Centre for Excellence in Teaching and Learning for Employability (e3i)

HEA Seminar at Sheffield Hallam University
12 May 2010

Volume 2: Supplementary Materials

Sheffield Hallam University
SHARPENS YOUR THINKING

Contents

GRADUATES' PERSPECTIVES ON THE INFLUENCE OF HIGHER EDUCATION ON THEIR EMPLOYABILITY

SURVEY RESULTS

Table 1 - Where do graduates perceive skills to be learnt best?

	Academic environment	Work environment	Could be learnt equally well in either
Adaptability / flexibility	5 (3%)	80 (48%)	78 (46%)
An interest in life-long learning	80 (48%)	10 (6%)	75 (45%)
Imagination / creativity	44 (26%)	14 (8/%)	107 (64%)
Independent working / autonomy	33 (20%)	37 (22%)	97 (58%)
Working in a team	7 (4%)	61 (36%)	100 (60%)
Managing others	5 (3%)	124 (74%)	36 (21%)
Working under pressure	16 (10%)	38 (23%)	114 (68%)
Oral communication skills	27 (16%)	36 (21%)	105 (63%)
Written communication skills	96 (57%)	7 (4%)	6 (39%)
Numeracy skills	92 (55%)	14 (8%)	62 (37%)
Attention to detail	41 (24%)	21 (13%)	106 (63%)
Time management	18 (11%)	44 (26%)	105 (63%)
Decision-making	9 (5%)	77 (46%)	82 (49%)
Taking responsibility for your learning	81 (48%)	12 (7%)	72 (43%)
Planning	32 (19%)	19 (11%)	116 (69%)
Problem solving	10 (6%)	31 (19%)	126 (75%)
Using new technologies	36 (21%)	24 (14%)	108 (64%)
Presentation skills	88 (52%)	9 (5%)	70 (42%)
Information gathering skills	93 (55%)	6 (4%)	69 (41%)

Table 2 – Skills and attributes which alumni would have liked more opportunities to develop

	Number of respondents	%
Managing others	84	50.0%
Using new technologies	60	35.7%
Presentation skills	55	32.7%

Oral communication skills	46	27.4%
Decision making	43	25.6%
Time management	40	23.8%
Information gathering skills	38	22.6%
An interest in life-long learning	37	22.0%
Working under pressure	37	22.0%
Planning	35	20.8%
Imagination / creativity	34	20.2%
Written communication skills	31	18.5%
Taking responsibility for your learning	31	18.5%
Problem-solving	30	17.9%
Adaptability / flexibility	29	17.3%
Numeracy skills	29	17.3%
Attention to detail	29	17.3%
Working in a team	28	16.7%
Independent working / autonomy	18	10.7%
No reply	18	10.7%

Table 3 – Career management skills - how prepared did graduates feel?

	Not at all prepared	**Not very prepared**	**Neither / nor**	**Quite prepared**	**Fully prepared**	**Don't know / not applicable**
The skills for CV writing	27 (16%)	30 (18%)	27 (16%)	52 (31%)	23 (14%)	9 (5%)
The challenges of finding a job	25 (15%)	41 (24%)	25(15%)	42 (25%)	21 (13%)	13 (8%)
The skills needed in a job interview	26 (16%)	33 (20%)	34 (20%)	57 (34%)	10 (6%)	8 (5%)
The skills required to do your job	7 (4%)	18 (11%)	23 (14%)	84 (50%)	32 (19%)	4 (2%)

Table 4 – Which aspects of CMS would alumni have liked more assistance in?

	Number of respondents
Identifying opportunities in the graduate job market	100 (60%)
Researching careers and employers	95 (57%)
Understanding what employers want from interviews	93 (55%)
Understanding different routes into employment	92 (55%)
Tailoring your CV to different roles	91 (54%)
Preparing for an interview	83 (49%)
Deciding what to include in a covering letter	79 (47%)
Deciding what to include in a CV	77 (46%)
No reply	12 (7%)

Table 5 - Do graduates have an interest in continuing their professional development?

	Strongly disagree	**Disagree**	**Neither / nor**	**Agree**	**Strongly agree**	**Don't know / not applicable**
I want to continue learning new skills and increasing my knowledge as part of my personal development	12 (7%)	23 (14%)	10 (6%)	40 (24%)	80 (48%)	3 (2%)
I take an active interest in my continuing professional development	11 (7%)	21 (13%)	17 (10%)	43 (26%)	73 (44%)	3 (2%)
I feel able to identify opportunities for my future career progression	10 (6%)	43 (26%)	33 (20%)	53 (32%)	18 (11%)	9 (5%)
While at university, I had plenty of opportunities to gain work experience (e.g. placement, paid / unpaid work)	21 (13%)	43 (26%)	20 (12%)	39 (23%)	25 (15%)	20 (12%)
I have a clear plan of how I am going to achieve career development and progression	18 (11%)	46 (27%)	37 (22%)	39 (23%)	19 (11%)	7 (4%)

Progress Files in Mathematics at Sheffield Hallam University

Jeff Waldock

Abstract

BSc Mathematics students at SHU are required to complete an electronic Progress File comprising a portfolio of work - in the form of a personal website - and a reflective logbook. In their logbook students provide regular entries for each module in which they reflect on their learning, identify what is going well and problems that need to be resolved. They are encouraged to develop an action plan to address the problems they have identified, and report progress made towards resolving them. They are also encouraged to raise issues in the logbook that staff can respond to quickly, thereby helping to develop an active, supported, learning community.

Background

There is a considerable body of research literature supporting the claim that both student achievement and the development of graduate employability skills are enhanced by the inclusion within the curriculum of structured processes that develop the ability for self-reflection. Students should be able to identify their strengths and weaknesses, formulate strategies for addressing the weaknesses and plan for their own personal, educational and career development. This applies to all academic disciplines, but perhaps has more impact in Mathematics, where students may have less well-developed skills of articulation.

Discussion following the Dearing and Garrick Reports in 1997 resulted in a recommendation that all HE degree courses should include a Progress File, defined in two parts as

- "*a transcript recording student achievement which should follow a common format devised by institutions collectively through their representative bodies,* and
- *a means by which students can monitor, build and reflect upon their personal development (termed Personal Development Planning in the consultation paper)*" [2]

More recently the Burgess review (2007) [3], recommended that "*by academic year 2010/11 a Higher Education Achievement Report (HEAR) will replace the transcript as the central vehicle for recording all undergraduate student achievement in UK HEIs. It will contain a wider range of information than the existing transcript and will capture more fully the strengths and weaknesses of the student's performance. Further work should be done on how to measure and record skills and achievements gained through non-formal learning but this, along with other student-generated/driven information, should be part of Personal Development Planning (PDP).*"

The increasing importance attached to the *additional* skills students should be gaining at University, over and above their course-specific skills, is further emphasised by the '*Higher* Ambitions' report, release by the Department for Business, Innovation and Skills in November 2009:

"But it is a top concern for business that students should leave university better equipped with a wider range of employability skills. All universities should be expected to demonstrate

how their institution prepares its students for employment, including through training in modern workplace skills such as team working, business awareness, and communication skills. This information should help students choose courses that offer the greatest returns in terms of graduate opportunity." [5]

Further support for this view comes from the students themselves. The National Student Forum, 2009 Annual Report [4], which calls for Universities to:

- monitor and formally record students' broader learning
- increase resources for, and promote of the use of, personal development plans
- provide optional modules/classes that consider how the skills and knowledge are developed

There is clearly a shared view amongst stakeholders that Progress Files – and the process of reflection and action planning – is of increasing importance in raising students' ability to recognise, develop and articulate their skills.

Implementation

The Mathematics programme at Sheffield Hallam University has since 2001 incorporated a web-based Progress File system. Unlike some other e-PDP approaches, in which student reflection takes place only once or twice per semester, the SHUMaths system requires students to engage with the reflective progress on a continuous basis. Every student is expected to provide reflective entries in their Progress File for each module at least weekly - and they receive academic credit for doing so.

The use of the on-line Progress File system has spread somewhat beyond the maths course itself - during the last complete session (2008-9) there were 368 students from 9 courses involved, contributing a total of 24,932 entries and nearly 2 million words. This year two new courses have adopted the system, bringing the number of students involved to 415. In the first seven weeks of the current session over 11,000 entries have already been made.

In year one, students are expected to make entries for each module at least weekly. These entries are assessed, and provide 20% of the mark for one module. Each student receives simple weekly feedback, in the form of a mark awarded against published assessment criteria. At the end of the year students provide a longer reflective summary of their development over this time, for which they receive fuller email feedback.

In year two students continue as above, but the entries are marked every other week with the marks again contributing towards a core module. The logbook marks comprise part of a general employability element of assessment in this module, as students prepare to apply for an industrial work placement.

In the final year, the logbook assessment is built into the Project module, comprising 5% of the 30 credits available. This keeps the Project work higher on students' list of priorities and helps tutors to track progress.

Although entries made by each student are hidden from other students, all are visible to staff, with the system providing many views of the data. Staff can view all entries by a particular student, all entries for a particular module or simply the latest entries. Students quickly develop a culture of topping up their logbook entries at every opportunity, and so this last approach provides an extremely useful way for staff of getting feedback on lectures,

for example, within hours of delivery. It also means that as a member of staff, you get a very clear idea of how your module material is being received across the whole group, and whenever a problem starts to occur it can be dealt with very quickly. This may mean modifying the way the module is delivered – which can take place starting with the very next class – or it may be a simple matter of responding to a student question. Since the system provides an easy way to reply to a student entry by email, this can be done very easily. It is much more effective than relying on staff-student meetings to gather feedback on the progress of the course – for one thing, it's much more immediate, so problems can be dealt with before they become serious. For another, it's much more representative – all students can provide comments, even those who might not otherwise have the confidence to contact staff.

Evidence of Success (Impact)

The system has been running now for eight years. At the end of each year, first year students are asked to provide a summative review and feedback of the system, for which they receive some logbook credit.

The results of this feed into the action plan for developing the system for the following year. Some selected students comments are shown below:

1. **Positive comments**

   "While I was writing something that I was afraid of, I was becoming stronger and with more courage to face all my problems."

   "I have found this progress file very useful throughout the year, in helping me to record my thoughts and feelings on all the modules, I have also found it useful in helping me to organise my time better by finding where my weaknesses and strengths are so I am able to see where I need to concentrate most on."

   "I also think that the progress file has helped me to develop my communication skills and to become more confident in talking about my own work and feelings on the course. It also allows you to see for yourself how you have progressed, or dealt with any personal problems."

   "The online progress file has been a huge help in making the jump from being in a 6th form to university. It forces you, once a week, to actually think about what you have done and what you still need to do."

   "From my positive comments, I was able to build on these as well as feel confident about the work. From my comments that showed I was struggling, looking back made me realise what I needed to do to improve and also build on aspects where I had problems. I could do this by giving myself targets and this is a way of recording them."

   "The logbook, looking back now, has made me realise how much I have improved, particularly in my computer skills."

   "Talking about myself the first thing that I thought it was that it would be terrible due of my problem that I faced in English language. As the year passing, day by day I was feeling more confident to write everything that I wanted to ask or everything that I wanted just to say."

"I feel that this online diary has been a good way of looking back on how you feel you have been coping throughout the year."

"It also lets me see how I felt at the beginning of the year about the course and compare to how I feel now."

"it was a way to express my feelings without thinking of what my teacher will think about me. I like this very much and makes me more strong because when a teacher send me an email as a reply of what I wrote in the logbook I fell that our teacher really care about our progress."

2. Negative comments

"... sometimes I would be writing in the logbook just for the sake of writing in it because I knew if I didn't I would lose marks."

"... I expected responses sometimes but didn't always get them which made me question whether some lecturers actually read the progress files."

"Why should it deserve marks? At degree level, is documenting the request for help a valid allocation of the marks?"

Student perceptions of the most important benefits and problems:

	2005	2006	2007	2008	2009	All years	
Out of:	27	13	26	19	30	**115**	
Benefits							
Planning and meeting deadlines, being organised	19	7	7	7	19	**59**	51%
Assessing understanding and reflecting on it	9	6	10	13	17	**55**	48%
Receiving replies from and communicate with lecturers	11	4	13	7	13	**48**	42%
Recording work done	4	5		10	12	**31**	27%
Gaining a view of progression over the year	8	2	4	4	10	**28**	24%
Express feelings	6	1	7	5	6	**25**	22%
Problems							
Every week is too much - may be nothing to write	12	3	8	11	19	**53**	46%
Lack of feedback, all tutors should read the comments	2	2	14	6	6	**30**	26%
Too time consuming, tedious	13	4	2	3	2	**24**	21%
Forget to fill it in	7	4	3	2	5	**21**	18%
Not relevant for me, unnecessary	5	1	4	1	2	**13**	11%
Shouldn't be compulsory	1		3	1	3	**8**	7%

A further measure of success – albeit an indirect one – comes from the results of the National Student Survey [6]. The last three of the 21 specific questions address students' personal development:

Q19: This course has helped me present myself with confidence,
Q20: My Communication skills have improved,
Q21: As a result of the course, I feel confident in tackling unfamiliar problems

In 2008, the scores for Mathematical Sciences at SHU was 91%, 91% and 94% for these three questions, respectively. In 2009, the scores increased to 95%, 95% and 97% respectively.

Nationally, Mathematical Sciences at SHU has been ranked 1st for this area in each of the last three years 2007-9.

Benefits, barriers and enablers

Embedding personal development planning in the curriculum through the use of e-Progress Files benefits students by developing their ability to

- reflect on their learning, identifying what went well or badly - and why;
- manage their time more effectively
- identify problem areas, develop a strategy to deal with them and report on progress made towards its implementation;
- develop skills in self-appraisal;
- take control of their learning;

An important benefit for students is also receiving personal feedback from staff in response to their comments and questions. The students' own comments, summarised above, provide evidence that this is the case.

For students, the main barrier to effective participation is their commonly held initial view that it is unrelated to their course, and lack of clear understanding of its purpose. The first of these difficulties can be addressed by engaging students in a shared discussion around what it might take to make them a more effective student, and raising their level of achievement. This way, they should realise that this will inevitably involve a process of self-evaluation, reflect and action planning to improve their performance – and that the Progress File framework represents a vehicle for achieving this. If they reach this conclusion themselves, it should follow that they are more likely to engage with the system.

The second difficulty can be tackled both by a clear explanation, repeated as necessary, of the purposes and benefits of the process of self-reflection, and by seeing (through trying it out) that it does in fact work. Once a student finds that they gain a real benefit from the system, their engagement should improve.

For staff the principal barrier is the extra time required to read and respond to comments (and to assess the entries). Although staff perception is that regularly reading and responding to the latest comments is quite time consuming, this can actually be done very easily because of the way the system is set up. Furthermore, this is offset by the benefits that follow from the rapid resolution of problems - improved retention, student satisfaction and engagement and the development of a shared community of learning.

Recommendations for others

From the experiences at SHU, there are a number of important features that an e-PDP system should have in order for it to work effectively:

- A key staff **champion** is needed to take responsibility for developing the system, and for selling it to all participants.
- It needs to be very **easy to use** (both for staff and students).

- It also needs the **active engagement of staff**. Students clearly perceive the logbook as having more value if they receive prompt replies or feedback to their entries.
- Although students understand the importance of developing employability skills, they prioritise their work according to credit received, so it is important that the logbook entries are **assessed**.
- The system needs to be **embedded into the curriculum**, becoming an important element of normal academic activity on the course.
- The **process** is more important than the tool used. Student engagement is the key and PDP should not become a tick box activity.
- Students are active partners in learning, and the purpose of each activity should be **explained and justified** to them. Progress Files are no exception!

References:

1. PDP in BSc Mathematics at SHU, e3i CETL Case Study, http://employability.shu.ac.uk/casestudies/JeffWaldock.pdf, last accessed 15/11/2009
2. Developing a progress file for HE: summary report of the consultation exercise, http://www.qaa.ac.uk/academicinfrastructure/progressFiles/archive/summary/default.asp, last accessed 15/11/2009
3. "*Beyond the honours degree classification*", the Burgess Group Final Report, October 2007, http://www.universitiesuk.ac.uk/Publications/Documents/Burgess_final.pdf , last accessed 15.11.2009.
4. National Student Forum, Annual Report 2009, Last accessed 15/11/2009, http://www.nationalstudentforum.com/wordpress/wp-content/uploads/2009/10/NSF_annual_report_2009.pdf and http://www.nationalstudentforum.com/report2009/ideas/employability/
5. "*Higher ambitions - the future of Universities in a knowledge economy*", Department for Business Innovation and Skills, November 2009, http://www.bis.gov.uk/wp-content/uploads/publications/Higher-Ambitions.pdf, last accessed 15/11/2009
6. 2009 National Student Survey data, http://www.hefce.ac.uk/learning/nss/data/2009/

APPENDIX 1 – The SHUMaths e-Progress File System

Here are some screenshots to illustrate the system.

