

Developing Independent & Autonomous Learning

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“Independence ... is not the absence of guidance, but the outcome of a process of learning that enables learners to work with such guidance as they wish to take ... getting there needs considerable insightful planning and action.”
(Knight, 1996, p.35)

“... individuals enter higher education with very diverse levels of personal autonomy, and many of the educational processes which they have experienced in the past have not encouraged it. If ways of learning adopted in earlier stages ... are carried forward unchallenged into HE, there is a danger that individuals will become less, rather than more, autonomous ...”
(McNair, 1997, p.3)

“Definitions of independent learning focus upon developing skills in self-motivation, evaluation, judgement and research.” (Awaya and McEwan, 2001: www.hawaii.edu/met/ecell/ilearner.html)
Learner Profile, ECELL University of Hawaii, 2001

“Broadly, independent learning is undertaken outside contact hours, but contributes to course-specific learning outcomes. ... Independent learning is undertaken by students, either on their own or with others, without direct input from teaching staff.” (Thomas 2014)

Structure

1. Meaning of independent & autonomous learning
2. Case studies
3. Characteristics of independent & autonomous learners
4. Methods to develop independent & autonomous learning
5. Developing strategies to develop independence at module/course level
6. Developing strategies to develop independence at programme level

Terminology

“*Independent study* is a process, a method and a philosophy of education whereby a learner acquires knowledge by his or her own efforts and develops the ability for enquiry and critical evaluation”
(Candy, 1991).

Independent learning “describes a wide range of practices. It has become a rallying cry for those who believe that students need, or can cope with, much less support from teachers than they often receive, and that such independence is beneficial to students. ... Independent learning nearly always involves extensive independent use of the library and other information sources rather than formal teaching. Lecturers’ time is concerned more with identifying clear learning goals, providing support and feedback during learning, and assisting in the collation, presentation and assessment of learning outcomes than with conventional teaching” (Gibbs, 1992a, pp. 41-42).

Someone qualifies as an *autonomous learner* when 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 (Based on Holec, 1982, cited by Thansoulas, nd, p.1).

Source: Based on Healey (1998, 9-10)

Control and Independence Strategies

"Student independence and autonomy is seen as a clear indicator of academic quality (see analysis of subject benchmark statements ...), yet to enable it may involve academics letting go of a degree of control in learning and teaching – something which may prove difficult to defend in a ‘Quality’ culture" (Hughes, 2001, 2).

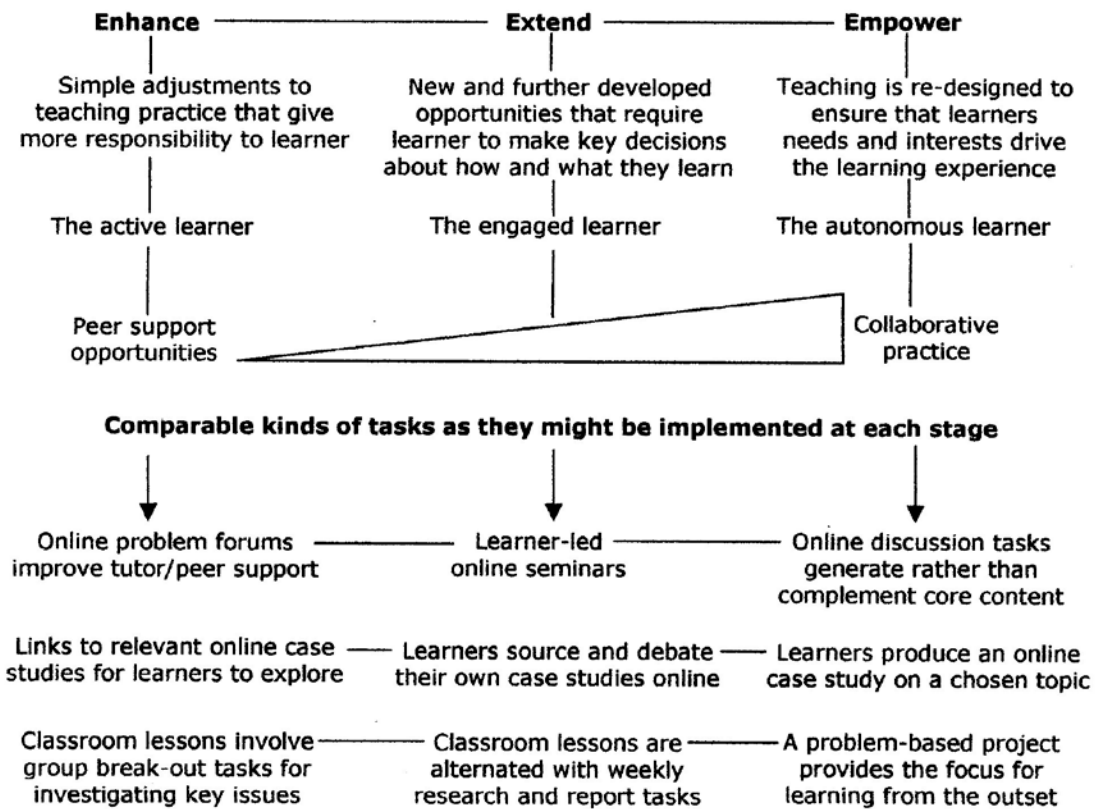
Problem areas resulting from large classes	Characteristic methods adopted	
	Control strategies	Independence strategies
1. Courses lack clear aims and objectives	Use of objectives Highly structured courses	Use of learning contracts Problem-based learning
2. Students lack knowledge about their progress	Objective testing Programmed instruction and CAL	Development of student judgement Self-assessment
3. Students lack advice on how to improve	Assignment attachment forms Automated tutorial feedback	Peer feedback and peer assessment
4. Library resources cannot support wide reading	Use of set books Use of learning packages	Development of students' research skills More varied assessments
5. Tutors are unable to support independent study	Structured projects Lab guides	Group work Learning teams
6. Students lack the opportunity for discussion	Structured lectures Structured seminars and workshops	Student-led seminars Team assignments
7. Tutors are unable to cope with the variety of students	Pre-tests plus remedial material Self-paced study	Variety of support mechanisms Negotiated goals
8. Tutors are unable to motivate students	Frequent testing High failure rates	Learning contracts, problem solving, group work

