC browsers. There are 2 Mac browser versions, however, for which there are problems. Andrew is working to resolve this before rolling out the integration functionality to all users.

Some investigatory work was also carried out relating to the integration of LauLima with WebCT – the university's central VLE. WebCT is proprietary software, however, and there is currently no facility to enable authentication from WebCT into a third party application. Consequently we are not able to integrate the two systems at this stage. A link from WebCT to LauLima can be created, but users would have to re-authenticate. Andrew has asked the VLE team to be kept informed of any WebCT developments at Strathclyde that may allow integration functionality to be developed in the future.

The DIDET project has an increasingly high profile within Strathclyde; we are being contacted by IT Services with news of developments within their department that may influence us. We have also been invited to present at an event being organised by Strathclyde's 'Learning Enhancement Network' to highlight the range innovative practice in teaching and learning through technologies that is taking place across the university. This event also includes a plenary session on development of the university's Teaching and Learning Through Technologies Strategy. The LauLima system has been installed by the Mechanical Engineering Department to support a help facility for the university's central VLE – WebCT. See next learning objective below.

Another development is that the 'Internet Communications' course run by the Centre for Academic Practice and Learning Enhancement is being re-designed for the start of the next academic year. We are investigating the suitability of using LauLima as one of the systems demonstrated to staff as part of this course.

▪ Offer the LLE tool to other departments within Strathclyde, Stanford and external UK institutions (possibly other DLIC projects). Ask any participating institutions to produce use case scenarios which capture the range of uses of the tool.

As is described in Section 3 under Workpackage 11, the Hotel School at Strathclyde, the Spoken Word Project at Glasgow Caledonian University, the Open University and the Dublin Institute of Technology have all registered an interest in using LauLima and have been briefed on the system and its potential use. LauLima is already in use elsewhere at Strathclyde; in the Information Resources Directorate (to be used with collaborators in the UK) and in the Department of Mechanical Engineering to provide a help facility for Strathclyde's WebCT users. The benefits of

LauLima will also be promoted at Strathclyde's Learning Enhancement Network Event in March 2006 where potential users will be given further information about the system and how to use it in their own departments.

As previously stated, all potential users of LauLima are asked to assist with the development of use case scenarios and these will be developed at the appropriate stage.

- Begin to develop a series of use case scenarios which illustrate how both the LLE and LDL can be used in the classroom. These will form part of the 'package' offered to other departments/institutions at the roll-out stage of the project.

As stated above for the previous learning objective, all those interested in using LauLima are asked to help produce use case scenarios. So far, we have had no objections from users and these will be written up when their level of use and experience of the system is sufficient to provide enough information. In the meantime we are maintaining a LauLima 'Use Record' on the LLE to record current and potential uses of LauLima in educational practice, from which the final use cases will be developed. The final versions will be developed in accordance with JISC use case templates. A use case relating to our use of the system in classes has been written up for and agreed with the LADIE project – Learning Activity Design in Education. This was to contribute to its aim of recording learning activity designs as a series of use cases; work being done in order to develop a learning activity reference model.

- Prepare a specification for the physical design environment to incorporate a space for students to work collaboratively, capture design data and for the research team to observe and record design activities.

This work was initiated by interviewing members of staff involved in the PDP class who identified the needs of the department and those specifically for the PDP class. A literature review was then undertaken into the area of distributed design, physical collaborative design environments and engineering design education, which identified that design education is unlike many other areas of learning in that it can only be taught through experience of carrying out the activity of design, while building on experiences and techniques from past designs. Collaborative environments that allow a team to work on the problem together with as few barriers to communication as possible are the most useful, this includes the use of shared whiteboards and large computer screens so that even the perspectives of the users are the same. While distributed design leads to a breakdown of these communication possibilities and so to poorer designs, in the past technology has been used to assist in the communication between the distributed parties. However due to technology shortfalls, in particular the lack of computing power and internet bandwidth, the desired results have not been achieved.