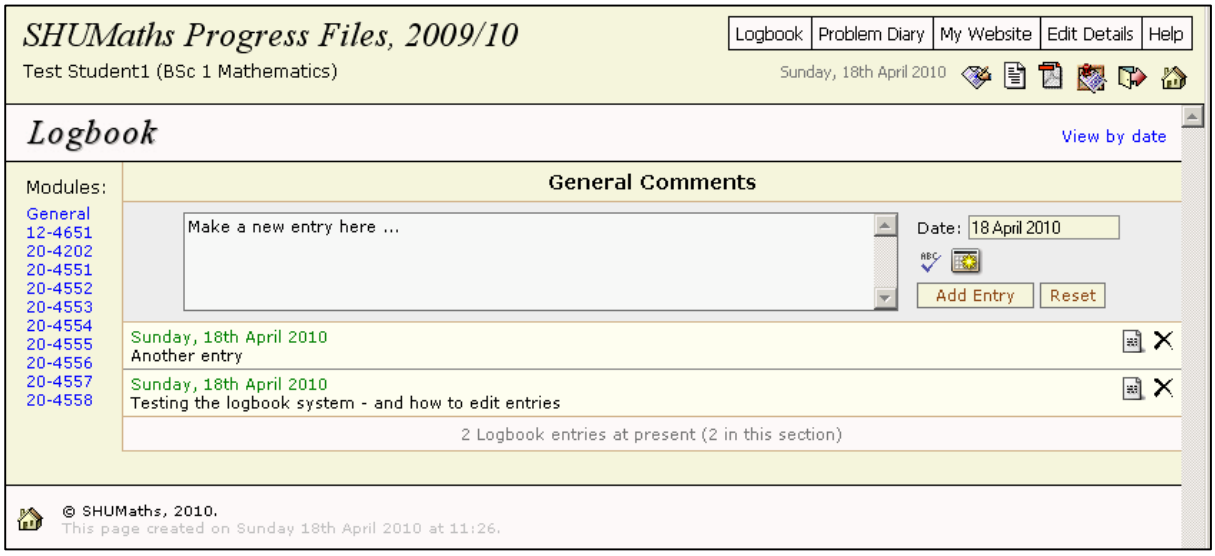
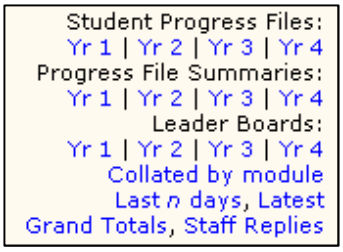


Figure 1: Student logbook entry form

Each module in their year of the course is listed on the left – all that's necessary if to select one and make the entry. A spell checker and date selector are provided. Students can obtain a PDF version of their logbook (for reference or archival purposes) by selecting the appropriate icon from the list at the top.

Staff are able to gain a variety of views of the logbook data. The image on the right summarises these, and some examples are shown below.



The first shows a tabular summary of all students in each year, giving details of the number of entries made for each module and the date of the last entry:

SHUMaths Student Progress Files 2009/2010

Summary for Year 1

Sunday, 18th April 2010 at 12:01

Name	Gen	12-4651	20-4202	20-4551	20-4552	20-4553	20-4554	20-4555	20-4556	20-4557	20-4558	Lang1
Student 1235	2 25 Feb	7 25 Feb	0 -	1 11 Nov	4 18 Mar	6 18 Mar	4 18 Mar	4 17 Dec	0 -	0 -	1 18 Mar	0 -
Student 1141	7 19 Mar	21 12 Apr	1 26 Mar	14 14 Apr	22 14 Apr	18 28 Mar	17 14 Apr	0 -	0 -	0 -	0 -	0 -
Student 1142	4 28 Feb	31 17 Apr	7 10 Dec	31 17 Apr	32 17 Apr	32 17 Apr	32 17 Apr	0 -	0 -	0 -	9 17 Apr	0 -
Student 1143	9 04 Mar	29 17 Apr	14 24 Jan	26 17 Apr	39 17 Apr	28 17 Apr	33 17 Apr	0 -	0 -	13 08 Apr	0 -	0 -
Student 1144	1 11 Oct	21 11 Apr	12 24 Jan	21 11 Apr	25 11 Apr	21 11 Apr	21 11 Apr	0 -	0 -	0 -	9 11 Apr	0 -
Student 862	22 13 Apr	42 15 Apr	0 -	35 15 Apr	45 15 Apr	33 15 Apr	41 15 Apr	16 27 Feb	0 -	0 -	18 15 Apr	0 -
Student 863	0 -	0 -	0 -	1 19 Oct	12 22 Mar	1 12 Oct	1 12 Oct	0 -	0 -	0 -	0 -	0 -
Student 1105	2 17 Mar	4 17 Mar	0 -	4 17 Mar	3 17 Mar	2 17 Mar	2 17 Mar	2 15 Dec	0 -	1 17 Mar	0 -	0 -
Student 1146	8 30 Nov	20 24 Mar	8 30 Nov	15 24 Mar	12 24 Mar	10 24 Feb	10 24 Mar	0 -	0 -	4 24 Mar	0 -	0 -
Student 1147	37 14 Apr	33 15 Apr	0 -	38 15 Apr	40 13 Apr	38 16 Apr	26 13 Apr	0 -	14 17 Feb	23 14 Apr	0 -	0 -

Figure 2: Year Summary of all student entries

Each of the student names on the left is a hyperlink to that student's progress file summary. Clicking on 'Student 1148' for example, will give the following:

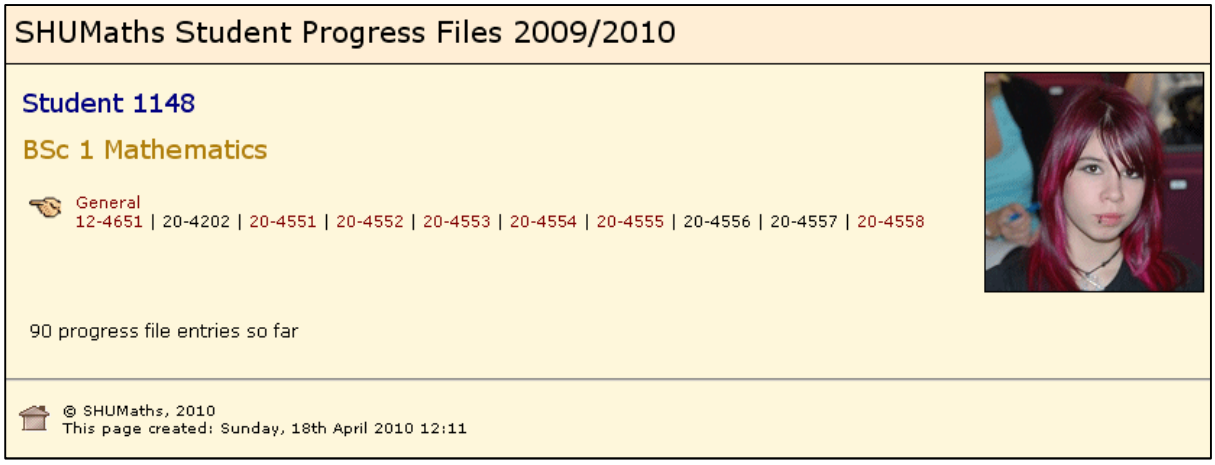


Figure 3: Progress File summary for an individual student

The links show which modules have entries (pausing the mouse over each will pop up details of the number of entries made in that module and the full module name). Clicking on one will list the relevant entries:

Figure 4: Progress file entries for one module for a specific student

The entries are listed in date order (latest first). The date is also a hyperlink to a reply form – allowing a member of staff to reply to this entry (see next page).

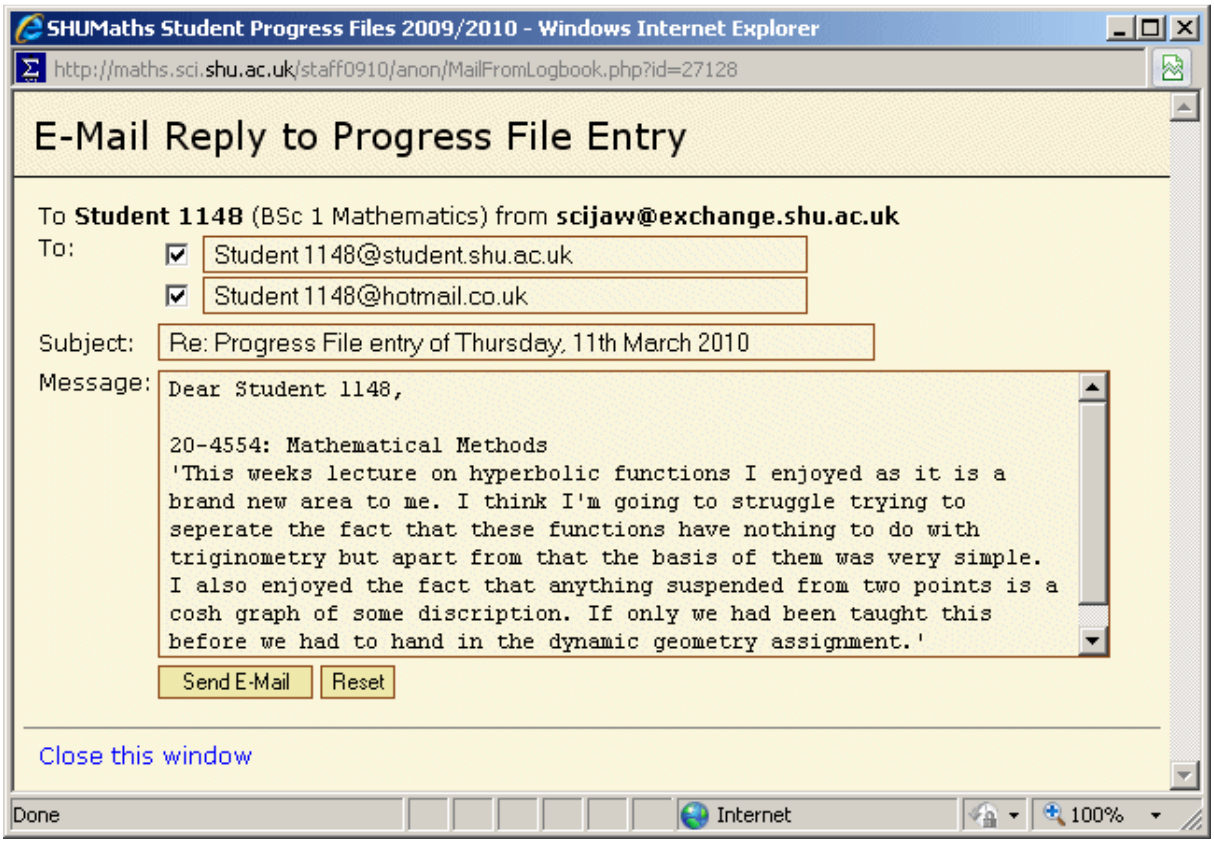


Figure 5: Email reply form, allowing staff to respond to individual entries rapidly

This window contains an e-mail reply form, which staff can use to answer a direct question or provide some help or advice if they feel it's necessary. The email addresses used comprise the default student email address but also include an additional email address, if the student has provided it. A record of messages sent is kept for review.

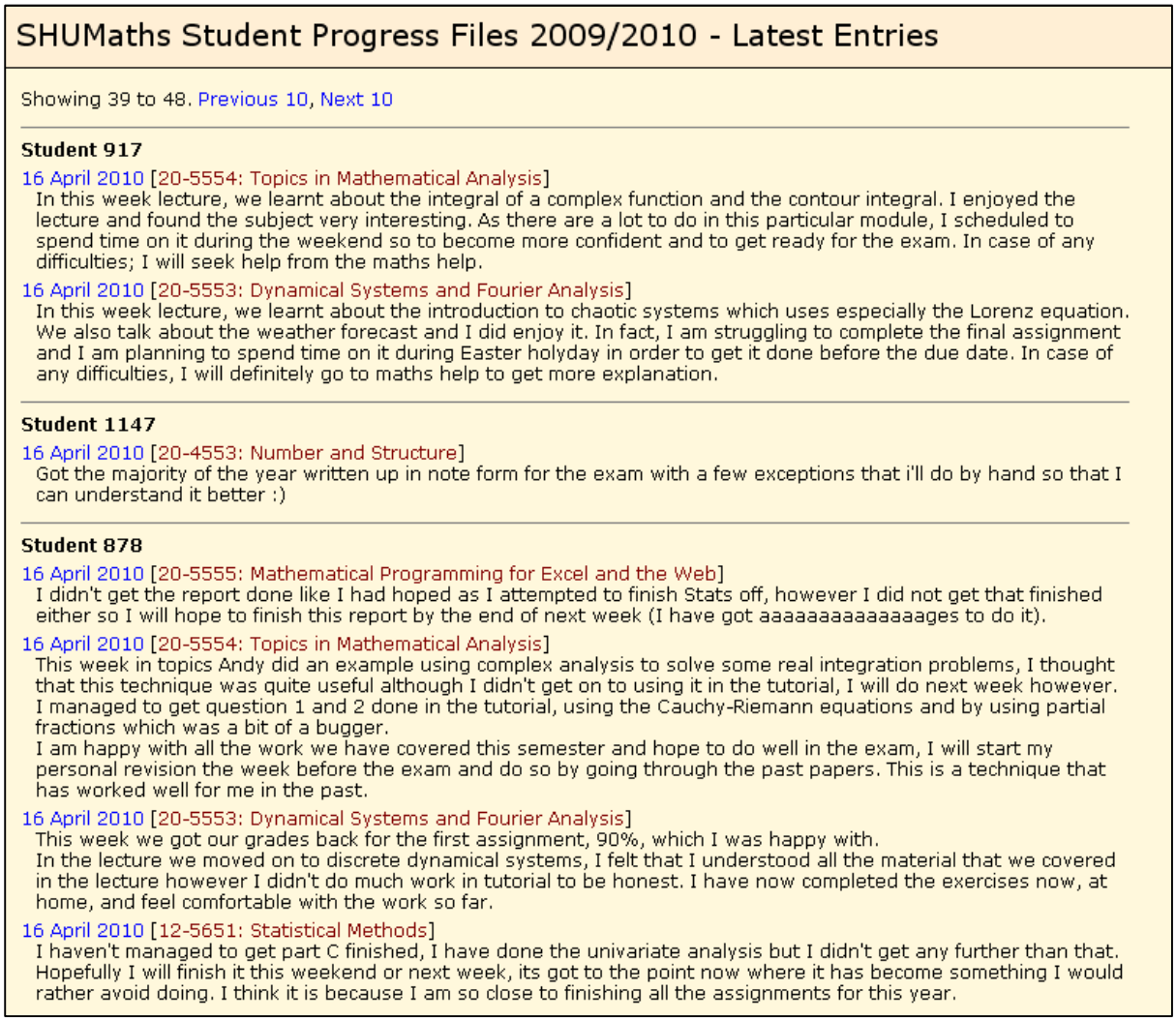
Latest Entries

The system provides a view of the latest entries, 10 to a page. Students get into the habit of using their logbook every time they are in a PC lab, so staff can frequently find comments about their classes within hours (sometimes minutes) of delivery. This can be very helpful in getting feedback on the classes, allowing changes to be made to content or style of delivery in time for the next class. Also, any problems can be dealt with – and hopefully solved – very quickly, allowing students to make more rapid progress through the material. This is particularly important in Mathematics, where if a student is stuck it is very hard for them to make any progress at all, and momentum (and interest) can be lost.

A screenshot of the 'latest entries' view is shown in Figure 6, over the page.

All entries during the last n days

Figure 7 is a screenshot of the 'last n days' view, useful for marking the logbooks. This helps by summarising all entries made during the previous period – default is 7 days.