Source: Gibbs (1992) *Teaching More Students: Problems and Course Design Strategies* (Oxford: Oxford Centre for Staff Development)

"Independent study means a lot more than students working on their own, rather it emerges when students play a significant part in choosing their own direction, discovering their own learning resources, formulating their own problems, deciding their own course of action and reflecting on the outcome of that process. If students are to develop independence, they need to be given the space in which to act as autonomous learners, they need freedom. However, this does not mean that to develop independent learning skills students simply need to be abandoned. Rather, a safe learning structure needs to be constructed that provides training, support and guidance from tutors and peers through the experience. The key challenge is the balance between freedom and structure. Academics are understandably cautious about letting go of control (à la Summerhill), particularly in the new ‘Quality’ culture, however ways can be found to create ‘temporary autonomous zones’ of student-centred practice that are defensible and even desirable" (Hughes, 2001, 5).

The 3E Approach

With the above explanation and provisos in mind, the figure below attempts to clarify the basic 3E approach. The Enhance, Extend and Empower stages are shown as a continuum, as at a broad level each stage can be seen as a step further towards the kind of radical change in teaching practice that is ultimately possible.



Source: TESEP (2007) www.napier.ac.uk/transform

Case Studies

A. Module/Course level case studies

Inquiry-based learning introductory course for social sciences had a significant impact on students' subsequent performance at McMaster University, Canada

McMaster University has been running a first-year course for social sciences based on inquiry since the late 1990s. This case study discusses this award-winning course as it evolved over the first five years (see Justice *et al.* 2002; 2007a), since then other instructors have taken on the course and is taught to reflect their interests. It was typically taught in groups of no more than 25 students assigned to an instructor. All of the groups had the same curriculum, reading material, process of assessment, and goals that were outlined in a detailed compendium. The classes met for 12 three-hour concurrent sessions. Class time consisted of a combination of exercises and tasks for building the students' critical abilities and time for students to share ideas about their individual inquiries with other students. Much of class time involved groups of four or five students assisting each other in such things as clarifying understandings or planning research strategies.

All students investigated aspects of a broad social science theme, such as 'self identity' and addressed a common inquiry question, such as: 'Why do images of ethnicity, race, gender, sexuality, age, class, or abilities help to create aspects of personal and community identity?' Students had to

propose their own inquiry question, such as: 'Why do some children apparently become violent after watching violent cartoons while others seem to be unaffected?' They had to justify why the question was important in relation to existing literature. They then investigated the question through a process which involved developing and testing hypotheses using secondary sources. The course emphasized the development of skills, including critical reading and thinking, independent and collaborative learning, information searching and evaluation, analysis and synthesis, oral and written communication, and self and peer evaluation. Analysis of five years of data (Justice et al. 2007b), comparing students who took the Inquiry course with comparable students who did not, shows that it has had a significant impact on how well students perform during their academic careers. The findings allow for initial differences between the two samples. Taking the Inquiry course is associated with statistically significant positive differences in obtaining passing grades, achieving Honours, staying on the Dean's honour list, and remaining in university.