Using the literature to find possible solutions, a specification has been drawn up that will assist in design education. The specification looks at the two aspects of communication in distributed design; synchronous and asynchronous communication. The synchronous communication specified the use of video conferencing and shared electronic white boards. The asynchronous communication specified the use of email, logbooks, and data and information repositories. An experiment will be carried out to determine whether the specified solution is more effective for distributed design than a control that does not make use of the tools specified. From the experiment the tools will be assessed through means of focus groups to determine the usability and suitability of the tools. The experiment intends to show the degree to which the tools are most suitable. The last part of the project is to evaluate the tools for use in the PDP class and then set out a specification of tools to be implemented in the class, specifically in DMEM with regards to the facilities and space that will be available in the department. A code of practice for use in other distributed engineering design

education environments will also be drafted. A short summary will be written speculating on the influence that changing technologies will make on the specification.

- Develop guidelines for class management to include curriculum, teaching team support, evaluation and the production of learning materials, with a view to developing a new level 5 class based on distributed networked support design projects for Strathclyde.

This information has been written up in the form of a Module Descriptor Form (MDF) which was submitted to the Department of Design, Manufacturing and Engineering Management's teaching and learning committee at the end of January. This work has been built upon, as reported in Section 3, Workpackage 10, by developing the joint collaborative design project which will be an assessed part of this new class.

- Continue to design and implement small scale experiments between students at Stanford and Strathclyde.

A second DIDET distributed experiment took place in September/October 2005 – A team of three students from Strathclyde, and four students from Olin College in Boston were paired with two student teams in the Stanford ME310 Course to develop and race a paper bicycle. This two week 'paper bike' project was selected as a testbed for a globally distributed design class scenario. Each of the teams had a design coach who helped facilitate the use of the digital library resources. At the end of the exercise, members of each team participated in a focus group discussion and also filled out a questionnaire designed to learn more about their experiences. This key objective has also been addressed by work on the previous objective relating to the new collaborative global design project which will be part of the new level 5 class at Strathclyde. This will involve teams across Strathclyde, Stanford and Olin undertaking a global design project. Development of this collaborative global design project will continue up until the start of the academic year when classes begin. (October 2006)

- Devise guidelines and procedures for content management in the LDL. Populate the LDL with content from Strathclyde and Stanford with a view to seeing if the two institutions should use the same selection criteria, procedures, workflows, etc.

A significant amount of work has already been carried out relating to the workflow for digital library content management. This has been condensed into a one page guideline for staff who wish to submit content. The implications of sharing a database between the US and UK institutions has been considered and discussed by the team. The option of a shared digital library hosted at Strathclyde or Stanford was considered. Stanford were happy to share Strathclyde's existing digital library but stressed that they would need to have control over what they could submit and retrieve. This conflicts with the UK's more stringent copyright and data protection laws, therefore an arrangement was agreed whereby each site would have their own digital library but would allow the other site access to the content. Andrew Lynn has confirmed that this is technically viable and he will work to implement this in time for the LDL to be populated sufficiently for the new collaborative global design project. This simplifies not only legal issues but mitigates the risks of one site being responsible for the other's data, e.g. each site is responsible for its own security, resilience, liability, and so on. By populating their LDL, Stanford will be able to assess in practice whether our selection criteria, procedures and workflow are appropriate for their use. The only procedure which may cause an issue for Stanford is that our final approval of content into the LDL is carried out by an information specialist in order to check for quality, legality of content and appropriate metadata, etc. We have not yet established if/how they will carry out an equivalent process given the less restrictive copyright and information legislation in the US. This proposed arrangement applies to the

LauLima Digital Library (LDL); the LauLima Learning Environment (LLE) will continue to be hosted by Strathclyde.

9.2   Project progress, development and lessons learned

As reported earlier there have been no significant changes to project plans or barriers to project progress.   DIDET continues to build on strengths in learning literacies, dissemination, tools development, deployment in the classroom and evaluation. We have made good progress with promoting both the system and the classroom model in the university and beyond. We continue to collaborate well with Stanford and Olin, and have overcome the barriers to joint course development by beginning to develop joint *elements* of courses at the three institutions. Please see Section 10 on Intellectual Property Rights for details of how the problem of US and UK differences in information legislation are being overcome.

9.4   Objectives for Next Reporting Period

The DIDET team's key objectives for the next reporting period, March 2006 - August 2006, are listed below.