SHUMaths Student Progress Files 2009/2010 - Latest Entries

Showing 39 to 48. Previous 10, Next 10

Student 917

16 April 2010 [20-5554: Topics in Mathematical Analysis]
In this week lecture, we learnt about the integral of a complex function and the contour integral. I enjoyed the lecture and found the subject very interesting. As there are a lot to do in this particular module, I scheduled to spend time on it during the weekend so to become more confident and to get ready for the exam. In case of any difficulties; I will seek help from the maths help.

16 April 2010 [20-5553: Dynamical Systems and Fourier Analysis]
In this week lecture, we learnt about the introduction to chaotic systems which uses especially the Lorenz equation. We also talk about the weather forecast and I did enjoy it. In fact, I am struggling to complete the final assignment and I am planning to spend time on it during Easter holyday in order to get it done before the due date. In case of any difficulties, I will definitely go to maths help to get more explanation.

Student 1147

16 April 2010 [20-4553: Number and Structure]
Got the majority of the year written up in note form for the exam with a few exceptions that i'll do by hand so that I can understand it better :)

Student 878

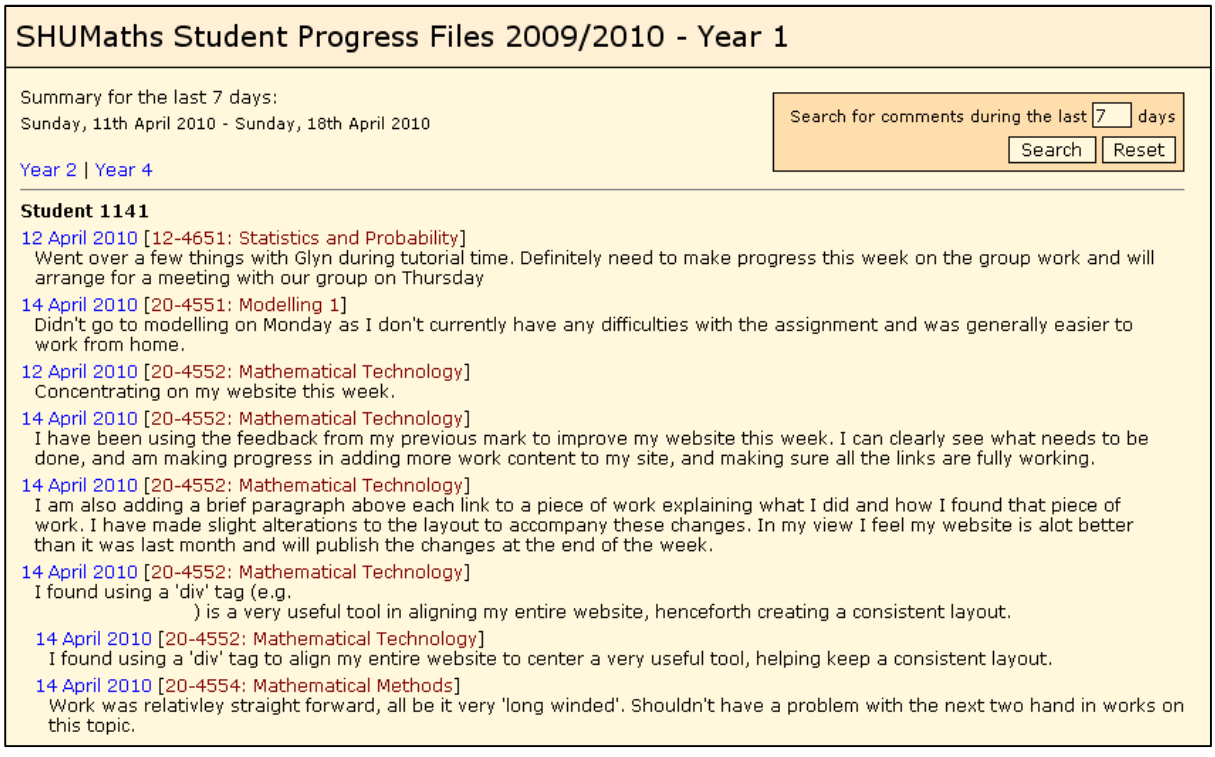
16 April 2010 [20-5555: Mathematical Programming for Excel and the Web]
I didn't get the report done like I had hoped as I attempted to finish Stats off, however I did not get that finished either so I will hope to finish this report by the end of next week (I have got aaaaaaaaaaaaaages to do it).

16 April 2010 [20-5554: Topics in Mathematical Analysis]
This week in topics Andy did an example using complex analysis to solve some real integration problems, I thought that this technique was quite useful although I didn't get on to using it in the tutorial, I will do next week however. I managed to get question 1 and 2 done in the tutorial, using the Cauchy-Riemann equations and by using partial fractions which was a bit of a bugger.
I am happy with all the work we have covered this semester and hope to do well in the exam, I will start my personal revision the week before the exam and do so by going through the past papers. This is a technique that has worked well for me in the past.

16 April 2010 [20-5553: Dynamical Systems and Fourier Analysis]
This week we got our grades back for the first assignment, 90%, which I was happy with.
In the lecture we moved on to discrete dynamical systems, I felt that I understood all the material that we covered in the lecture however I didn't do much work in tutorial to be honest. I have now completed the exercises now, at home, and feel comfortable with the work so far.

16 April 2010 [12-5651: Statistical Methods]
I haven't managed to get part C finished, I have done the univariate analysis but I didn't get any further than that. Hopefully I will finish it this weekend or next week, its got to the point now where it has become something I would rather avoid doing. I think it is because I am so close to finishing all the assignments for this year.

Figure 6: The 'latest entries' view



SHUMaths Student Progress Files 2009/2010 - Year 1

Summary for the last 7 days:
Sunday, 11th April 2010 - Sunday, 18th April 2010

Search for comments during the last 7 days
Search Reset

Year 2 | Year 4

Student 1141

12 April 2010 [12-4651: Statistics and Probability]
Went over a few things with Glyn during tutorial time. Definitely need to make progress this week on the group work and will arrange for a meeting with our group on Thursday

14 April 2010 [20-4551: Modelling 1]
Didn't go to modelling on Monday as I don't currently have any difficulties with the assignment and was generally easier to work from home.

12 April 2010 [20-4552: Mathematical Technology]
Concentrating on my website this week.

14 April 2010 [20-4552: Mathematical Technology]
I have been using the feedback from my previous mark to improve my website this week. I can clearly see what needs to be done, and am making progress in adding more work content to my site, and making sure all the links are fully working.

14 April 2010 [20-4552: Mathematical Technology]
I am also adding a brief paragraph above each link to a piece of work explaining what I did and how I found that piece of work. I have made slight alterations to the layout to accompany these changes. In my view I feel my website is alot better than it was last month and will publish the changes at the end of the week.

14 April 2010 [20-4552: Mathematical Technology]
I found using a 'div' tag (e.g.
) is a very useful tool in aligning my entire website, henceforth creating a consistent layout.

14 April 2010 [20-4552: Mathematical Technology]
I found using a 'div' tag to align my entire website to center a very useful tool, helping keep a consistent layout.

14 April 2010 [20-4554: Mathematical Methods]
Work was relativley straight forward, all be it very 'long winded'. Shouldn't have a problem with the next two hand in works on this topic.

Figure 7: Summary of all entries in the last n days (default is n=7)

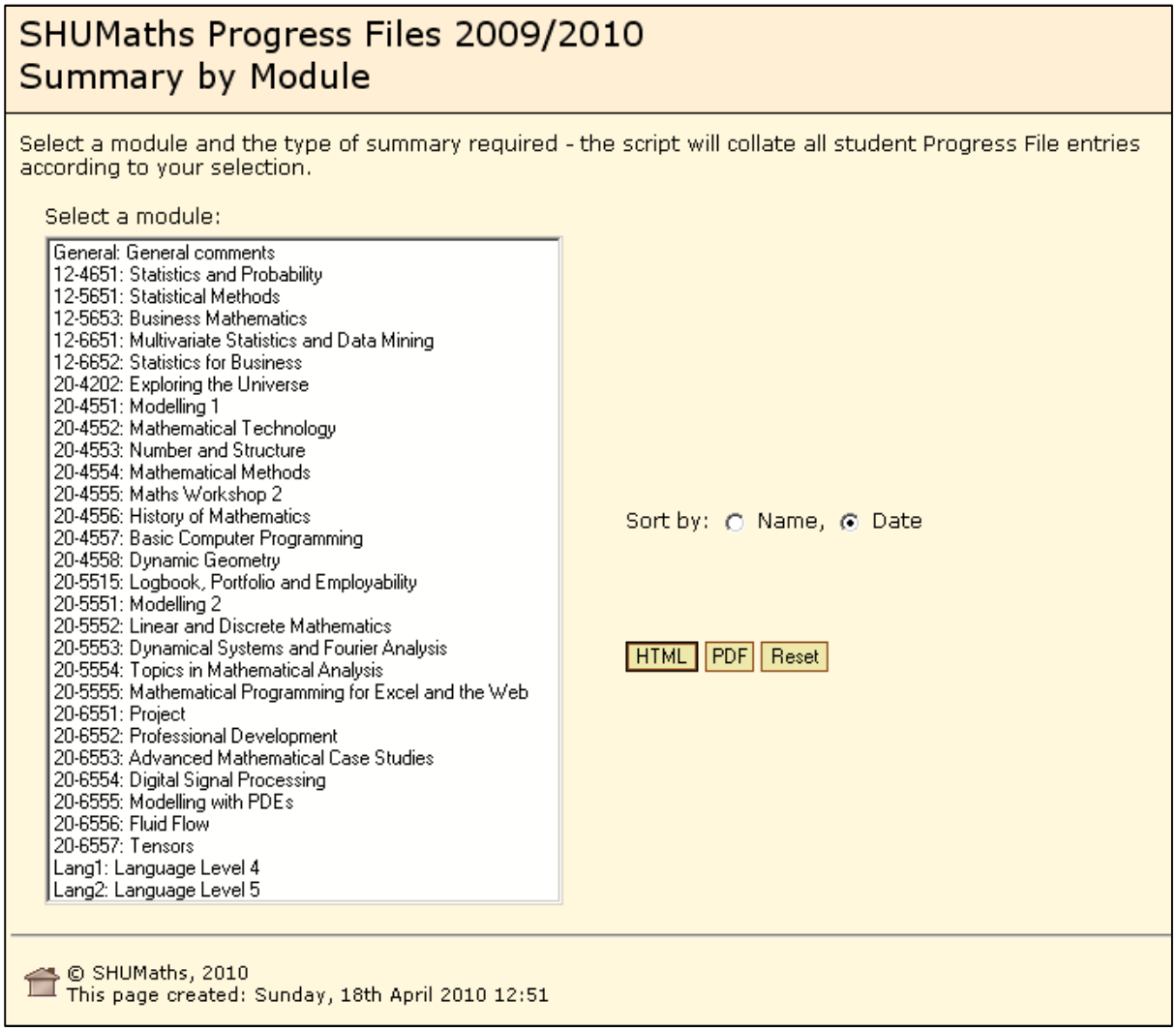
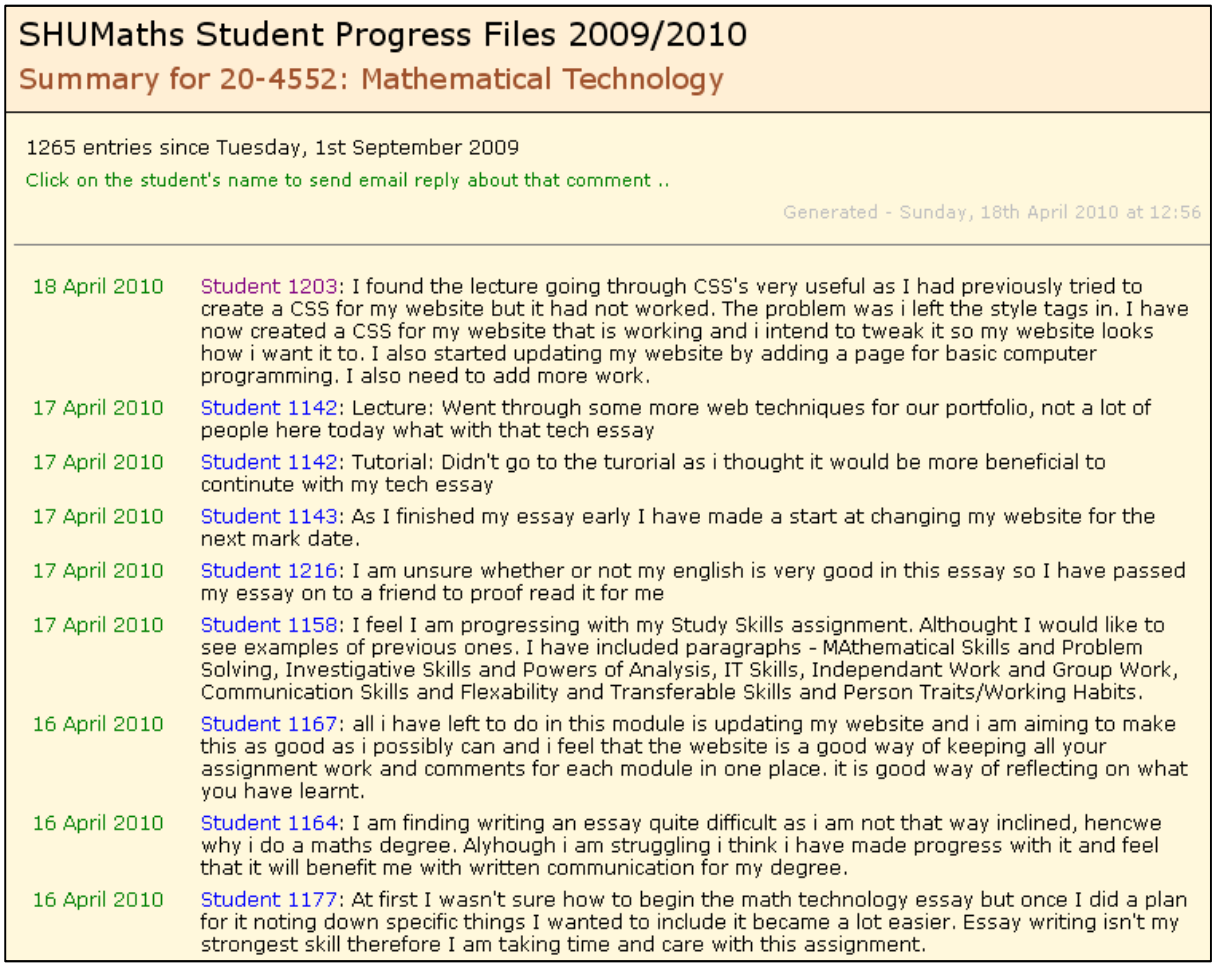


Figure 8: Selecting a module

Entries sorted by module

An individual module tutor is likely to want to be able to see comments specifically about their own module. As shown in Figure 8 above, the first step is to select that module. The form allows sorting by name of date (sorting by date is the default).

This results in a view illustrated in Figure 9 over the page.



SHUMaths Student Progress Files 2009/2010

Summary for 20-4552: Mathematical Technology

1265 entries since Tuesday, 1st September 2009

Click on the student's name to send email reply about that comment ..

Generated - Sunday, 18th April 2010 at 12:56

18 April 2010	Student 1203: I found the lecture going through CSS's very useful as I had previously tried to create a CSS for my website but it had not worked. The problem was i left the style tags in. I have now created a CSS for my website that is working and i intend to tweak it so my website looks how i want it to. I also started updating my website by adding a page for basic computer programming. I also need to add more work.
17 April 2010	Student 1142: Lecture: Went through some more web techniques for our portfolio, not a lot of people here today what with that tech essay
17 April 2010	Student 1142: Tutorial: Didn't go to the turorial as i thought it would be more beneficial to continute with my tech essay
17 April 2010	Student 1143: As I finished my essay early I have made a start at changing my website for the next mark date.
17 April 2010	Student 1216: I am unsure whether or not my english is very good in this essay so I have passed my essay on to a friend to proof read it for me
17 April 2010	Student 1158: I feel I am progressing with my Study Skills assignment. Althought I would like to see examples of previous ones. I have included paragraphs - MAthematical Skills and Problem Solving, Investigative Skills and Powers of Analysis, IT Skills, Independant Work and Group Work, Communication Skills and Flexability and Transferable Skills and Person Traits/Working Habits.
16 April 2010	Student 1167: all i have left to do in this module is updating my website and i am aiming to make this as good as i possibly can and i feel that the website is a good way of keeping all your assignment work and comments for each module in one place. it is good way of reflecting on what you have learnt.
16 April 2010	Student 1164: I am finding writing an essay quite difficult as i am not that way inclined, hencwe why i do a maths degree. Alyhough i am struggling i think i have made progress with it and feel that it will benefit me with written communication for my degree.
16 April 2010	Student 1177: At first I wasn't sure how to begin the math technology essay but once I did a plan for it noting down specific things I wanted to include it became a lot easier. Essay writing isn't my strongest skill therefore I am taking time and care with this assignment.