Recent research investigated in what way(s) Inquiry 1SS3 students changed that might explain their long-term enhanced performance at university. A quasi-experimental study compares a randomly selected group of 54 students who took Inquiry 1SS3 in their first semester with 71 comparable students who did not (Justice *et al.*, 2009). The research goes beyond self-reports of learning and directly measures abilities and performance. Inquiry 1SS3 is associated with meaningfully higher scores in actual performance tests of many intellectual and academic skills and often the magnitude and significance of the difference between groups is comparable to that between upper- and lower-level students (~2 years of university).

Sources: Justice *et al.* (2007a and b; 2009);

Integrating resource based learning into courses is about designing what students do in and out-of-class rather than what teachers do

The first part of the Environmental Philosophy third year module at Oxford Brookes University is designed around an exercise using a range of resources, including two handbooks, readings, and an extract from a classic film - *The Grapes of Wrath*. The exercise introduces the students to different ways in which geographers in the twentieth century have interpreted the relationships between society and environment. The two handbooks are used instead of lectures. The first outlines four environmental philosophies - environmental causation, cognitive behaviouralism, Marxism and Gaianism. This handbook (19 pp) is given out at a preliminary meeting when the students are told they need to be familiar with all four philosophies by the day school the following week.

The module attracts approximately 70-80 students. At the beginning of the day school, run by four staff, the students are put into seminar groups of 16-20 students. The students then divide themselves into four groups and each group is randomly allocated one of the four environmental philosophies, along with some additional reading material. The groups are given 30 minutes to prepare a 5-6 minute presentation summarizing their specific philosophy and commenting on its strengths. A discussion follows in which other groups explore the weaknesses in what they have heard.

The seminar groups reconvene and the second handbook is distributed, which contains a selection of writings about the Dust Bowl years of the 1930s, some background notes on *The Grapes of Wrath*, and a brief content analysis of the seven scenes that comprise the 20 minute extract they will see. The groups are then given an hour to prepare a 7-10 minute presentation, in which it is suggested that they should reiterate their philosophical approach, give their interpretation of the Dust Bowl from that position, and pinpoint where, from that perspective, the 'blame' for the Dust Bowl disaster lies. The students have a second opportunity to see the film extract. They make their presentations following lunch. These are then assessed by the tutors and their peers against pre-circulated criteria, which are also used to structure a discussion, which seeks to pull the ideas together.

The experience of participation in the exercise acquaints students with the role that they play in later sessions of the module, namely, mastering a viewpoint by having to represent and explain its distinctive features to others. The exercise supports 18-24 hours of learning over a three to four week

period. The first handbook took about 20 hours to produce, the second about 10 hours. The course has run for five years. In 1998 the exercise was modified for use in a new first year module.

Further information: John Gold, George Reville and Martin Haigh, Geography Department, Oxford Brookes University; email: jrgold@brookes.ac.uk

Reference: Gold *et al.* (1996)

Source: Healey (1998, 32-33)

Learning through inquiry: fostering the development of a community of researchers at Sydney Australia

Involving undergraduates in the research process exhorts students to learn by active participation and encourages the development of a sense of a community of researchers. Learning through inquiry places the teacher as 'companion researcher' or guide (Boyer Commission 2000) and facilitates students' ability and desire for independent learning. This paper outlines the development of inquiry based learning in a large upper level undergraduate Sociology class at the University of Sydney. In 'Social Justice, Law and Society' students engage in collaborative group research projects, critiques of peers' written work, and peer assessment. The use of learning technologies to facilitate peer communication, as well as feedback to and from the teacher, is integral to this process of 'learning as inquiry'. The paper briefly outlines the relationship between learning outcomes, teaching methods, including learning technologies, and assessment strategies in this unit of study. Two themes are then addressed: a) students' experiences of learning through inquiry or discovery, and b) the advantages of appropriate learning technologies to enhance student learning in this context. The paper proposes that inquiry based learning enhances and supports students' independent learning, as well as fostering students' sense of place within the community of the university.

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Academic controversy in business ethics at AUT, New Zealand

Working in tutor-selected groups, students at Auckland University of Technology research an allocated "academic controversy" in business ethics, presenting their findings in an oral presentation to the class. Academic Controversy (Johnson and Johnson, 1996) makes creative use of differences of opinion between individuals or among group members. It exists when a student's or part of a group's ideas, information, theories and opinions are incompatible with another's and the two seek to reach an agreement. Academic controversies are resolved by taking part in what Aristotle called "deliberate discourse" i.e. the discussion of the advantages and disadvantages of particular views or proposed actions. This discussion can result in new solutions or agreement being found. One of the following topics will be allocated to each student group. These topics have been chosen because there are at least two tenable and well documented positions about each, i.e. they involve academic controversies in the discipline of business ethics.

1. The social responsibility of business is to increase its profits.
2. Codes of ethics are merely window dressing.
3. Insider trading - is it ethical?
4. Whistleblowing - is there a place for it in business?
5. Advertising to children - just another market?