1. LDL Resources
    Build up a sufficient number of resources to allow evaluation of the LDL to begin. These resources will include a suitable number to support Strathclyde's new level 5 class and the corresponding collaborative global design project with Stanford and Olin. Further examine and, if possible, improve existing workflow for LDL population; concentrating on the point at which resources are actually identified and submitted into LDL to ensure that this becomes embedded in existing processes and practice.
2. New level 5 class at Strathclyde
    Complete development of the new level 5 class in Global Design, ready to begin at the start of the academic year in 2006. This includes the full development of the syllabus and teaching materials, as well as setting up the collaborative global design project between Strathclyde, Stanford and Olin College that is part of the class. Procedures must be in place to support the US/UK collaboration, such as system changes, weekly working plans, etc.
3. Project Website
    Re-launch project website with improved template design, updated information and links to wiki pages to demonstrate some aspects of the LauLima system in practice. Updated content must also include all dissemination material to date, both for the DIDET project and for the joint Digital Libraries in the Classroom Programme dissemination that is currently underway.
4. Distribute Software
    Make the LauLima system software available to the worldwide community for immediate download and disseminate this information, for example using a JISC news item or OSS-Watch Service announcement. Have procedures in place to collect information on the use of LauLima so that we can report on its roll-out and continue to write up use cases and case studies for dissemination purposes.
5. Evaluation Strategy
    Further develop the project evaluation strategy; continue to work collaboratively with Stanford and Olin on this and agree a way forward to aid evaluation for the remainder of the project.

10. Intellectual Property Rights

Intellectual Property Rights and Digital Rights Management remains an area where DIDET would make use of lessons learned from other DLIC projects. The continuing work of the JISC on DRM is proving useful in informing rights metadata development. During this reporting period, we have overcome the problem of differences in UK/US legislation by making Strathclyde and Stanford responsible for their own digital library content. We hope to keep the workflow and procedures consistent despite this divide and each site will have seamless access to the other's content. We will report on any effects from the result of this decision and will continue to feed back any lessons learned in this area. The DIDET team has also used the JISC Legal service to great effect, they have assisted by offering advice relating to the student copyright form now signed by all student teams who use LauLima and whose work may be stored in the digital library. To date there have been no issues whatsoever with students signing the forms and agreeing that their work may be stored in the LDL for research, teaching and learning and any other non-commercial purposes. In addition, JISC Legal has offered assistance with establishing good practice when using photographic and video images containing student images. Again, no issues have been encountered in this matter.

11. Evaluation

Evaluation is an ongoing element of the project (Workpackage 12). Results of evaluation work are being regularly published (see Section 15 on Dissemination) Evaluation carried out during this reporting period is detailed below.

Evaluation at Strathclyde

Product Development Partnership (PDP) - A reflective blog was issued to the students in these 4th and 5th year team-based industry linked projects at the end of Milestone 1, as per last year. Students were asked to reflect in open text format on what had been learnt in the areas of team communication, team and project management and project information and resources and to think on how they might make improvements to their recent experiences. Responses are currently being analysed and will be fed back across the student teams during the remainder of this year's class. Team coaches (formerly supervisors) also provide formative feedback to students on their organisation and development of project resources within the team wiki sites.

Integrating Design Project 1 (IDP 1) - At the end of this six-week 3rd year team project to prototype a fruit squeezing device, students were asked to respond to a questionnaire focusing on the storing of information and their use of the digital library during the project. Results are being analysed. Following the assessing of student presentations and team wiki sites, students are taking part in a reflective feedback session highlighting good practice and lessons learnt. Good resources from all team wiki sites were also identified at the assessment stage by coaches and earmarked for inclusion in the digital library as valuable re-usable resources for the next cohort of IDP 1 students. This process is informing the digital library workflow and related processes.

Collaborative Experiment II, Collaborative Exercise – Paper bike

A collaborative distributed exercise was run from 29 September 2005 - 14 October 2005 which involved design teams from Strathclyde, Stanford and Olin developing and racing a paper bicycle. Evaluation was undertaken collaboratively with Strathclyde, Stanford and Olin. Strathclyde carried out a focus group, Stanford a questionnaire and Olin a wrap-up. The focus group identified issues relating to training, importance of videos and pictures in developing shared understanding, physical and technical set-up (including props), value of impromptu meetings, time difference, 'awareness', cultural aspects and lack of time to undertake project management. Results are being used to feed into future collaborative global design project activity on the project.