Figure 9: Showing all entries for a specific module (or General)

APPENDIX 2 – Analysis of 2008-9 logbook entries

Group split into quartiles on the basis of their number of entries:

Gender analysis

	Year 1		Year 2		Year 4	
	M	F	M	F	M	F
Q1	20%	37%	26%	25%	18%	30%
Q2	27%	22%	26%	25%	24%	26%
Q3	29%	19%	19%	38%	24%	26%
Q4	25%	22%	30%	13%	35%	17%

- The proportions of females whose number of entries lie in the top quartile group is proportionately higher than their male peers.
- The proportions of males whose number of entries lie in the bottom quartile group is proportionately higher than their female peers.

Some variation with year

... are female students more reflective? or perhaps less confident?

Country of origin analysis

Year 1

	UK (White)	UK (Other)	Non-UK
Q1	24.6%	21.1%	42.9%
Q2	24.6%	21.1%	42.9%
Q3	31.6%	10.5%	14.3%
Q4	19.3%	47.4%	0.0%

Year 2

	UK (White)	UK (Other)	Non-UK
Q1	24.2%	42.9%	0.0%
Q2	24.2%	28.6%	33.3%
Q3	24.2%	28.6%	33.3%
Q4	27.3%	0.0%	33.3%

Year 4

	UK (White)	UK (Other)	Non-UK
Q1	17.9%	25.0%	50.0%
Q2	21.4%	25.0%	37.5%
Q3	25.0%	50.0%	12.5%
Q4	35.7%	0.0%	0.0%

UK-White + Non UK: (55.0% Male : 45.0% Female). **Good gender balance**
UK-Other: (82.5% Male : 17.5% Female). ***Predominantly*** male

Are Male UK-OTHER students disaffected?

Age analysis

	Year 1				Year 2				Year 4			
	Q4	Q3	Q2	Q1	Q4	Q3	Q2	Q1	Q4	Q3	Q2	Q1
30+	0.0%	25.0%	50.0%	25.0%	0.0%	40.0%	0.0%	60.0%	0.0%	0.0%	0.0%	100.0%
25-29	40.0%	0.0%	40.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	0.0%
20-24	42.9%	21.4%	14.3%	21.4%	12.5%	25.0%	37.5%	25.0%	27.3%	27.3%	18.2%	27.3%
19	28.6%	42.9%	14.3%	14.3%	16.7%	25.0%	33.3%	25.0%	0.0%	14.3%	42.9%	42.9%
18	18.9%	26.4%	26.4%	28.3%	38.9%	22.2%	22.2%	16.7%	50.0%	25.0%	25.0%	0.0%

- ages 30+ generally contribute significantly more
- 18 year old group generally contribute significantly less

•Mature students value the process and engage with it more than younger students?

Appendix 3 – the skills elements of the BSc Mathematics Programme at SHU

Year	Activity	Skills
Open day presentation includes a section on skills, and the fact that a degree is about more than studying a subject. Aim is to raise student awareness of the opportunities available for gaining skills.		

Year	Activity	Skills
1	Introductory discussion of skills at induction	Skill awareness
	Progress File (a.k.a. weekly reflective e-logbook)	Reflection, action-planning, target-setting, organisation
	e-Portfolio (website)	Communication, writing
	CV production	Self-awareness, career management
	Peer-Assisted Learning, group work, oral (group) and poster presentations	Teamwork, self-efficacy, problem solving, leadership
	Essay on study skills	Self awareness, awareness of the 'wider picture'
	End of year reflection on skill development	Reflection, self-awareness, recognition of progress

Year	Activity	Skills
2	Progress File	Reflection, action-planning, target-setting, organisation
	e-Portfolio	Communication, writing
	Delivering small group presentations	Communication, teamwork
	Preparation and application for industrial placement: • CV assessment • self-appraisal • employer awareness • job-application skills • writing covering letters • answering difficult questions • interview skills.	Career development, career management, self-efficacy

Year	Activity	Skills
3	Industrial Placement (optional)	Work-based learning

Year	Activity	Skills
4	Progress File	Reflection, action-planning, target-setting, organisation
	e-Portfolio	Communication, writing
	10 credit Professional Development module (mandatory): • industry and career awareness • self-evaluation and reflection • group presentation and poster • individual poster presentations	Career development, teamwork, communication
	Peer-Assisted Learning leading (voluntary)	**L**eadership, self management, adaptability
	30 credit individual Project: • oral presentation • report • oral examination	Problem solving, adaptability, communication

16

ISSN 1774-9847
ISBN 978-1-905148-15-8

The Use of "Challenges" to Drive Autonomy, Employability and Student Engagement: a Journey through and Evaluation of a Challenge Based Project

Nick Nunnington, Sheffield Hallam University

May 2009

CEBE working papers series

The Higher Education Academy

CEBE Centre for Education in the Built Environment

CEBE working papers series

16

The Use of "Challenges" to Drive Autonomy, Employability and Student Engagement: A Journey through and Evaluation of a Challenge Based Project

Nick Nunnington, Sheffield Hallam University
May 2009

Editor: Chris Webster
Editorial Assistant: Diane Bowden

Published by the Centre for Education in the Built Environment
Cardiff University, Bute Building, King Edward VII Avenue, Cardiff CF10 3NB

The views expressed in this Working Paper are those of the author(s) and do not necessarily reflect those of the Higher Education Academy Centre for Education in the Built Environment

The Use of "Challenges" to Drive Autonomy, Employability and Student Engagement: A Journey through and Evaluation of a Challenge Based Project

Abstract: The use of challenges to stimulate enquiry and problem based learning is being introduced into a number of real estate courses throughout Europe. At the same time the built environment professions are moving towards a more multi-disciplinary and international approach in solving ever more complex real estate and business problems. There is a need therefore for built environment education to "collapse boundaries" between professional disciplines and across European borders and design projects that stimulate, enthuse and capture the imagination of learners.

This working paper examines the evolution of a challenge based approach, the associated support required to be effective and proposes a model to calibrate projects, which will be tested in future research. Taking the reader through one of the projects, it critically examines the role of the challenge aspect and provides a critical and comparative evaluation of the project through student and tutor feedback and structured focus groups.

The paper:

- outlines the pedagogic underpinning of the use of "challenges"
- describes a series of innovative challenges
- evaluates the challenges from both tutor and student perspectives
- proposes a new model to calibrate and test the challenge of projects.

There is a plethora of articles and papers around problem and enquiry based learning but relatively little in terms of the complexity and challenge needed to stimulate deep learning. Written by an advocate of challenge and a practitioner who has been developing complex international "challenges" this paper undertakes a longitudinal review of a project that has run successfully for a number of years. In conclusion it proposes that challenge is an essential component of successful problem/enquiry based learning and the effectiveness of projects relies on a series of inter-connected variables that could be measured to examine future projects.

Keywords: Autonomous Learning, Multidisciplinary, Enquiry Based Learning, Role Play, Virtual Learning Environment

Table of Contents

List of Figures and Tables

1.0 Introduction

We are increasingly encouraged to innovate using enquiry based learning, problem based learning, to promote student autonomy, embed employability and utilise e-learning. This paper examines the author’s use of ***challenge*** as the driver for engaging students in all of the above and as the central “plank” of his philosophy to innovate. The paper starts with the surprising origins of his approach in the outward bound movement and ends with a proposed model to calibrate and examine effective learning, where ***challenge*** is an essential component for success.

1.1 Challenge in Learning

Literature and references to challenge arise predominantly from the physical challenges embodied in “Outward Bound” activities and the work of its founder Dr Kurt Hahn, a German educational philosopher. Outward bound was instigated by Hahn at the request of Lawrence Holt, head of the Blue Funnel Shipping Line, a merchant shipping company, to support the survival of young sailors in World War II.

Hahn's philosophy revolved around the importance of supporting students to discover their true capabilities by impelling them to undertake experiences that would help them to find their greater capacities. In essence the philosophy is all about challenge but coupled with appropriate support. For Hahn, it was the educator's responsibility to inspire and to support the student. Hahn was reported to be stern with his teachers and instructors - for any student to fail to reach his/her potential was a failure of the teacher, not of the student (Neill, 2004). Hahn believed that challenge coupled with experiential learning was a powerful way to develop cognitive as well as physical skills; he is quoted in an address to the Outward Bound trust in 1960: “I am equally certain that the project chosen by the boy, carried through with purposeful tenacity to a well-defined goal, can tap the hidden reserves of the mind in a way that an examination can rarely do” (Hahn, 1960, p. 3).

1.2 So what is a Challenge?

Challenge is often described as the perception that a task or situation exceeds one's comfort zone or capacities; thus the challenge will require a person to find "something extra": this can be physical, such as running further, or cognitive, such as mastering a new computer programme. Challenge should ideally trigger positive emotions such as excitement and confidence as well as the trepidations of fear and doubt, but it is recognised that both sets of emotions are inevitably entwined in a challenging situation. This is why it has become widely accepted from Hahn and other uses of challenge that the growth achieved from such challenges is a function of both the challenge and the appropriate support provided, i.e. **growth = challenge x support**.

1.3 An example of a Challenge: The European Challenge project

The European Challenge project involves students working on a complex consultancy project simulating the relocation of a 350 person financial services organisation to a new Headquarters building in Europe. The project, supported by EU funding, has formed a network of universities across Europe including the European Business School, Kingston, Sheffield Hallam, Warsaw School of Economics, Dublin Institute of Technology, The Technical University of Slovakia, and The Institute of Construction, Copenhagen. In addition, Masters students from Johns Hopkins Washington DC have joined the Challenge.

The project is intensive and highly demanding, taking place over 12 days in Berlin and the challenge comes from working in an interdisciplinary, intercultural team to solve a highly complex multi dimensional problem. Students work from a comprehensive written technical brief and integrate knowledge gained in learning sets based in their home university. Once they arrive in Berlin, international teams are formed and the knowledge themes are integrated and disseminated.

Students become the consultants with their tutors role playing the client. This role play uses sophisticated scripting and briefing to ensure that political, personal and emotional tensions between the key client Directors are exposed. This ensures the students receive a genuine understanding of consultancy practice, the importance of listening and the need to manage client conflict and expectations. Having developed a robust client brief in the first stage of the project which examines business need, productivity and contemporary space management, the students fly out to one of ten European major cities to find a headquarters building solution. The teams undertake a strategic matching process, financial analysis and space plan which is presented to a jury of academics and senior European practitioners.

Embedding high levels of autonomy, with only one, 50 minute briefing in the whole two week programme, the student teams work through the challenge with high levels of support, provided by unconventional means such as the tutor role play. Feedback and evaluation demonstrates the effectiveness of a challenging approach which pushes students out of their comfort zones in terms of knowledge and understanding, cultural and emotional intelligence and working under peer and time pressure. Students report high levels of knowledge development, retention and personal development compared to traditional delivery and non challenging activities.

The project is described in more detail in Appendix A.

1.4 The outward bound philosophy as a process

The outward bound approach is interesting in that when analysed as a process it resonates with much of what we aim to achieve in contemporary enquiry/problem based learning. The Walsh & Gollins Model (Priest & Gass, 1997, p. 140) and reproduced by McKenzie (2000) is set out below in Figure 1 in its original form relating

to outward bound activities and then reinterpreted in Figure 2 to describe the author’s European Challenge project.