Students are then required to:

1. Research and prepare (at least) two positions
2. Present and argue for each position
3. Engage in an open discussion within the group to argue and debate the opposing position and rebut attacks on the position
4. Synthesise and integrate the best evidence and ethical reasoning into a joint position
5. Present their findings to class members

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Source: <http://www.itl.usyd.edu.au/RLT/resources/search.cfm>

Involving students in organisational consultancy, Middlesex University, UK

The module "Consulting to Organisations" aims to provide student with "real life" experience by engaging them directly as consultants with organisations and the issues that those organisations have identified as significant. On organisational premises, and in collaboration with the internal personnel there, a small team of students clarify the issue with their client. Information is then collected, using a variety of research methods, and analysed in the light of both academic theory and the specific organisational context. Recommendations for action, both orally and in writing, are made to the client. As well as experiencing the reality of the organisation, students also experience working with a team of diverse peers to produce credible outcomes.

Initially, four developmental workshops are provided: these cover team building, consulting, organisational culture and client contact. Four feedback sessions are organised during the subsequent consultancy phase of the module. The parameters of the module are set out in a handbook, and within these students are expected to take responsibility for their own work and that of their team. This is a Level Two module of eleven weeks, normally undertaken by undergraduates in their second year. It carries the same credit award as any other module and feedback from students, from organisational clients and from a number of external examiners over the fourteen years the module has been in operation has been extremely positive. Four modes of assessment are employed and they reflect the aims of the module and also provide a range of methods, which is thought to reflect the different strengths and weaknesses of the student group. All students are required to attempt, though not pass, all four of the elements: a written report and oral presentation to their respective clients, a team peer-assessment exercise and an individual learning report. The learning report requires students, on an individual basis, to identify and review their learning from both their experience of the module, with specific reference to their client contacts, and their experience of working in a team. The areas addressed are knowledge, skills, attitudes and emotions.

Sources: Correspondence with Philip Frame, 2006; Frame and O'Connor (2003)

Final Year Work Based Projects in the Humanities at Sheffield Hallam University, UK

This module offers humanities students a chance to gain experience from a work based/ work related setting across 2 semesters. Examples of the range of recent types of project include:

- Writing a handbook for volunteers working with dementia sufferers in residential homes.
- Aim Higher Mentoring Associate work in secondary schools.
- Writing for the in house film magazine and managing external relationship with the Showroom Arts Cinema
- Youth group leadership
- Student Union Volunteering committee chair and publicity responsibilities.

The project/placement is negotiated by the student within guidelines from the tutor or it can be a prearranged project with a contact established by the tutor. At level 6 students are expected to take on a leadership or management role. The students are supported through this process by taught sessions and tutorials in each semester. They work towards the submission of a folder which records their experience and reflection and its relationship to their degree, personal development, and employability skills.

Source:

<http://insight.glos.ac.uk/tli/activities/ntf/creativehops/examples/Pages/Arts,MediaandHumanitiesExamples.aspx>

Engaging students in applied research through a community sports development consultancy project at University of Central Lancashire, UK

The final year Community Sports Development module acts as a capstone module for Sports Coaching students which is taken in addition to the honours dissertation. Students work as a project

team through a consultancy brief with a partner agency and recommend strategies that can be employed to support community development through community sport and coaching initiatives. There are normally 8-12 consultancy briefs divided up among the 40-50 students, with students creating their own consultancy teams. Examples include: a) A “health check” of football refereeing in Blackburn; b) Community Sport and Crime Reduction; and c) Community Sport (“Street Dance”).

Source:

<http://resources.glos.ac.uk/ceal/resources/casestudiesactivelearning/undergraduate/index.cfm>

Charity Fund Raising Final Year Project in Business and Management Studies for Enhancing Employability at the University of Bradford, UK

This is a new module designed with two broad outcomes in mind:

- 1) to give students the knowledge and expertise they needed to perform well in the graduate selection process; and
- 2) to add to their CV activities which would give them something to talk about at interview and which would stretch them in the development of their skills.

The former was delivered via classroom teaching whilst the latter was seen as the product of planning and delivering fund-raising initiatives for one of a small number of charities. Students variously undertook football matches, disco nights, cake stalls, fashion shows, etc and on a significant number of occasions, obtained corporate sponsor ship to cover certain expenses. The emphasis of the module is on the practical demonstration of skills and students are asked to present an analysis of what they had done and why in an “Apprentice Boardroom” at the end of the module. Assessment criteria included their presentation skills, their performance as a team and their performance on the task. Whilst teams who raised larger sums of money typically did better than those who did not, the amount of money raised was not part of the assessment. Assessment was through a formal presentation undertaken in front of three employers as well as tutors and team documentation (minutes of meetings, accounts, receipt from the charity involved, evidence of communication with the charity, risk assessment of health and safety for the activities proposed, feedback from the mentor and two-side reflective account) submitted one week before the presentation. The documentation gave an indication of potential questions which could be asked at the presentation.