Evaluation at Stanford

Collaborative Exercise (paper bike) - carried out jointly with Strathclyde (see above).

Stanford conducted the questionnaire issued to all participants. In addition to a Stanford-Strathclyde team, Stanford undertook a Stanford-Olin team. Major findings were that browsing was generally preferred to searching in Informedia; the potential impact of the coach on library use seemed to be high; and the Stanford-Olin team used Informedia heavily at three stages of the exercise, for inspiration initially; for specific ideas later on and at the end for reflection. Again, results are being used to feed into future collaborative global design project activity on the project.

Future Plans

As listed in our next set of objectives in Section 9.4, the DIDET team intends to further develop the project evaluation strategy. This will entail a review of what has been achieved to date and planning work on how evaluation will progress. There is a good opportunity with the new collaborative global design project to gather baseline data from Stanford's existing class into which the project will be incorporated. We will then be able to compare the class before and after the new global design project has been implemented.

12. Number and level of classes involved in the project

University of Strathclyde

(i)   Integrating Design Project 1 (56314): 3rd year undergraduate student teams design a prototype for a domestic fruit squeezing device.
(ii)   Product Development Partnership: 4th and 5th year undergraduate student teams work to industry partner briefs through various product development stages.
(iii)   Formula Student Team: 1st to 5th year students from the departments of DMEM, Mechanical Engineering and Electrical Engineering work in a team to design, develop, build and race a car.
(iv)   Global Design Class proposed for 2006/2007: 4th and 5th year students learn the principles of global/distributed design, related tools and methodologies and participate in a globally distributed design project.

Stanford University

(i)   ME310, Tools for Team Based Design: 1st year graduate student teams work on industry sponsored design projects, producing a functional prototype, which is accompanied by text and video documentation.
(ii)   ME297, Design Theory and Methodology Forum: Graduate students investigate contemporary topics in engineering design research in a collaborative group environment.

Olin College

(i) Collaborative Distributed Design (proposed for 2006/2007): 3rd and 4th year undergraduate students participate in a globally distributed design project. Students are first exposed to state of the art knowledge on distributed teamwork frameworks, and upon completion of the project, revisit and evaluate their efficacy.

13. Teaching staff involved with the project

University of Strathclyde

- Dougal Cameron, Martin Bell, Arthur Slight, Visiting Professors, DMEM
  Industry-based design engineering experience (for PDP Class)
- Hilary Grierson – Research Fellow, Centre for Academic Practice and Learning Enhancement
  Global team design, internet technologies, online learning, DMEM design coaching
- Bill Ion – Head of Department, DMEM
  Product design engineering, virtual design studios
- Caroline Breslin – Project Manager, Learning Services
  Information management, e-learning, assisting with DMEM design coaching
- Angela Stone – Lecturer, DMEM
  Product design engineering, mechanical engineering, virtual design environments
- Avril Thomson – Lecturer, DMEM
  Product design, shared workspaces, global team design
- Andrew Wodehouse – Lecturer, DMEM
  Product design, gaming technologies
- Remi Zante, Alastair Conway, Ross MacLachlan – Research Staff, DMEM
  Design coaching

Stanford University

- Larry Leifer, Professor for ME 310: Tools for Team Based Design.
- Mark Cutkosky, Professor for ME 310: Tools for Team Based Design.
- Ade Mabogunje, Instructor for ME 397: Design Theory and Methodology Forum
- Malte Jung, Graduate Research Assistant, Mechanical Engineering Department
- Neeraj Sonalkar, Graduate Research Assistant, Mechanical Engineering Department

Olin College

- Ozgur Eris, Assistant Professor of Mechanical Engineering and Design, Olin College

14. Collaboration between project partners

As reported in Section 9, a two week collaborative distributed experiment was run in September/October 2005 which involved design teams from Strathclyde, Stanford and Olin developing and racing a paper bicycle. This served as a test bed for a globally distributed design class scenario with focus group and questionnaire results are being used to feed into future collaborative global design project activity on the project.