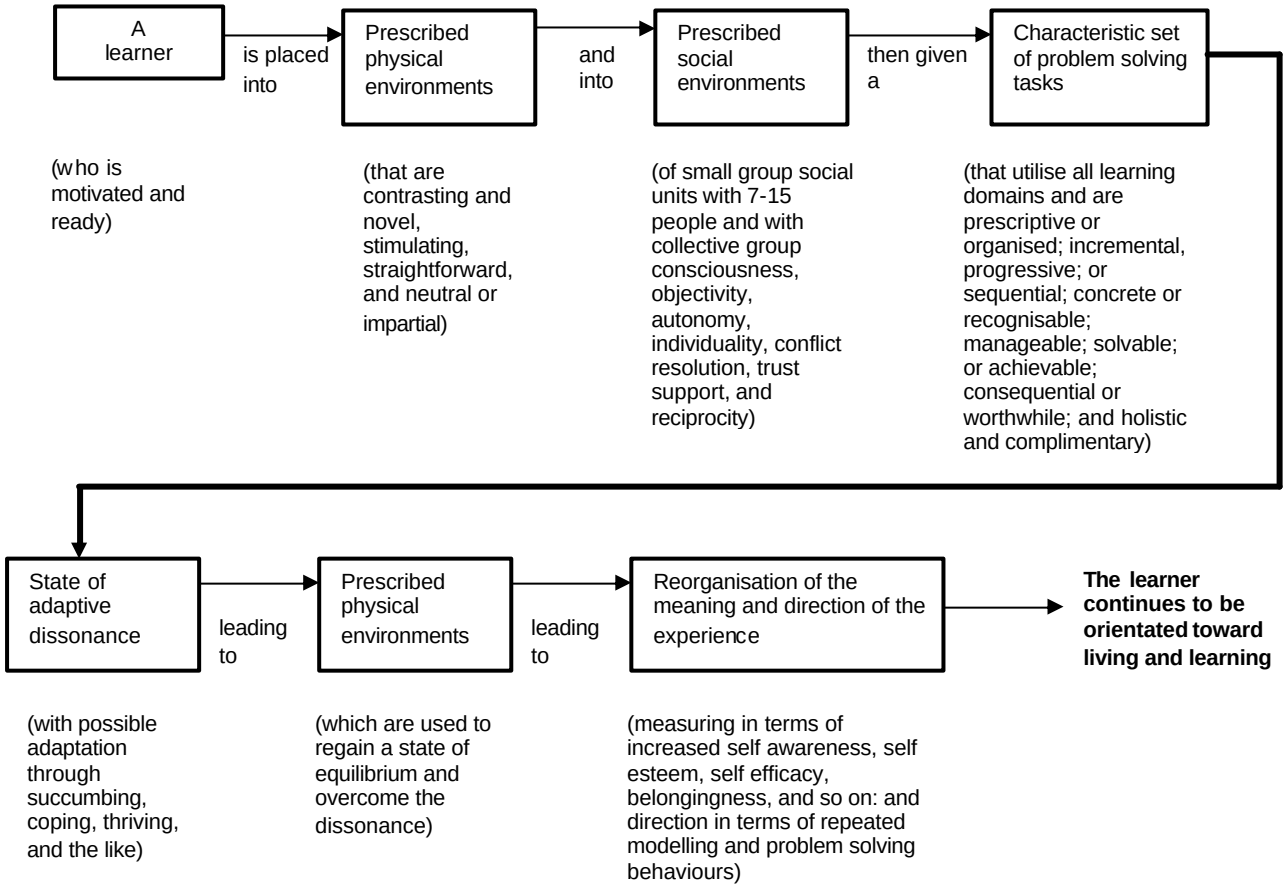


Figure 1: The Outward Bound Model proposed by Walsh & Gollins

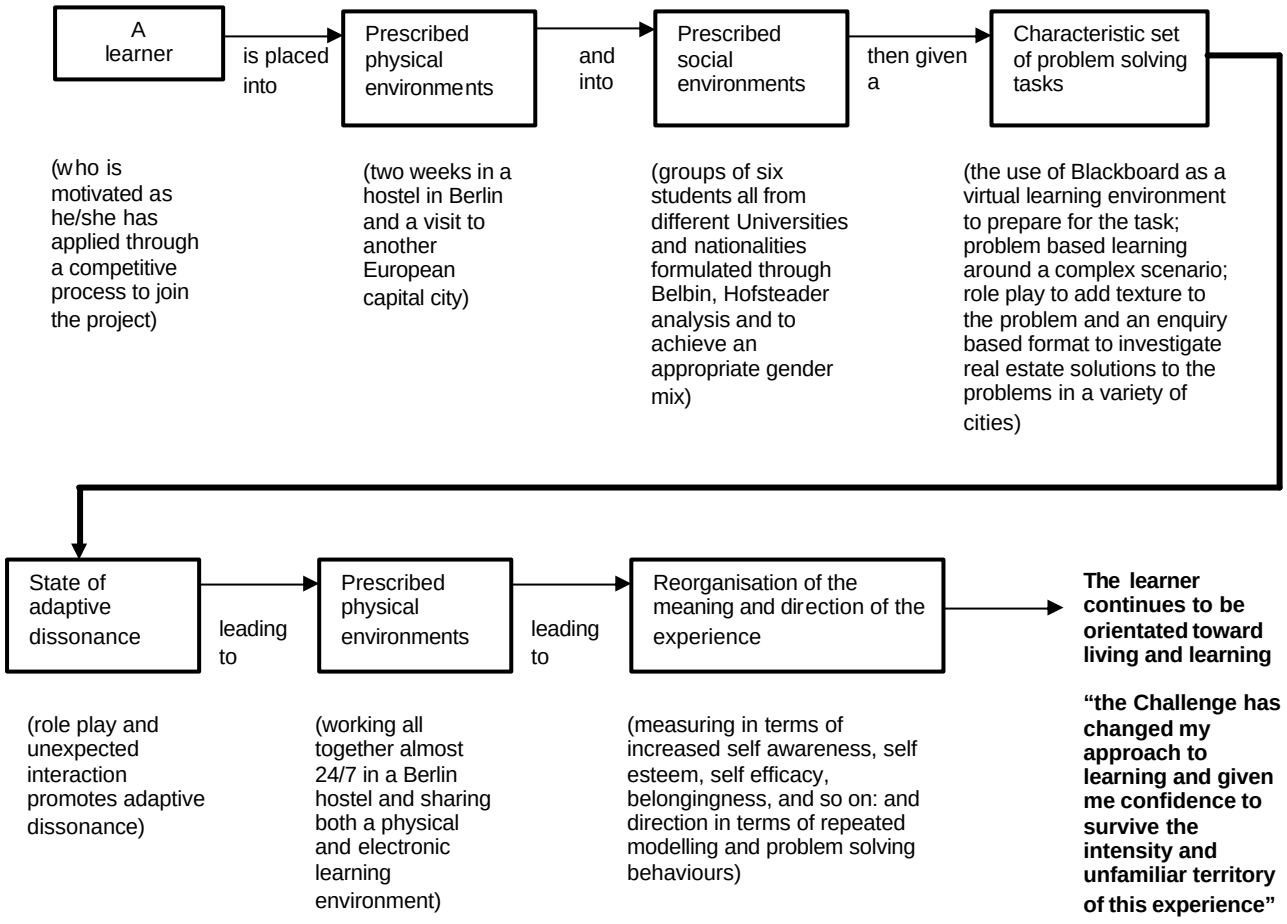


Figure 2: Application of the Walsh & Gollins Model to the European Challenge

The author was surprised when researching the background to ***challenge*** to find a holistic model which seemed to underpin all of his projects and act as a focus for enquiry and problem based autonomous projects rooted in the outward bound tradition which puts challenge and support at the heart of its approach. This discovery has encouraged the author to develop a contemporary model to bring all of these ideas together and examine the components for success.

1.5 Bringing the pieces together

Before moving on to propose a new model it is worth considering briefly the various contemporary approaches to education that the proposed model attempts to integrate and evaluate.

Enquiry based learning

“Enquiry-Based Learning inspires students to learn for themselves, bringing a real research-orientated approach to the subject.” Dr Bill Hutchings, Director Centre for Excellence in Enquiry-Based Learning (CEEBL) University of Manchester (CEEBL, 2008).

CEEBL propose that:

> Enquiry Based Learning (EBL) describes an environment in which learning is driven by a process of enquiry owned by the student. Starting with a ‘scenario’ and with the guidance of a facilitator, students identify their own issues and questions. They then examine the resources they need to research the topic, thereby acquiring the requisite knowledge. Knowledge so gained is more readily retained because it has been acquired by experience and in relation to a real problem. (CEEBL, 2008)

Characteristics of EBL as defined by CEEBL

- Learning is essentially student-centred, with an emphasis on group work and use of library, web and other information resources.
- Lecturers become facilitators, providing encouragement and support to enable the students to take responsibility for what and how they learn.
- Students reach a point where they are not simply investigating questions posed by others, but can formulate their own research topics and convert that research into useful knowledge.
- Students gain not only a deeper understanding of the subject-matter, but also the knowledge-development and leadership skills required for tackling complex problems that occur in the real world.

Problem Based Learning

It is important to recognise that problem based learning (PBL) is generally viewed as one way in which enquiry based learning can be applied successfully. EBL and PBL are often confused; Figure 3 below from CEEBL helps to resolve this confusion.

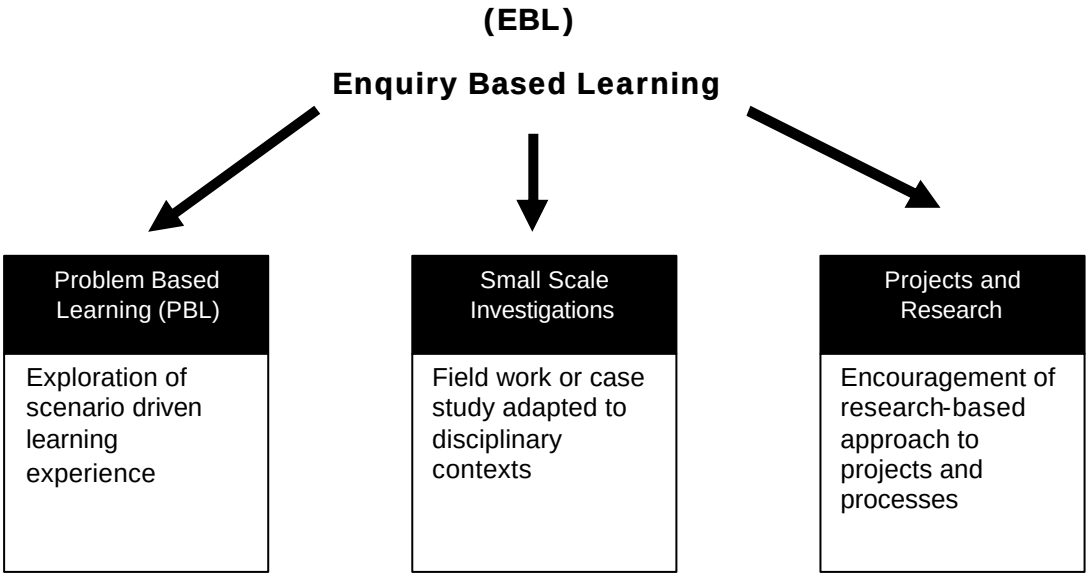


Figure 3: Enquiry Based Learning (EBL) Model (Source: CEEBL, 2008)

Best practice in EBL design emphasises the support dimension and Juwah (2002) presents an excellent model of this support in the form of “scaffolding” (presented below in Figure 4). This scaffolding should be applied to all projects although the individual make up of the scaffolding will be dictated by the context, subject and nature of the project.

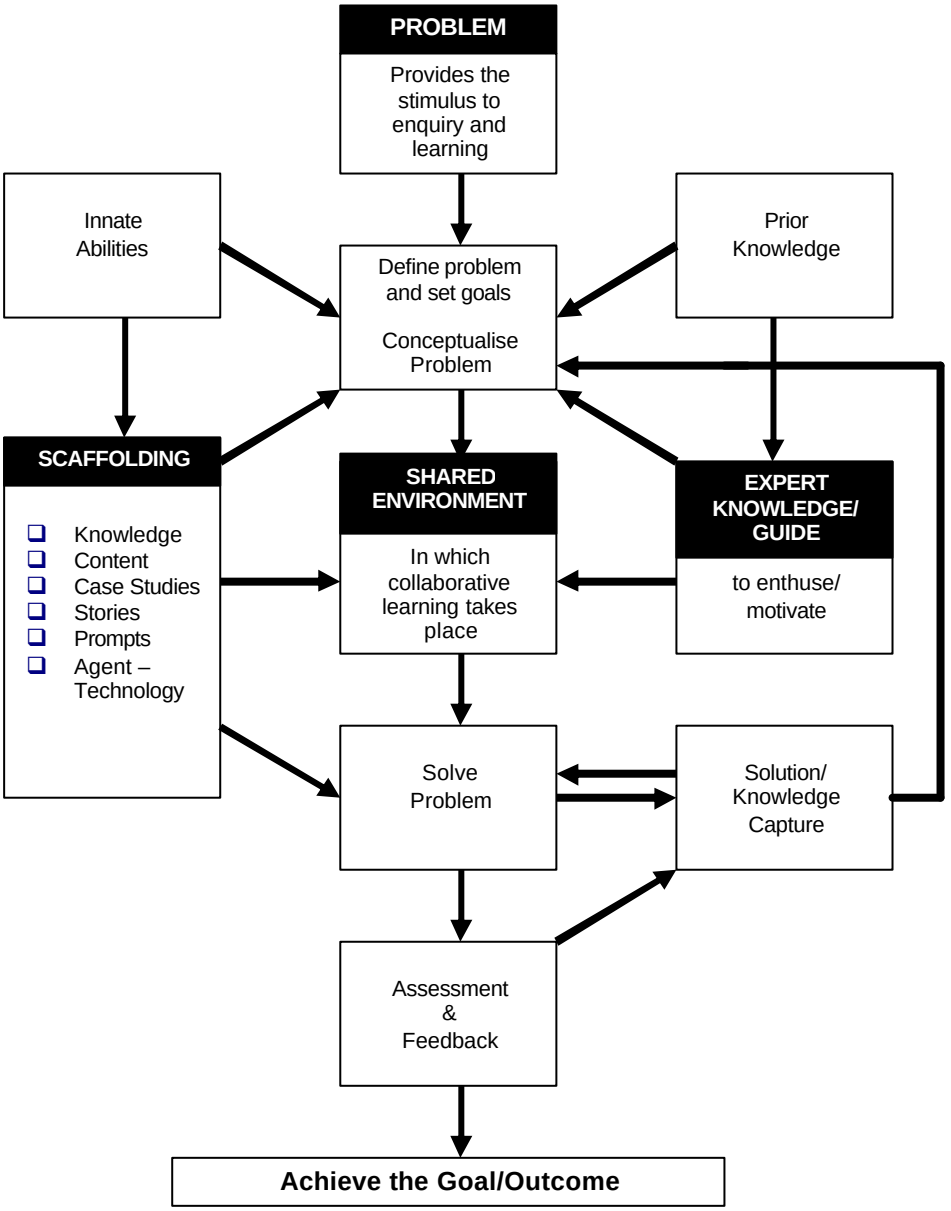


Figure 4: Scaffolding required for successful EBL

This model is interesting in that it resonates with the support component inherent in the challenge model as discussed in the first part of this section. Other elements of this model link to many aspects of challenge which are discussed in Section 2.0, especially in relation to the importance of prior knowledge and the creation of an appropriate shared environment.

Autonomous learning is inherent in both EBL and PBL evidenced by, for example, the fact that much of the content of the web site for the Centre for Excellence in Promoting Learner Autonomy PLA at Sheffield Hallam University is now devoted to EBL/PBL.

Autonomous Learning

Autonomous learning is extremely difficult to define, as the author’s experience of working in the Centre for Excellence in Teaching and Learning Promoting Learner autonomy at Sheffield Hallam University knows from first hand experience. Rooted in language teaching and embraced by the e-learning revolution, autonomous learning means very different things to different people.

The starting point of autonomy is largely recognised as emanating from Henri Holec at the Centre de Recherches et d’Applications Pédagogiques en Langues at the University of Nancy in France and his simple definition “Autonomy is the ability to take charge of one's own learning” (Holec, 1981, p. 3).

Other useful definitions include:

“Autonomy is a recognition of the rights of learners within educational systems” (Benson, 1997, p. 18).

"Learner autonomy is 'essentially a matter of the learner's psychological relation to the process and content of learning--a capacity for detachment, critical reflection, decision-making, and independent action” (Little, 1991, p. 4).

“Autonomy is a situation in which the learner is totally responsible for all the decisions concerned with his [or her] learning and the implementation of those decisions” (Dickinson, 1995, p. 5).

The term autonomy has come to be used in at least five ways (Benson & Voller, 1997):

- for situations in which learners study entirely on their own
- for a set of skills which can be learned and applied in self-directed learning
- for an inborn capacity which is suppressed by institutional education
- for the exercise of learners' responsibility for their own learning
- for the right of learners to determine the direction of their own learning.

A common theme in justifications for autonomy, especially in general education but also in language learning, is that autonomous learners become more highly motivated and that autonomy leads to better, more effective work. Again this resonates with the challenge theme and is central to the model proposed in this paper. There have been a number of empirical studies into links between motivation and autonomy.

> …there is convincing evidence that people who take the initiative in learning (proactive learners) learn more things and learn better than do people who sit

> at the feet of teachers, passively waiting to be taught (reactive learners). They enter into learning more purposefully and with greater motivation (Knowles, 1975, p. 14).

Dickinson (1995) reviews the literature on motivation and suggests that there is an important link between autonomy and some educational theories of motivation which could account for the claimed power of autonomy. The author believes in such a link and this is inherent in the proposed challenge model presented in this paper.

Constructivism

Of course, it should be recognised that autonomy itself sits within an educational philosophical framework of constructivism. As Candy (1991, p. 254) observes, “[o]ne of the central tenets of constructivism is that individuals try to give meaning to, or construe, the perplexing maelstrom of events and ideas in which they find themselves caught up”. In contrast to positivism, constructivism proposes that, rather than internalising or discovering objective knowledge (whatever that might mean), individuals reorganise and restructure their experience. Candy and others propose that constructivism “leads directly to the proposition that knowledge cannot be taught but only learned (that is, constructed)”, because knowledge is something “built up by the learner” (von Glasersfeld & Smock, 1974: xvi, cited in Candy, 1991, p. 270). Constructivist approaches encourage and promote self-directed learning as a necessary condition for learner autonomy.

What is an autonomous learner?

Someone qualifies as an autonomous learner when (s)he independently chooses aims and purposes and sets **goals**; chooses **materials**, methods and tasks; exercises choice and purpose in **organising** and carrying out the chosen tasks; and chooses criteria for **evaluation** (Holec, 1981).

2.0 Towards a New Paradigm

This paper attempts to examine contemporary approaches to learning and tease out the fundamental principles that lead to deep cognitive learning and skills development, which the author believes can be developed simultaneously through a challenge based approach. In the literature there is much discussion of new paradigms of education and learning in relation to e-learning, asynchronous on-line learning, lifelong learning and student centred learning, to mention only a few. However, the author can find little direct reference to the idea of Challenge beyond the early works of Hahn and proposes that it is possible to consider the movement towards a new learning paradigm based on the more comprehensive analysis of challenge presented in this paper. In this section a new model is introduced based on the author’s research, seventeen years of experience of working with challenge based projects and detailed evaluation of the author's European Challenge project which is explained in Appendix A.

It is proposed that for professional education:

Deep Learning
and **= [Challenge x Support x Facilitated Autonomy x Motivation]**
Skills Development

where **Motivation is a function of:**

R_{ea} = Realism

R_{ev} = Relevance

E_p = Enthusiasm/personality of the tutor

E_{nj} = Enjoyment (in other words – fun)

M = Manageability

2.1 Analysing each component

In this section the proposal is examined in relation to theory, pedagogy and professional context and in Section 3.0 by application to three of the author’s major challenge projects. As a working paper it is hoped that this empirical study will continue and be further developed into an evaluation instrument which can be used to measure and evaluate projects in accordance with the above proposition.

2.2 Challenge

Challenge has been discussed in Section 1.0 and is seen as something outside a learner’s comfort zone. It is likely to provoke both positive and negative emotions but through appropriate levels of support any negative emotions such as fear of the unknown should be managed through support and ultimately converted into satisfaction through achievement. Hahn and his supporters argue that challenge is at the heart of

transformational learning. Neill (2004) argues that as greater strength and flexibility (dynamic capacity) are developed, a person can learn to apply themselves to every increasing unfolding of challenges in increasingly complex and difficult situations. In other words, a student learns about the experience of challenge in general, what it is like to be challenged, and how to become more efficient in approaching challenge.