Source:

<http://insight.glos.ac.uk/tli/activities/ntf/creativehops/examples/Pages/Business.Hospitality.SportandTourismExamples.aspx>

Alternative Final Year projects in the Biosciences at the University of Leeds, UK

Final year students within the Biomedical Sciences group of programmes (Human Physiology, Medical Sciences, Neuroscience, Pharmacology) have the opportunity to undertake one of the seven types of research project. Each project is of 8 weeks duration, with students expected to commit 3.5 days per week to their project. Students are provided with a list of projects (with project descriptors) in March of the year preceding their final year and invited to choose, in rank order, 10 projects they would like to be considered for. Projects are then allocated based on student choice and ranking within the year group; with projects starting in the January of their Final Year.

The assessments for all project types are similar. Students are required to write a 25-30 page dissertation and deliver an oral presentation. Students undertaking critical review projects also have to submit a 5 page grant proposal linked to their review. There is also a supervisor allocated “productivity” mark.

i. Individual laboratory projects

Students undertake an individual programme of research in the laboratory of their project supervisor, often contributing to ongoing research within that laboratory.

ii. Group laboratory projects

Students work collaboratively, a team of 3-4, to undertake a programme of research; based either in their supervisor’s laboratory or in the teaching laboratories.

- iii. *Computer simulation project*
Students investigate the function of biological systems using established computer models (e.g. human cardiac myocytes).
- iv. *Critical review projects (with linked grant proposal)*
Students undertake a hypothesis driven critical review of the literature in a specific area/topic within the biosciences.
- v. *Survey projects*
Students undertake a public health survey under the general theme of “Healthy Lifestyles”.
- vi. *Science and Society projects*
Students undertaking science and society projects create, deliver and evaluate an interactive, curriculum enhancing teaching in local primary (students aged 7-11) and secondary (students aged 13-18) schools.
- vii. *Educational development projects*
Students undertaking educational development projects develop and evaluate learning resources for use in undergraduate teaching. Working either individually or in small teams, students develop learning resources or new teaching methods (e.g. social media) to support ongoing teaching.

Source:

<http://insight.glos.ac.uk/tli/activities/ntf/creativehops/examples/Pages/ExamplesofCreativeHonoursprojectsfromScience,Technology,EngineeringandMathematics.aspx>

Students undertake paid internships as agents of change or educational researchers in biosciences at the University of Leeds, UK

The Faculty of Biological Sciences, University of Leeds has recently begun to run two programmes of non-laboratory based internships for first and second year students. These provide good training for students who opt to take the educational development dissertation option. The first, badged as “Students as agents of change” is where students work in groups to develop a resource to enhance the curriculum; it can be something they have identified themselves as being needed within their programme or a project initiated by a member of staff. The second scheme is where the intern contributes (individually) to an educational research project. Examples of ongoing projects include podcasting of research seminars for student/staff use; improvements to educational environment; collation and evaluation of Open Educational Resources for teachers/students. Start-up funding for these internships was obtained from the University of Leeds Academic Development Fund and the Leeds for Life Foundation. These internships are extremely popular, with 63 applications for 18 internships in September 2011. A second tranche was made available in January 2012. Students undertaking Students as agents of change projects agree the number of hours required to complete their project with their supervisor and are paid in installments when they meet defined objectives/milestones. Educational research interns are paid, in two installments, for 75 hours work. For both schemes, academic support and advice is provided, as required, throughout the internship, a true collaborative partnership between the intern and supervisor to meet the agreed outcomes. Students are required to blog their initial aspirations, reflect on progress and the skills gained throughout the internship and provide an end of internship case study. The Faculty has incorporated the resources into its teaching and its public engagement activities and has committed to the continued funding of the scheme.

Source:

<http://insight.glos.ac.uk/tli/activities/ntf/creativehops/examples/Pages/ExamplesofCreativeHonoursprojectsfromScience,Technology,EngineeringandMathematics.aspx>

Students taking a historical methodology course engage in original oral history research at Indiana State University, US

The 30 or so students taking the introductory historical methodology course are engaged in original research. Anne L. Foster, an assistant professor of history, who teaches the course, was eager to find topics in which her students could "become experts" and make a real contribution to local knowledge.