The US and UK teams are also working collaboratively on a joint paper which was submitted to the ASME International Design Engineering Technical Conference which will be held in Philadelphia, Pennsylvania, USA in September 2006. (See Section 15 on Dissemination)

As reported earlier in this document, the US and UK teams are now working together to develop the new collaborative global design project which will be an integral part of classes at Strathclyde, Stanford and Olin in academic year 2006/07.

15. Dissemination

UKERNA has accepted an application for a new domain name for the DIDET project: http://www.didet.ac.uk and this new URL is already in use. The project team feel that this URL is more intuitive than the one previously used and reflects the project's relevance to the whole education sector. In line with our stated objectives for the next reporting period, the website will be re-launched with some improvements to design and the content will be updated to reflect the project's progress. The website will also be used to distribute the LauLima software to interested parties. Although we will not be able to provide direct technical support to sites who wish to use the software, we will use the website to publish documentation, information and frequently asked questions. We will also link to a DIDET supported user forum where users can discuss issues and share experiences.

The following papers have been written and published/presented:

1. Grierson, H., Wodehouse, A., Ion, W.J., Juster, N., 'Supporting Reflection and Problem-based Learning through the use of LauLima', *3rd Engineering and Product Design Education International Conference*, Edinburgh, September 2005.

2. Juster N; McGill L; Lynn A; Ion W; Grierson H; Wodehouse A; 'Integrating digital libraries within a learning environment to support the education of the global designer' *Proceedings of the China-Europe Engineering Education Conference 2005*, p 285-286 (full paper pp6 on CD) Chongqing, China, November 2005. ISBN 7-89492-592-6

The following papers have been accepted and are awaiting publication/presentation

1. Eris, O. 'Insisting on Truth at the Expense of Conceptualization: Can Engineering Portfolios Help?' to appear in the *International Journal of Engineering Education*, 2006

2. Wodehouse A, Grierson H, Ion W, Juster N. 'Search Behaviour in a Digital Library' Submitted to Engineering and Product Design Education Conference, Salzburg, Austria, September 2006.

3. Grierson H, Wodehouse A, Ion W, Juster N. 'Project Memory to Support Global Team-Based Student Design Projects' Submitted to Engineering and Product Design Education Conference, Salzburg, Austria, September 2006.

4. Grierson H, Wodehouse A, Ion W, Juster N. 'Building a Repository to support Engineering Design Education' Submitted to Engineering and Product Design Education Conference, Salzburg, Austria, September 2006.

5. Sonalkar N, Mabogunje A, Jung M, Eris O, Wodehouse A, Grierson H, Leifer L, Lynn A, Juster N, Ion W. 'A Conceptual Framework for understanding the Impact of Digital libraries on Engineering Design Learning Performance', Submitted to ASME International Design Engineering Technical Conferences, Philadelphia, Pennsylvania, USA, September 2006.

As referenced earlier, Caroline Breslin and Andrew Wodehouse will be presenting at the University of Strathclyde's Learning Enhancement Network Event to disseminate DIDET's work as an innovative use of teaching and learning technologies at the university.

Caroline Breslin has also agreed to participate in the 'Embedding E-learning' workshop that was proposed by Susan Eales and Hugh Davis for the Tenth European Conference on Research on Advanced Technology for Digital Libraries (ECDL-06), to be held in Alicante, Spain, September 17-22, 2006.

Plans are to continue publishing findings at conferences and in journal articles in each of the key areas of design education, educational technology, information literacy, digital libraries, and systems development. There are other specific events for which the team plans to submit publications, such as ALT-C in Edinburgh in September. Project team members feel that we have achieved very good coverage with conference publications to date and that we would now like to focus particularly on journal papers.

16. Embedding within the institution

The DIDET classroom model and the LauLima software continues to be used in classes in the Department of Design, Manufacturing and Engineering Management at the University of Strathclyde. As detailed in previous sections of this report, there has also been significant interest in the project and the LauLima system at an institutional level; we have been invited to present on the project, its technology and the classroom model at an internal event to enhance learning and there are other departments already using the software.