Challenge may also lead to a learner experiencing a tertiary level of learning, which can be transforming. Once a student develops skills in encountering challenge, his/her self-efficacy (belief in one's ability) naturally grows. This can in turn trigger a cycle of being confident enough to try new challenging experiences and learn new skills. Thus self-efficacy continues to increase until it meets new barriers which challenge the inherent ego-processes of self-efficacy. This is a meta-skill that, once acquired, can fuel long-term change and transformation (Neill, 2004). The author believes this represents the critical link between the origins of challenge as an educational strategy and contemporary transformational education.

2.3 Support

Support goes hand in hand with challenge and in most cases, the more challenging the task, the more support may be required. Reference has been made to scaffolding in Section 1.0 and this is how support is measured in the model. Support should be discreet but visible and be available when required by the learner. Support comes in many forms and learners may have different preferences dependent upon their learning style, situation, personality and experience. It should therefore be flexible, varied and capable of rapid deployment when required. Unfortunately with greater degrees of autonomy and distance this may become more difficult as the learner may require the support when it is not physically available, leading to frustration and de-motivation. In this case the supporting scaffolding should, where possible, be provided in a number of different formats to ensure access at appropriate times, or at the very least, made explicit when it is available to avoid a mismatch of expectations.

2.4 Facilitated Autonomy

In this context, autonomy is concerned with setting up a dynamic and stimulating setting which motivates and fosters self directed approaches. The approach recognises that investment in autonomous learning is front-loaded with considerable time and energy being devoted to creating a realistic and exciting problem or set of problems to engage with, ensuring appropriate prior knowledge is made available and creating comprehensive “scaffolding” which supports the learner to achieve the desired outcome. As will be discussed in the next section with reference to the European Challenge, the author believes that learner autonomy requires active facilitation and is not necessarily something that happens miraculously or spontaneously. Facilitated autonomy is an approach where student and tutor choice is designed in and students have control over their learning environment. For example, the use of a virtual learning environment where how it is used is not dictated by the institution.

Facilitation should be complex and multi faceted, from providing a problem that stimulates engagement, to exposing learners to different perspectives, for example using practitioners’ stories, role play and deliberate provocation, to making a variety of learning opportunities available for learners to self-select from.

The more investment that is made in facilitating autonomy, the higher the ranking of this variable.

2.5 Motivation

In this model, motivation is seen as one of the most complex and essential components of success and has a sub-set of elements derived from a review of the literature and empirical observation and evaluation of the author’s three challenge projects.

Aspects of student motivation have been widely analysed. In an early study from the United States, Sass (1989) asks his students to analyse what makes their classes more or less "motivating". He asks his classes to recall two recent class periods, one in which they were highly motivated and one in which their motivation was low. Each student makes a list of specific aspects of the two classes that influenced his or her level of motivation, and students then meet in small groups to reach consensus on characteristics that contribute to high and low motivation. In over twenty courses the same eight characteristics emerge as major contributors to student motivation:

- Instructor's enthusiasm
- Relevance of the material
- Organisation of the course
- Appropriate difficulty level of the material
- Active involvement of students
- Variety
- Rapport between teacher and students
- Use of appropriate, concrete, and understandable examples.

These variables are reinforced by a more contemporary study linking motivation to curiosity. A model of curiosity that is based on the notion of manageable gaps in one’s own knowledge is presented by Loewenstein (1994) His work suggests that motivation tends to increase as an individual realises that a gap exists between the current knowledge level and a desired knowledge state. He notes that the key to understanding curiosity “lies in recognising that the process of satisfying curiosity is itself pleasurable” (Loewenstein, 1994, p. 90). He emphasises that the key to successful use of curiosity is manageability. “To stimulate curiosity, it is necessary to make students aware of the manageable gaps in their knowledge” (Loewenstein, 1994, p. 94). It is proposed that gaps that are too great discourage learning; if students consider the new learning to be unattainable they will be deterred from accepting the

challenge. This demands careful communication of the gap and appropriate support mechanisms to reassure students of their capability to achieve the outcomes and close the gap. This is measured in the proposed model by the Manageability (M) element of motivation. Cohen and Levinthal (1990) add "absorptive capacity" to the notion of motivation. This is defined as "the ability . . . to recognise the value of new, external information, assimilate it and apply it" (1990, p. 128). In cognitive science research, absorptive capacity has been demonstrated in studies that illustrate that a student's propensity to learn is determined by the breadth and depth of their prior knowledge. In the proposed model absorptive capacity is embedded in the Relevance variable (R_{ev}) because Cohen and Levinthal (1990) illustrate that students must value new material, which is interpreted as relevance, and this is an extremely significant element of motivation. In this model absorptive capacity is also recognised in the Facilitated Autonomy component. As will be demonstrated in Section 3.0 innovative facilitation of prior knowledge was one of the pre-requisites to successful learning in the European Challenge.

The Relevance Variable (Rev)

This is therefore identified in the work above as an essential component of a learner's motivation. In our model relevance is measured both internally, the consistency with the programme of study, but also externally, in terms of relevance to the professional context and employability.

The Enthusiasm/personality of the tutor Variable (E_p)

The literature demonstrates that the enthusiasm, demeanour and personality of the tutor can have a big impact upon motivation in learning. Therefore an element of the motivation component of this model has been designated Ep for Enthusiasm / Personality of the tutor. Interestingly Lantos back in 1997 observed the emergence of the student as consumer, focused on grades and getting a good job rather than seeking to learn, and earning credentials for well paid jobs rather than learning for its intrinsic value. However, rather than lamenting the situation he embraces it as a facet of contemporary education and concludes that as instructors, tutors must concern themselves with motivation and a mission of inspiring students.

Lantos (1997) provides an excellent model based on comprehensive literature review and empirical observation to propose nine principles for motivating students based on the tutor's attitude (and corresponding behaviour) in the PROFESSOR acronym:

P Pragmatic, Problem Solving and Participation provoking

R Reward-dispensing and Reinforcing

O Objectives orientated and Outcomes achieving

F Flexible and Fluid

E Enthusiastic and Encouraging

S Satisfier of Students' needs and Salesman (Customer) orientated

S Sincere and ethical, Straightforward

O On top of things and "Cutting Edge"

R Rapport establishing and Relationship building

Examining each component of the PROFESSOR model gives insight into how forward thinking Lantos was. Table 1, below, links the empirical work of Lantos to observations against each component. This table is re-examined in Section 3.0 in relation to the European Challenge (Table 6).

Table 1: The Professor Model

P	**Pragmatic, Problem Solving and Participation provoking**	This is indicated as possibly the most significant variable to enhance motivation. Coaching and encouraging by example seems to be highly effective. Demonstrating the practicality of course material rather than abstract theory supports motivation and engagement. Encouraging in class or on-line participation through interactive teaching is essential.
R	**Reward-dispensing and reinforcing**	Techniques to make learning enjoyable, entertaining and fun. Using humour, games and positive reinforcement. Complimentary and affirmative feedback in class. Prompt positive, critical feedback on submitted work.
O	**Objectives orientated and Outcomes achieving**	Highly explicit outcomes for the course, assignments, teaching sessions and activities. The objectives to be set at three levels: cognitive, affective and behavioural – to combine cognitive and skills based development.
F	**Flexible and Fluid**	Providing a framework not a restrictive programme, with flexibility to give more time to areas that capture the imagination. Assigning activities with direction not dictatorship. Providing surprises and unexpected activities. Being open minded.
E	**Enthusiastic and Encouraging**	Being enthusiastic in presentation style, displaying passion for the subject, teaching and application of the knowledge. Encouraging informal interaction and relationships.
S	**Satisfier of Students' needs and Salesman (Customer) orientated**	Getting to know student needs and constraints. Make the material personal, relate it to career opportunities, the profession and what they might do in the world of work.
S	**Sincere and ethical, Straightforward**	Building trust, never abusing power and being genuine. Being empathetic and understanding. Giving equitable treatment to students.
O	**On top of things and "Cutting Edge"**	Demonstrating contemporary awareness of literature and practice. Good networking with both academics and practitioners.
R	**Rapport establishing and Relationship building**	Knowing students collectively and individually, disclosing things about yourself, humanising the tutor and developing rapport.

The Enjoyment/fun Variable (E_{nj})

This is embodied in Lantos’ work on motivation and is an essential part of successful learning. In this model it is identified as a distinct element of motivation, not merely a function of the tutor’s approach. Enjoyment requires the task to be varied, manageable, unexpected and offer opportunities for the participants, not just the tutor, to inject humour and fun. Enjoyment has to be deliberately considered when planning the challenge. Enjoyment can be controlled through activities which are ancillary to the learning. For example, in constructing a team there is a wide range of “fun” activities which stimulate reflection on team work but also create a constructive and enjoyable “atmosphere”.

The Realism Variable (R_{ea})

Realism is subtly different from Relevance and is therefore separately identified as a factor of motivation. Empirical evidence from the author’s own teaching shows a dramatic difference between engagement of real estate students between the abstract and the realistic. For example, in teaching Modern Portfolio Theory and Capital Asset Pricing Models students have consistently struggled with the difficult mathematical constructs that underpin these concepts. Students are highly demotivated by impenetrable texts and questions over validity of applying the approach to real estate. However in a fore-runner to the author’s next major challenge project (see Appendix A) use of an applied challenge in which students have to try to beat the market and apply the theory to a simulation using real portfolio data, the realism is identified as an essential component of the task. Students comment:

> This aspect of the course has been the most challenging for me and most of the course; it wasn’t until we tried to apply the concepts for ourselves that I began to understand what it was all about.
>
> The fact that we were using data from a real portfolio made it a more interesting project, in lectures these theories were usually applied to non real estate applications and their relevance was questioned, in the project knowing it was real and having had a portfolio manager come and talk to us how he applied the concepts top this actual set of data really made a difference – I wanted to have a go despite my concerns about the complexity of the maths.

3.0 The Proposal in Practice: Analysing the European Challenge

Students who had participated over three years of the European Challenge project were asked through questionnaires and focus groups what they thought about the European Challenge in structured activities designed to examine each component of the model proposed in Section 2.0.

Before examining the variables in the model it is worth noting that the European Challenge embraces ***challenge*** in a number of different ways, indeed ***challenge*** lies at the very heart of its rationale, execution and outcomes as set out in Table 2 below.

Table 2: Analysis of the European Challenge

PROFESSIONAL AND EDUCATIONAL CHALLENGES	*How the European Challenge Project meets the Professional and Educational Challenges*
The professional firms; the individual professional; the professional bodies and academic Institutions must learn to ***adapt*** to a virtual world of work with greater autonomy and empowerment and reliance on team based knowledge creation.	The Challenge embraces ***learner autonomy*** by providing a sophisticated virtual learning environment in which control of learning is given over to students through a variety of tools. The project is team based with teams constructed of pan European participants.
The professional firms; the individual professional; the professional bodies must ***commit*** to lifelong learning and organisational learning to compete effectively, particularly in the areas of business and management education.	The Challenge is centred upon business and management issues and broadens students’ appreciation of business issues and operates a fully integrated business and real estate scenario.
Recruitment patterns in the traditional professions may have to change to embrace the new skills and practices of a knowledge based approach.	The Challenge has proven to be a useful tool in increasing employability and appears attractive to employers who require more business awareness.
Professional bodies must ***re-appraise*** their minimum competence based “thresholds” to allow flexibility and challenge, they are too often a lowest common denominator not an enabler of change and may become unattractive to high flyers seeking hybrid careers.	The Challenge pushes the boundaries of traditional accreditation and blends business strategy, human resource management and other core business issues with real estate fundamentals.
The focus of traditional information based education in a world where information is constantly out-of-date must shift.	The Challenge use on-line resources and encourages students to seek out information autonomously. It focuses on key principles and advocates the need to recognise that detailed information is constantly shifting and how to manage this change in information resources.

UK and European higher education places an emphasis on developing student independence, enabling students to take charge of their learning. This is increasingly important with economic and social globalisation and the need to enhance the capacities of learners to play a full part in society, particularly as 'knowledge-workers' (Breton and Lambert, 2003).

At Sheffield Hallam University and the Hanzehogeschool in Groningen, increasing learner independence, a key element of learner autonomy, is central to the University’s

commitment to putting students at the heart of their teaching and learning provision, and for achieving excellence in their learning provision.

The European Challenge embraces the principle of learner autonomy as “taking charge of one’s learning” (Holec, 1981, p. 3). Whilst all students follow a well crafted brief, how they manage the learning is largely left to them as both a team and as individuals. The Blackboard learning environment facilitates a range of learning opportunities for which they must take control and set the pace and agenda for learning.

Learner autonomy as learner control has origins in language study with an emphasis on learning management, and cognitive processes to build metacognitive knowledge (Benson, 2001). The European Challenge tries to expand this perspective. We reviewed how to conceptualise learner autonomy and arrived at the following four elements:

1) Integration of knowledge and learning (Boyer, 1990) with students creating a variety of original approaches within and between disciplines.
2) Use of local, national and international contexts that enable students to evaluate and often participate in activity in the wider world, building on the work of Peters (2004).
3) Supporting students through transitions so they take control of their learning experiences.
4) Putting pedagogic innovation at the heart of the learning experience.

Finally, we believe these elements should be blended and recognise that knowledge workers require skills of networking, self-realisation and knowledge management. The Challenge builds these elements into the design of the project by:

- **Networking** – the project creates many relationships in pan European project teams; relationships between students from the same country/university; diverse tutor relationships including role play, mentor, supervisor and local support and networking with professionals working in a team’s allocated European city. The Blackboard virtual learning environment (VLE) provides a valuable networking system.
- **Self Realisation** – Belbin team role analysis and comprehensive role play encourages reflection and self realisation of the students’ strengths and weaknesses in managing their learning. Autonomy in how to manage communication and working processes to complete the tasks encourages personal reflection and an evaluation of their team role and management styles.
- **Knowledge Management** – the project requires students to create their own micro “learning organisation” and to convert tacit to explicit knowledge needed as described by Nonaka (1994) in creating a knowledge management framework. Again the Blackboard VLE facilitates this process.

3.1 Challenge

The "Challenge" aspect of the project was examined in terms of:

a) the pressure created by the time scales imposed

b) the intensity of the project

c) the intellectual "stretch"

d) the extension beyond their comfort zones.

An analysis of the transcripts reveals the following consistent comments throughout the three years of participation presented in table 3:

Table 3: Student feedback on the European Challenge project

Pressure: The pressure was constant and at times a concern – we worked all night on our brief. We worked all through the night but had the sense to send the people delivering the presentation to bed. It was pressured but we felt this was appropriate – it mirrors real life – work is not drip fed like at Uni it has deadlines and pressure points. We learnt so much from our mistakes in the first part in terms of time management. The pressure was an essential component of the experience – I would not have developed and changed so much without it. The time scales forced us to work better as a team. I find it hard to believe what we achieved in the time scales – I have never achieved such excellent work before even when I had much longer to complete it. The time scales were brutal but they made us focus and looking back it worked…I do not think the project would have achieved the same results without the time pressure.	**Intensity** This project was…well manic but talking to people in the real estate business they have told me times when they were working just as intensively – it is a great preparation or practice. I have learnt so much in two weeks that I will NEVER forget, the intensity makes it stick, it seems real not a simulation. The intensity really supported the doing by learning idea...I was seeing, hearing and doing all the time – the role play increased the intensity…the tutors playing Directors didn't let anything slip – they made us feel like idiots sometimes – but we deserved it and next Board meeting we upped our game – the intensity of the experience made me develop my skills over night – especially in managing the interaction with the client and making sure we extracted the right information from them.
Intellectual Stretch I have learnt more in these two weeks, than from a whole Semester…NO to be frank with some Modules the whole year. When we looked at all the information presented in the conference session I realised just how complex this project was going to be and how much we all needed to know – but because we had "experts" in each team who had been studying parts of the knowledge needed it all came together. We learnt from each other all the time as the project required bits of knowledge from each University – I saw it all come together and really understand now how a relocation needs so many different parts of my course and skills.	**Comfort Zone** The first day was really scary, whilst we had sent e-mails and used Facebook and hotmail, actually meeting the team was hard – especially at the same time we heard from the tutors just what was expected of us in two weeks. I hadn't travelled much before this, so here I was in Berlin with five students from all over Europe and a huge Challenge in front of us...I was very unsure during the first hour or so…but after the ice breakers and team building events I felt more confident…we were all in the same boat…and the tutors all seemed really supportive. My team mates were so competitive I felt initially like I wasn't good enough and I felt really challenged but with the support of the tutors we examined why we were there and what we wanted to get out of the experience – sharing that really helped. I was at times way out of my comfort zone, especially at the beginning. But now I realise how much I have grown and without this experience I really would not have the same amount of confidence…it has been…and I know this sounds silly but life changing.