In 2004, the class produced a history of the black community of the Wabash Valley, including Lost Creek, a neighbourhood of Terre Haute, Indiana, the city that is home to the university. Lost Creek was established in the 1820s by freed and runaway slaves with the help of local Quakers. The course stresses oral histories, and that year's project included a video interview with a 104-year-old woman whose grandparents were slaves. Another group of students, in the fall of 2005, interviewed three elderly local men with connections to the Holocaust: a concentration-camp survivor from Latvia, a Jew whose family managed to flee Germany, and a former U.S. soldier who helped liberate a concentration camp in Germany. One student did an independent project that turned the class material into a permanent exhibit at Terre Haute's Holocaust museum. Students would have interviewed more people, but changes in the university's rules on human research subjects made it difficult. Ms. Foster says she expects the university's research board to relax the new rules to facilitate the taking of oral histories.

Source: Bollag (2006b)

Students studying Bachelor of Early Childhood Education and Care undertake an action research project at TAFE NSW, Australia

As a compulsory part of a Bachelor in Early Childhood Education and Care, students study research methodology in two twelve week semesters, as part of the second and fourth years of the degree. These research units consist of four hours of face-to-face learning each week to explore the different components of the action research model using inquiry-based learning. As part of learning about and implementing qualitative and quantitative research, students are required to conduct a research project based on an area of change they have identified in consultation with staff at an early childcare service. Working in pairs, students are required to complete a research proposal, implement their research in an authentic work-based context and write up their findings. The student pair up and then make recommendations based on the findings. Ideally these recommendations are taken up by the childcare centres in the future.

An example of research conducted compared two contrasting centre's school readiness programs which is defined as the transition preparing children for the move from centre based care or the home to school based settings. The student pair initially explored the relevant literature to clarify the best way to prepare children for school. Using qualitative research methods, the student pair conducted surveys of staff and parents asking about their beliefs regarding school readiness. The resulting data led to a finding that parents and staff had various and quite differing ideas on what constitutes a high quality school readiness program. The project recommended that more education for staff and parents about characteristics of school readiness programs which have proven to lead to positive outcomes would be beneficial to a program's success.

Source: Correspondence with Martin Brown (martin.r.brown@tafensw.edu.au); <http://www.highered.tafensw.edu.au/courses/profiles/bachelor-of-early-childhood-education.html#Ue5wEI21EgU>; <http://www.highered.tafensw.edu.au/documents/20510-course-profile.pdf>

B. Departmental and institutional case studies

Intergenerational student teams support first-year inquiry courses in chemistry at the University of Michigan

Each year the chemistry department at Michigan has c100 students in term time or summer involved in undergraduate research with the c40 Department research groups. In addition, standard undergraduate laboratory instruction courses have been modified in order to create a more deliberate link to more authentic research practices.

An inquiry-based curriculum for first-year students. The large (c1400 students) introductory organic chemistry courses have been significantly revised to focus more on student inquiry, narrowing the gap between how faculty understand chemistry and how students experience chemistry in their coursework.

Authentic laboratory research for many. A subset of c160 students in this first year course self-select into a supplemental instruction program where they spend two additional hours per week engaged in tasks that involve their connecting with, understanding, and transforming information and data from the primary literature. In the laboratory, after spending about half their time developing manipulative skills around small, open questions they take on the design and implementation of limited but authentic laboratory primary research.

Upper level student support and development. This supplemental instruction program is a collaborative activity between the primary faculty member and a team of 8 upper-level undergraduate students (themselves graduates from the first year course) who have co-designed the instructional materials and who are solely responsible, with guidance from the faculty member, to implement these 2-hour sessions. These students are seen as potentially the next generation of teacher-researchers.

Source: Coppola (2005)

Co-ordinated interventions in Zoology at University of Tasmania, Australia

The department has developed a set of linked strategies/interventions including:

Year One c200 students

- Workshop on the use of animals in research: students put in the position of researcher, considering experimental design and animal ethics to complete an animal ethics application form
- Throughout the year, students encouraged to interact with a web portal with links to 'Hot Topics' in Zoology related to lecture material

Year Two

- Over several weeks an assessed task in which real, experimental data is given to the students for guided analysis and preparation as a manuscript for publication

Year Three

- Courses include group research projects, critical reviews of current literature, writing research grant applications, lectures from scientists outside the school, and training in scientific communication
- Zoology Research Unit individual students are matched with an academic supervisor to complete a semester-long research project
- Selected students work with staff to prepare a research paper for *Nexus Journal of Undergraduate Science, Engineering and Technology* (<http://www.utas.edu.au/scieng/nexus/>)

Years Two and Three

- All invited to participate in Student Research Volunteers program. Volunteers are matched with mentors, usually Postgraduate or Honours students in the School, for short-term, in-house research placements that may offer either laboratory or field experiences

Years One, Two and Three

- 'Reach into Research' seminars held several times each semester. Speakers from industry, collaborating institutions School PhD students present their research, and then all non-undergraduate audience members, except the facilitator, leave the room

Source: Edwards *et al.* (2007)

Integrating the development of inquiry and research skills through a whole degree programme: geography and earth sciences at McMaster

Departments have the power and resources to better ensure that the disciplinary case studies that feature in earlier sections of this handout are at some point integrated into a coherent structure such that (undergraduate) students are systematically and progressively developed as researchers through their degree. Over the last c10 years, in part response to McMaster's institutional policy to encourage 'student inquiry, the School of Geography and Earth Sciences has radically redesigned its Earth & Environmental Sciences (EES) programme.

In Level One the development of inquiry and research skills begins in courses where students are introduced to inquiry-based learning through the use of a Socratic, 'questioning style' of lecturing and lab assignments that require students to formulate and answer their own research questions. Students also develop introductory oral and written communication skills through research presentations to small groups of their peers and through writing short reports.

Many Level II and III courses involve students in short- term (several weeks) independent or team research projects. Students present the results of their research as a written paper, a poster or an oral presentation.

In Level IV all students are required to undertake some form of individual research project, either as a one term (13 week) research paper, or as a full year (minimum 26 weeks) undergraduate thesis that usually involves gathering of primary data prior to the start of Level IV.

Undergraduate Research. Many thesis students are employed as research or field assistants by faculty during the summer months or on a part-time basis during term-time. Funding is available to help offset the costs of hiring a student through McMaster University and competitive scholarships are available through funding agencies such as NSERC (Natural Sciences and Engineering Research Council of Canada). McMaster University hosts an Undergraduate Research Poster Session each year and many undergraduate students are encouraged to present the findings of their research at national or international conferences and to submit manuscripts (co-authored with their research supervisors) for publication in scientific journals.

Source: Correspondence with Carolyn H. Eyles and Susan Vajoczki, School of Geography and Earth Sciences, McMaster University

Involving students in interdisciplinary interactive media consultancy projects at Miami University, Ohio, US

Interactive Media Studies at Miami University is an interdisciplinary programme (including Computer Science, Engineering, MIS, English, Marketing, Graphic Design, Education, etc.) that brings together students and faculty to investigate how interactive media informs and transforms their disciplinary perspective. The programme has been running since 1996 and uses problem-based learning and team-oriented projects to help students to learn how to apply their theoretical knowledge to innovative digital solutions for a paying client.

About 100 students a year take the programme. Demand is high and they have to turn away 2-5 students a day from the programme. With 2-3 sections running each semester; the students work in groups of up to 20. The students themselves decide how to divide up tasks; typically there are groups undertaking development, design and marketing. The programmes are team taught with the last two weeks spent on de-briefing and talking about what they've learnt. The students are typically in class four hours a week, but spend many more hours, for example visiting clients, undertaking research or doing user testing. They make a presentation to their client at the end of the project.

Commercial companies are charged \$20,000 per project paid on delivery; non-profit organisations and charities are typically charged c£5,000. They found the client did not take it as seriously when no charge was made. From the client's perspective, they get out of the box thinking that they would

never obtain from a consultant firm. The clients typically end up with something that far exceeds their expectations. The students find it surprising and challenging to manage the changes which commonly occur during the development stage of the project.

Recent completed projects include:

- Healthcare IT asked IMS to create a new logo for their company and build a new Web presence to highlight their state-of-the art hospital tracking systems. IMS assessed needs and built the site, a product demo and a back end administrative system for managing sales and customer support.
- Procter & Gamble's Beauty Care Division contracted with IMS to develop a Web-based expert system that would allow customers to get product recommendations suited to their personal needs. A kiosk was designed to be deployed in a major retail chain.
- The Taft Museum of Art needed a complete Web strategy. IMS developed a web identity for them, put their collection online and created e-commerce capability for their gift shop.

Sources: Interview with Glenn Platt 14 November 2007; <http://student.sba.muohio.edu/ims/>

Inter-disciplinary inquiry-based learning (IDIBL): Focusing on action research in the workplace

The Inter-Disciplinary Inquiry-Based Learning (IDIBL) framework project at the University of Bolton has developed an undergraduate and postgraduate module framework for inquiry-based learning. The student is seen as an action-researcher who must identify an opportunity in their work-context for improvement. Learners support each other in an online community to combine study with work.

The modules contained within the framework focus on process, and generic concepts and outcomes rather than subject content. Through a process of negotiation between the individual learner and the course staff, a personalised inquiry is developed to include learning activities and assessment products that meet the module requirements and informed by the learners' professional practice. The student then plans the action they will take, undertakes it in their own work context, evaluates the action and revises the plan.

All learners in a cohort carry out their inquiries and develop assessment products to the same set of milestones. Thus they are expected to provide support and challenge to each other and travel a common path in spite of the personalisation of their study. The design encourages different perspectives from diverse professional and academic disciplines to be exchanged. The students encounter academic staff, subject experts and each other through an online community where discussions are held asynchronously to allow all to participate at the time which fits their life. Subject experts are invited to take the 'hot-seat' in which they respond to questions raised by student researchers related to their own inquiry. In this way, generalisations, experience and theories are introduced in meaningful and effective contexts.