The underlying theme is that without the Challenge the project would not have been such a worthwhile experience – the Challenge is multi-faceted – working with

strangers, adapting to other cultures, living with strangers in a country you have not been to before, managing a complex project in tight timescales. Many students commented in the focus groups that they did not find that their courses challenged them enough and the European Challenge really motivated them. Whilst they would not want to do this every week of the academic year a large proportion found the “Challenge” component an essential part of effective learning.

Interestingly it is not only the students who actually travel to Berlin and carry out the “real” Erasmus sponsored Challenge that respond to the Challenge variable. The project is run as a “virtual edition” using a two DVD set to replicate the role play and virtual tours to buildings across Europe. Supported with live tutor role play this version replicates much of the excitement and challenge resulting in similar if not quite so strong positive reactions to the "real" European Challenge.

3.2 Support

In discussion in the focus groups it was clear that a common theme was that challenge went hand in hand with support – validating the original concept of Hahn (1960). Indeed comments from students reinforce the direct relationship between Challenge and Support (see Table 3 above); and the following comments:

- …it was hard initially, dealing with the complexity, but support was provided in different ways…on Blackboard, tutors from each country, our team mentor and the tutors playing the client in role…it gave us the confidence to meet the challenge(s).
- I loved the way support was given “in role” by tutors as Directors of the client company, they could be brutal and unforgiving but also very supportive in steering us through the complexities of the situation
- The Blackboard facility was very comprehensive, often the answer we were seeking was on Blackboard…I especially liked the fact that quite a lot of the content was generated by other students in the project and if I didn’t understand something I could go and chat to them about it, not necessarily a tutor.
- When I was in Prague, Nick had organised a lot of time with the local practitioners, they not only showed us the potential buildings but they gave us lots of local insight and were willing to support us. As I had never been to Prague before this was essential because the local market is so different from what I am used to.

Supporting the Challenge took on many forms, and we can reframe the Juwah (2002) scaffolding for the European Challenge as follows:

- The knowledge and expertise of tutors*: eleven tutors all with different backgrounds participate in the challenge, several of which are both academics and practitioners in corporate relocation. Informal interaction meant that this*

resource was widely engaged with whether in the learning space provided in the hostel in Berlin or in the bar in the evening.

- Context setting and instructional content up-loaded to the Blackboard VLE: *comprehensive materials organised into themes provided a comprehensive reference point, much of the material was sourced and up-loaded autonomously by students during the pre-challenge period when they were investigating their allocated theme, thereby giving them ownership and becoming “experts” for the benefit of the whole group.*
- Case Studies and other information up-loaded to the VLE and presented at the opening conference: *only one hour of “instruction” is provided in the two weeks of the challenge by the lead tutor, students themselves presented case studies and other information, sharing resources and knowledge.*
- Stories from tutors, students and from the tutors acting as the executives of the client company: *tutors who are practitioners provide interesting stories and personal encounters, practitioners also provide stories of real relocation projects adding texture and realism.*
- Prompts from the tutors acting as the executives of the client company: *the role play drives most of the learning, carefully managed role descriptors ensure stories, behaviours and priorities are consistent but mirror reality in having tensions and concerns.*
- Technology: *the Blackboard VLE to drive learning and facilitate communication for groups, who are scattered across Europe, set up to facilitate autonomous use by each group.*

3.3 Facilitated Autonomy

In the European Challenge facilitated autonomy is explicitly designed into the project in a number of different ways.

Syndicated Knowledge sharing

In the preparation for the Challenge students work on an allocated knowledge theme. Whilst they are given guidance and a range of initial texts and references to work from, it is their responsibility to build a contemporary, focused knowledge base for their component of the challenge. An element of peer pressure and institutional pride drives high engagement, after all when they first arrive in Berlin they are still in their Institutional teams and will be presenting their knowledge theme to the other students from many other countries. In addition knowledge that they in turn will also become the “experts” for that knowledge theme drives motivation and engagement without intervention form tutors. Students are required to prepare for the first day in Berlin:

- an A0 sized poster for a poster conference

- a briefing paper for circulation
- and populate the Blackboard area for their allocated theme with a minimum of THREE new appropriate and useful resources.

The success of this approach through the creation and sharing of a contemporary knowledge platform from which the project can be operated from resonates with the work of Cohen and Levinthal (1990, p. 84) “absorptive capacity has been demonstrated in studies that show that a person’s learning rate is determined by the breadth and depth of his or her prior knowledge”. The more objects, patterns and concepts in one’s memory, the more rapidly one acquires and uses new concepts (Bower and Milgard, 1981).

Flexibility in using the Blackboard VLE

Autonomy is also embedded in the way in which freedom and flexibility of the use of Blackboard has been embraced by the providing University – the Hanzehogeschool, Groningen, The Netherlands, allowing students greater access and control than is usual.

Analysis of student autonomy is still being evaluated in detail. However, initial outputs show unprecedented levels of student autonomy as measured by the diversity of usage of the tools and resources provided to students by the Blackboard VLE. Each student team was given its own Blackboard site and was encouraged to develop its style, format and management of the site in an autonomous setting.

Initial results show a wide diversity in the use and development of the sites with standard deviations showing a wide variety of usage of the various components. Simple analysis of the usage indicates that some groups preferred a series of discussion boards around specific topics and virtual meetings in an informal and fairly unstructured format, whereas other groups were highly structured requiring formal virtual meetings at set times every week and a formal minutes and agenda system.

Simple graphical analysis of each team’s use of the communications facilities shows the diversity of engagement and supports the view that high levels of student autonomy were achieved. A fascinating additional study would be to analyse the formality of working against the make up of the teams to identify if cultural typologies of different nations influence the autonomy of use of the Blackboard resources. This is set out in Figure 5 below.

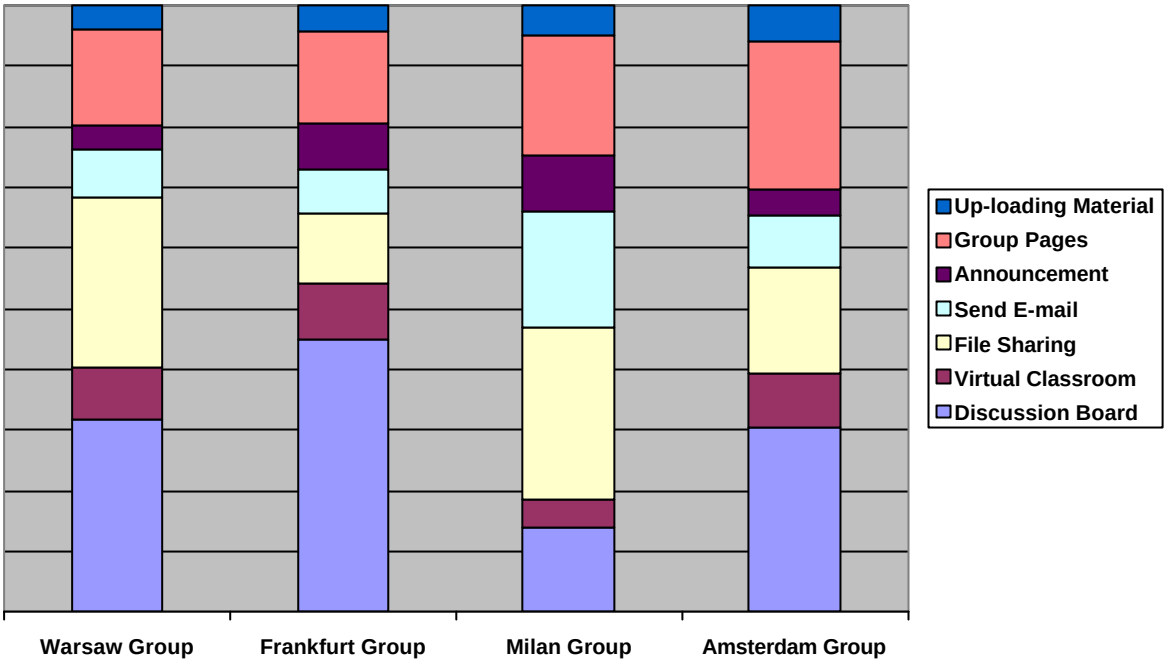


Figure 5: Comparison of Challenge 2006 groups’ use of communication tools

Note: all groups were given identical resources and briefing information as to how to use the facilities. A proxy variable for autonomy.

Initial comparisons with the control groups working in one country and not given the same amount of control over their resources show fewer interactions, less motivation and inferior outcomes to those given high degrees of autonomy over how they manage the project over a 12 week semester.

3.4 Motivation

Motivation is examined in respect of the elements identified in the section below.

Before doing this however, it is worth considering how motivation could be measured in terms of an output. In evaluation of the European Challenge we examined the Blackboard statistics for the European Challenge project against a control group engaged in a similarly weighted Blackboard delivered assignment using a more traditional approach. Each project had the same number of ECTS and contact hours.

Interrogation of the Blackboard course statistics reveals amazing levels of engagement by the European Challenge groups, for example, the seven strong team allocated to Madrid as their potential location produced an astonishing 5511 hits on the site during the 12 week semester period (see Table 4 for a breakdown of hits). Examination of the detailed usage shows an even spread of usage by students and represents an average of 76 hits per week per student.

Table 4: Numerical analysis of engagement with the Blackboard virtual learning environment for one Challenge group (Madrid)

Blackboard Statistics: *Total Number of Accesses per Area*		
Area Name	Hits	Percent
Announcements	1734	31.46
Course Information	204	3.70
Staff Information	164	2.96
Course Documents	3171	57.53
Assignments	134	2.43
Books	104	1.88
Total	**5511**	**100**

This compares with a total of only 489 total hits for the comparable “control” group of six students following a Blackboard enabled project of the same credits and duration in the final year of an undergraduate programme in the UK.

Examining the individual components of Motivation

Realism (R_{ea})

The best evidence of realism is the fact that Steven Skinner, a 2007/8 participant in the European Challenge from Sheffield Hallam University, won the CoreNet Global/NB Real Estate essay competition for 2007-8 based on an aspect of the Challenge and at the award dinner talked to practitioners who undertook corporate relocation activities. Their reaction was that the project exactly replicated good practice and in fact in parts took it to new levels of sophistication.

The following student comments in focus groups reinforce the high degrees of relevance:

> Nick (Nunnington) does this kind of corporate relocation in practice as a consultant and he brought case studies and stories from his experience which really helped us with the project. Knowing this kind of thing is done for real made me want to learn more about the subject and it is something I think I would like to now do in practice.
>
> I know that doing this project has expanded my vision and appreciation of real estate and how it affects businesses and organisations. I saw, when I went to

> Frankfurt, that we were doing what Jones Lang LaSalle do in reality and I feel this will be very beneficial in securing a job.
>
> One of our tutors from Johns Hopkins is currently involved in corporate relocations in his own practice in Washington DC, he constantly related the simulation to his own work and it made us realise just how realistic the project was.

The following quote from one of the participants in the 2007-8 European Challenge demonstrates how the realistic tutor role play also drives engagement:

> I realise now the limitations of lectures, when I compare this module to the others on the final year I am amazed how much I learnt from the European Challenge project and wanting to read the materials on Blackboard to ensure I could complete the task - never read so much for a tutorial as I do before a client grilling.

Relevance (R_{ev})

Relevance is always a controversial indicator, with many students not recognising the relevance of material until they have left university. In the Challenge relevance is measured not only in terms of the material engaged with and the knowledge created, but also the skills developed and how these are valued in terms of employability. At the final presentations of the Challenge, employers are invited to attend and jobs have been secured as a consequence of these encounters. Feedback from employers is that the Challenge provides hands on experience of some of the most important, but often neglected, aspects of skills development for real estate professionals. In particular, employers reported the need to provide succinct and client focused presentations and to communicate effectively with clients who may not know or agree what the outcome of their real estate needs are. Both of these are actively engaged within the European Challenge process.

Perhaps the best way of evidencing relevance is in relation to employability and by examining a recent job description for one of the top five real estate practices. This is reproduced exactly in Table 5 as in the on-line job description with a column added to show if this aspect of the job is embraced by the European Challenge project.

Table 5: A job specification for a major Real Estate Consulting Practice which mirrors the European Challenge project activities

Duties & Responsibilities ***Typical projects include some or all of the following:***		
Workplace consultancy and change management	Turning real estate solutions into business solutions by creating environments which support the way people work.	✓
Estate, Property & Accommodation Strategy	Working with clients to translate their business needs into a practical plan to align the estate with the organisation.	✓
Financial Modelling	Applying financial expertise to advise on the optimum structure within which to hold and occupy real estate and structure transactions.	✓
Major Relocations	Advising on and managing significant relocations, including, where appropriate, providing a turn-key service.	✓
Organisational Reviews	Reviewing the policy, practices, structures and relationships through which major organisations manage their real estate.	✓
Strategic Property Advisor	Providing client-side support on specific projects and longer term roles. Appointments include Restructuring, Recruitment, Virtual Property Director and Interim Management support.	✓
Outsourcing and procurement	Deploying market-based expertise to out-source and procure real estate related services ranging from estate management, FM and professional Design Team appointments.	✓

Enthusiasm/personality of the tutor (E_p)

A consistent comment in the focus groups over the three years of study was that the enthusiasm and personality of the tutors involved had a big impact upon motivation not only to engage in the Challenge but to participate in the European version. It is quite clear that the enthusiasm generated by both the tutor and previous students who had undertaken the project provided concrete motivation to join the project.

During the project it was commented that "tutors seemed to be energised by the project – enthusiastic and enjoying the challenge of the role play – this rubbed off on us…the energy seemed to transfer itself to us…it was very motivating."

Examining the project in terms of the Lantos (1997) PROFESSOR motivational framework demonstrates high degrees of Enthusiasm/personality of the tutor as set out in table 6.

Table 6: An analysis of the European Challenge against the criteria of the PROFESSOR model

P	**Pragmatic, Problem Solving and Participation provoking**	The European Challenge deals with a realistic scenario that demands a pragmatic response by both tutors and students. Tutors are constantly improvising through role play making the participation lively, dynamic and engaging.
R	**Reward-dispensing and reinforcing**	Games are used in the opening weekend to build trust and support in teams and between tutors and students. The role play is both serious in ensuring students understand that consultancy is never just based on paper based interaction but also fun, through the exaggeration of conflicts between the Board members of the "client". Feedback from the first stage is given within hours of completion to ensure the second stage is entered into in an appropriate way.
O	**Objectives orientated and Outcomes achieving**	Highly explicit outcomes are embedded in the student briefing document in both academic and a personal growth context. Specific interim outcomes drive achievement but how these outcomes are achieved is left to the student/team.
F	**Flexible and Fluid**	The project framework has flexibility explicitly designed in to give more time to areas that capture the teams' imagination. Teams can pursue specific routes in negotiation with their client. Several surprising activities include staged "disagreements" between Board members to highlight internal conflicts and politics within the client organisation.
E	**Enthusiastic and Encouraging**	Tutors give up two weeks at a busy time of year because they believe in the project and want to participate. This ensures vitality, engagement and enthusiasm which reinforces the positive attitudes of the student participants. Through the intensity and "lock-in" nature of the format of delivery, informal interaction and relationships are an inherent part of the delivery.
S	**Satisfier of Students' needs and Salesman (Customer) orientated**	The work is highly relevant and realistic and valued by employers. Participation by professionals who undertake the simulated activity for real and are very positive about the project reinforces the positive, motivated attitude of participants. Students are told that HR professionals will be observing the final presentations in order to "talent spot" for graduate recruitment.
S	**Sincere and ethical, Straightforward**	Review meetings with both allocated and impartial tutors ensure consistency and lack of bias.
O	**On top of things and "Cutting Edge"**	Students can see for themselves when visiting their allocated city and talking to the practitioners who facilitate this part of the simulation that the project mirrors, if not exceeds, real life practices.
R	**Rapport establishing and Relationship building**	A major dynamic of the intensity of the project and through the role play is that students and tutors share a lot of time together and get to know each other more effectively than in a standard "drip feed" learning experience.

Enjoyment (Fun) (E_{nj})

It is clear from both the literature and practice that enjoying the learning experience is an essential component of success but one which perhaps, practitioners are least

comfortable with. This will be a difficult element to measure and can realistically only be measured through the eyes of the participant. Therefore feedback will be needed to create a “litmus scale” of enjoyment/fun against which future projects could be calibrated.

Two quotations from past participants of the European Challenge demonstrate the importance of enjoyment and how it is embedded:

> The staff from different countries and cultures also seemed to enjoy the interaction…taken out of their home environment they seemed different…the motivation was infectious…our tutors were enthusiastic and enjoying the role play it rubbed off on us.

> This has been a life changing experience and has equipped me not only with relevant advanced knowledge that I can apply in a practical way, but a whole range of new skills, from working under pressure to diplomacy, needed when working in an international team. It has boosted my self confidence and given me a ready made European network of contacts and quite a few new friends. I have never worked so hard, but also had so much fun.

Manageability (M)

There is no doubt that the European Challenges demands high levels of commitment, engagement and participation and that this is driven by the other elements which make up the motivation variable. It is interesting to compare what is achieved in this project in two weeks compared to running the project over a five week period using a classroom/virtual experience with the same outcomes and credits. Over the past four years of running parallel projects there is no doubt that better written submissions and presentations are made by the group undertaking the intensive version of the project than the longer term project with less hours available to them. There is no doubt that motivation, being in Europe, locked in a hostel with almost 24/7 access to tutors has a huge impact on motivation. As one student commented:

> The project was a matter of lots hard work, especially to understand aspects that are not a normal part of the curriculum…at first we were worried about how we would achieve the high expectations of our tutors, but the excitement and reality of the project kept us motivated.

Notwithstanding this, manageability seems to be a moveable feast and may prove difficult to calibrate. What is manageable in the intensive, closeted environment of the two week version of the project seems to be much higher than that of exactly the same project undertaken in a less pressurised context. Manageability is therefore probably more realistically and effectively measured in relation to the literature in terms of Loewenstein (1994) and measurement of the gap between the current knowledge level and the desired (or intended) knowledge state.

4.0 Conclusions

The paper has attempted to bring together the various components of contemporary education and to reframe them in a model which examines projects from the perspective of a challenge. The proposed model attempts to focus the disparate themes of contemporary education and to examine the positive constituents of successful problem based learning. The proposed model is successfully applied to the European Challenge project and resonates highly with the comments made in the comprehensive evaluation of the project. The analysis indicates that highly successful enquiry and problem based learning requires careful orchestration of the variables presented and is unlikely to succeed if any of them are neglected. Projects of this type require exhaustive and front-loaded investment to ensure that they are motivating in terms of their realism, relevance, enjoyment and manageability and this is reinforced by the enthusiasm and commitment of the tutor(s). Carefully facilitated autonomy with adequate support is essential for success and this requires careful planning and thoughtful execution. Perhaps the most interesting outcome is in relation to the nature of challenge itself. Hahn’s original ideas seem to resonate surprisingly well with the other aspects of contemporary pedagogy examined in this paper. The right level of challenge coupled with appropriate levels of support remains, as evidenced by the European Challenge, an essential component to drive a successful project.

The variables identified in the proposed model are not independent and future work will be required to ensure that appropriate metrics are created which adequately maintain independence and consistency.

The next steps are to apply the model to other Challenges developed by the author and to attempt to provide a framework model which can be used to measure and calibrate the success of projects by examining the constituent variables and helping tutors involved in contemporary problem based learning projects to design in aspects of the challenge philosophy to ensure success.

5.0 References

Benson, P. (1997) The multiple meanings of autonomy: Responsibility, ability and right. In Dickinson, L. (Ed.) *Autonomy 2000*: *The development of learning independence in language learning. Conference Proceedings.* Bangkok: King Mongkut’s Institute of Technology, Thonburi.

Benson, P. (2001) *Teaching and researching autonomy in language learning.* London: Pearson Education Ltd.

Benson, P. & Voller, P. (1997) *Autonomy and independence in language learning.* London: Longman.

Breton, G. & Lambert, M. (Eds.) (2003) *Universities and globalization, private linkages, public trust*. Paris: UNESCO.

Boyer, E. (1990) *Scholarship reconsidered*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Bower**,** G. H. & Milgard**,** E. R. (1981) *Theories of learning.* Englewood Cliffs, NJ: Prentice Hall.

Candy, P. C. (1991) *Self-direction for lifelong learning.* California: Jossey-Bass.

Centre for Excellence in Enquiry-Based Learning. (CEEBL) (2008) *What is Enquiry-Based Learning (EBL)?* URL: http://www.campus.manchester.ac.uk/ceebl/ebl/

Cohen, W. M. & Levinthal, D. A. (1990) Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35 (1), 128-152.

Dickinson, L. (1995) Autonomy, self-direction and self access in language teaching and learning: The history of an idea. *System*, 23 (2), 165-174.

Hahn, K. (1960) *Annual meeting of the outward bound trust* on 20th July, 1960. URL: http://www.wilderdom.com/KurtHahn.html

Holec, H. (1981) *Autonomy and foreign language learning*. Oxford: Pergamon Press.

Juwah, C. (2002) *Using communication and information technologies to support problem-based learning.* URL: http://www.heacademy.ac.uk/assets/York/documents/resources/resourcedatabase/id449_using_it_to_support_problem-based_learning.pdf

Lantos, G. (1997) Motivating students: The attitude of the professor. *Marketing Education Review,* 7 (2), 27-38.

Little, D. (1991) *Learner autonomy 1: Definitions, issues and problems*. Dublin: Authentik.

Loewenstein, G. (1994) The psychology of curiosity: A review and reinterpretation. *Psychological Bulletin,* 116 (1), 75-98.

Knowles, M. S. (1975) *Self-directed learning*. New York: Association Press.

McKenzie, M. D. (2000) How are adventure education program outcomes achieved?: A review of the literature. *Australian Journal of Outdoor Education*, *5* (1), 19-28.

Neill, J. (2004) *Outward Bound: History of Outdoor Education Research.* URL: http://wilderdom.com/research/HistoryResearch.html

Nonaka, I. A. (1994) Dynamic theory of organisational knowledge creation, *Organisation Science*, 5 (1), 14-37.

Peters, O. (2004) Visions of autonomous learning. keynote presentation at the *European Distance Education Network (EDEN) Conference*, Oldburgh, March 2004.

Priest, S. & Gass, M. (1997) *Effective leadership in adventure programming*. Champaign, IL: Human Kinetics.

Sass, E. J. (1989) Motivation in the college classroom: What students tell us. *Teaching of Psychology,* 16 (2), 86-88.

Further Reading

Boisot, M. H. (1998) *Knowledge assets: Securing competitive advantage in the information economy.* Oxford: Oxford University Press.

Boud, D. & Feletti, G. (Eds) (1997) *The challenge of problem based learning*. Second edition, London: Kogan Page

Cairncross, F. (1997) *The death of distance: How the communications revolution will change our lives.* London: Orion Business Books.

Cohen, M. (2001) Real estate investment moves to the defensive. *Financial Times*, 8 May 2001.

Darwin, J. (1996) Dynamic poise - a new style of management - Parts 1 & 2. *Career Development International*, 1 (5), 21-25.

Handy, C. (1989) *The age of unreason*. Business Books, London.

Jacques, R. (1996) *Manufacturing the employee: Management knowledge from the 19th to 21st Century*. London: Sage Publications.

Knowles, M. S. (1980) *The modern practice of adult education: From pedagogy to andragogy.* Chicago: Follett.

Moorcroft, S. (Ed.) (1992) *Visions for the 21st Century*. London: Adamantine Press Limited.

Moore, G. (1995) *Inside the tornado*. New York: Harper Business.

Nonaka, I. & Hirotaka, T. (1995) *The knowledge creating company.* Oxford: Oxford University Press.

Quinn, J., Anderson P. & Finkelstein, S. (1996) Managing professional intellect: Making the most of the best. *Harvard Business Review,* March April 1996, 71-80.

Ratcliffe, J. & McIntosh, A. (2001) King Sturge: Global Real Estate Scenarios, London full report published by King Sturge and summarised in *Foresight: The Journal of Futures Studies, Strategic Thinking and Policy,* 3 (5), Oct.01

Ridley, N. (2001) Unifying force. *Estates Gazette*, July 2001.

Seely Brown, J. & Duguid, P. (2002) *The social life of information*. Boston: Harvard Business School Press.

Thanasoulas, D. (2000) What is learner autonomy and how can it be fostered? *The Internet TESL Journal,* VI (11), November 2000. URL: http://www.aitech.ac.jp/~iteslj/

Tranfield, D., Smart, P. & Smith, D. (2002) *Changing times strategic consulting for professional effectiveness.* RICS Management Consultancy Faculty and Cranfield University School of Management.

Wenden, A. (1998) *Learner strategies for learner autonomy*. Great Britain: Prentice Hall.

Appendix A: The European Challenge: an overview

Historical background

The “European Challenge” is based on an idea from Nick Nunnington (Sheffield Hallam University UK) who developed in 1997 the “Vancouver Challenge”, a virtual development exercise for students and practitioners. The activity was a great success being runner up in the global EMMA (Education Multi Media Awards) in the category of Adult Education competing with providers such as the BBC, Mercedes Benz and Harvard Business School.

The success of the Vancouver Challenge inspired real estate faculty members of *Hanzehogeschool*, Groningen to commission Nick to design a similar programme but this time with a **corporate real estate focus**. This has grown and now includes a variety of universities across Europe including the European Business School, Kingston, Sheffield Hallam, Warsaw School of Economics, Dublin Institute of Technology, The Technical University of Slovakia, The Institute of Construction, Copenhagen and Johns Hopkins Washington DC. In 1996 additional partners in Germany, Finland and Slovenia joined the project. The European Challenge project involves students working on a complex consultancy project simulating the relocation of a 350 person financial services organisation to a new Headquarters building in Europe.

The project is partly funded by the European Union who fund the travel and accommodation costs of the 80+ students and 10+ staff who are involved in the project each January. Nick’s involvement is also funded through two of the Higher Education Funding Council (HEFCE) Centres for Excellence in Teaching and Learning (CETL) at Sheffield Hallam University.

Eighty students from eight universities, located in Denmark, Germany, Ireland, The Netherlands, Slovakia, Slovenia, Poland, UK and USA engage in a unique project, which showcases a number of contemporary approaches to real estate education.

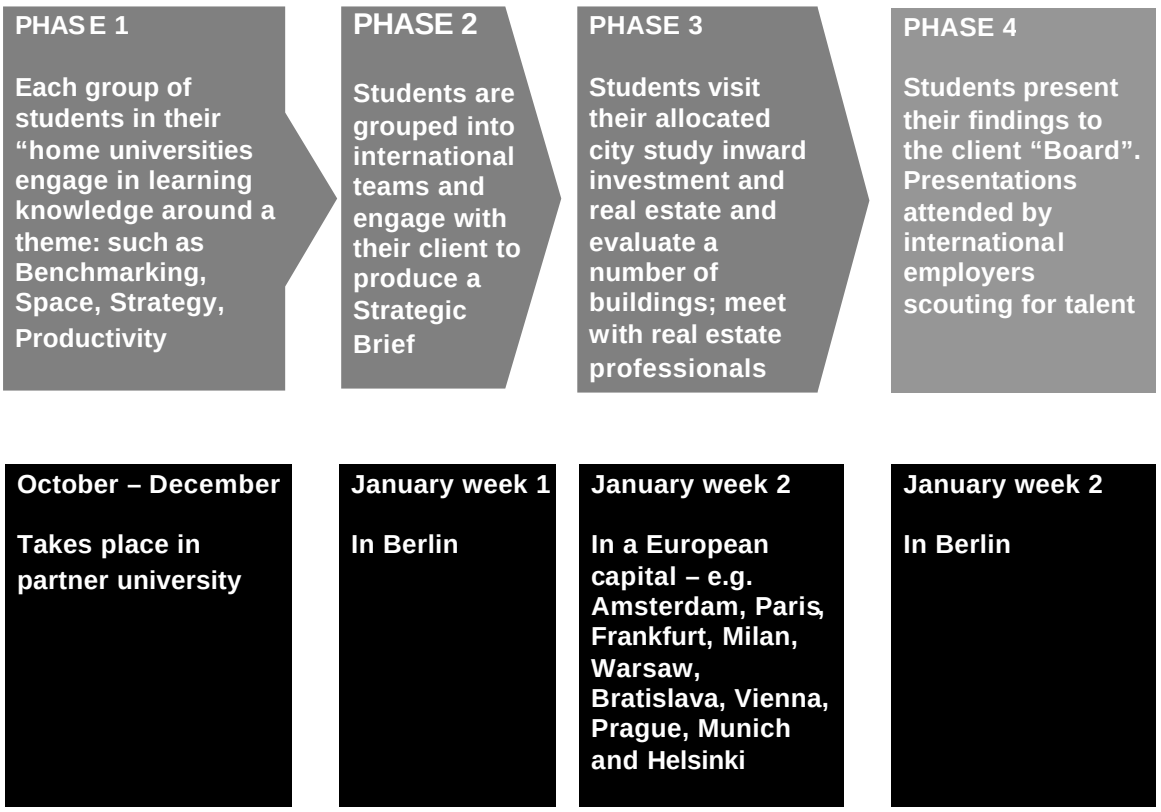
Need

The project recognises the growing significance of corporate real estate, the interface between business and real estate and the need for the profession to operate with high grade consulting skills. It is designed to expose students to a realistic project which examines real estate strategically, holistically and focuses on the impact of real estate on the bottom line, not just in terms of cost but also how it can be used to increase productivity. Ultimately it immerses students in cutting edge corporate real estate issues and has been very well received by all practitioners who have engaged with it, including James Charnaud MD of Client Solutions, Cushman & Wakefield, New York, who was present when the project was first introduced to Johns Hopkins students in Washington DC in October 1995 and more recently by industry leaders at the CoreNet

Global conference in Orlando Florida, where the winning students from last year’s Challenge were invited to attend as their prize.

Operation

The structure and schedule of the project is illustrated graphically below:



In the first semester the students work in their home university teams researching one of eight knowledge themes which underpin the practical project. They work autonomously using Blackboard and on the first formal day of the project they present their themes to the whole group, provide a briefing paper and up-load key resources they have found to the Blackboard virtual learning environment. The students are then formed into multi-national, inter-professional teams acting as consultants to the client. The students become consultants to each other and experts in their knowledge themes. Consultancy hours facilitate student to student learning and support. Tutors only act as facilitators, providing guidance and support but no traditional teaching.

The second stage of the project requires the students to prepare a “strategic brief” defining the needs of the organisation, its priorities, culture, adjacency preferences and expectations. Alongside comprehensive written material such as business plans, mission and vision statements, board meetings and client meetings using extensive role play with tutors acting as Board members ensure that the soft people management issues are thoroughly engaged with. Nick Nunnington has designed in tensions between the Board members which replicate his consultancy experience in this area and each tutor has a role play briefing which details their behaviour, personality types,

typical sayings and most important of all their stance on a series of fundamental decisions to be made in relation to the business relocation process.

At the end of the first week the students fly out to one of 11 major cities including Bratislava, Paris, Geneva and Brussels to evaluate the strengths and weaknesses of the location and find a suitable building using an objective matching technique to score the building location, attributes and specification against the organisational demands as set out in the strategic brief. Active involvement by inward investment agencies and local real estate consultants add to the realism of the experience.

Returning to Berlin for the second week the students are required to present a city template – profiling the cities in a consistent format, which requires both desk research and field investigation, it covers aspects such as business and personal costs, residential property availability, schools and access by air, rail and car. They also produce a detailed building appraisal; a space layout which preserves adjacencies identified in the strategic brief and on the final day a presentation to the Board of Directors designed to convince the company to move to their city, selected building and space configuration. Above all they must convince the Board that their solution will support the ambitious productivity improvements sought by the company.

On the final day the 11 groups present to the Board of Directors and the tutors from each participating university. The top three are then asked to repeat their presentation and to present to ALL staff, students and a jury which includes nominated professionals which have included Steven James, HR manager of King Sturge and HR managers from Cushman & Wakefield in Warsaw.

Outcomes

- an exciting and dynamic **challenge** based project for students, supervised by teaching staff and external professionals;
- an employability boosting activity;
- academic staff development and collaboration between institutions;
- sharing of knowledge and practice of the real estate market in European countries;
- sharing of knowledge about valuation systems, procurement, financing and managing of real estate;
- demographic, economic, social and political data in each country to determine locational advantages and disadvantages;
- knowledge about cultures, traditions, habits and business practices and the linkages between real estate and business;
- interaction and partnerships between sponsors, academic institutions and students.