Sources: Milwood *et al.* (2007, 2008); [//idibl.bolton.ac.uk/](http://idibl.bolton.ac.uk/);
[//resources.glos.ac.uk/ceal/resources/casestudiesactivelearning/undergraduate/index.cfm](http://resources.glos.ac.uk/ceal/resources/casestudiesactivelearning/undergraduate/index.cfm);

Undergraduate research at University of Gloucestershire, UK begins at induction

In 2007 over 650 students in the Faculty of Education, Humanities and Science undertook discipline-based inquiry projects during induction week. This involved them working in small groups to collect information from the library and in the field, analyse it, present it to tutors in novel ways, and receive formative feedback. For example, the human geographers and the sociologists researched the experience of Gloucester residents of 'the Great Flood of 2007'. The Biologists and the Psychologists investigated primate behaviour at Bristol Zoo, while English Literature students visited an arboretum and explored the use of trees in literature. Social and academic activities were integrated, the students and staff had fun, and, importantly, they made friends, all before going to their first class. The approach was developed, and initially supported, by the Centre for Active Learning. It has proved a significant staff development activity both for the many academic tutors and the library staff who changed their approach to library induction to support the specific student research projects. Over the next two years other Faculties in the University are developing their versions of developing undergraduate research as part of induction.

University of Roskilde (Denmark): Half of the work of all students is spent undertaking projects

(<http://www.ruc.dk/en/>)

At least 50% of student time in the assessed curriculum in five years from BA to MA is taught through project work. The projects involve students working in groups guided by staff. "Problem-orientated project work ... [is] participant directed indicating that it is the group members that collectively ... take the responsibility for the project. ... The result is a body of knowledge owned for the most part by the students that produced it and not borrowed from the teachers who taught it" (Legge, 1997, p.5). The first two years are interdisciplinary group projects, later projects tend to be within one discipline and sometimes may be undertaken individually.

Auditing and developing student research skills at Adelaide, Australia and Reading, UK

Selected departments at both Adelaide and Reading have systematically audited department based undergraduate and postgraduate programmes for the extent to which they develop student research 'skills'. Research at Adelaide has developed both a conceptual framework on student research development and based on this a diagnostic tool to support interventions to strengthen student research skill development in courses. Thus two consecutive first year courses in Medical Science have adapted their assessment tasks to explicitly and systematically develop student research skills in accordance with the Research Skill Development (RSD) framework. A broadened application of the framework is being trialled, including with laboratory-based and numeracy-rich research, and to other disciplines and departments, including Petroleum Engineering, Nursing and English. The framework is publicly available for other institutions to adapt.

Within Departments methods to collect data on undergraduates' research skills teaching and learning can be time-consuming and ineffective. At the University of Reading a related electronic 'research skills audit tool' has been developed for staff to systematically map research skills teaching and assessment within their own modules. The tool facilitates quick and easy collation of modular data across entire degree programmes, thus making it a valuable Departmental resource for reviewing undergraduate curriculum design.

Sources: Willison and O'Regan (2006; 2007); Fraser, *et al.* (2007)

Hampshire College: Linking research and teaching is key element of the college's mission

(<http://www.hampshire.edu/>)

Hampshire is a small private liberal arts US college focused on self-initiated, individual research programs of study negotiated by students with academic staff. More specifically:

- *Beginning and Division 1 Requirements*: 'Students must formulate substantive questions on a range of specific subjects and then reflect critically on the implications of the analytical frameworks and methods they used in pursuing the questions' (Prince and Kelly, 1997, p.7).
- *Division 2 Requirements*: 'Working with at least two or three faculty, students ... define a substantive area of study and then specify key questions that will serve as general guides through the concentration... In the second step ... the student designs a program of study, including ... independent study' (ibid., p.8).
- *Division Three and Capstone Requirements*: This is 'primarily devoted to a ... thesis or artistic project' (ibid., p.9).

Building a research identity in the Bachelor of Education (Early Years) at Northern Melbourne Institute of TAFE, Australia

The Bachelor of Education (Early Years) is a four-year undergraduate degree that prepares pre-service early years and primary school teachers. The program attracts students from diverse backgrounds; many of whom are not well prepared for tertiary study. The program is committed to developing in students a 'research identity' from the outset as we believe that developing scholarship and a scholarly mind-set is crucial for professional teachers in practice. Students are introduced to research skills in Year 1. Subsequently, students are introduced to research-led and research-oriented teaching and learning. In this, students are required to participate in critical reading and discussion of research literature in order to understand research structures broadly and the impact of

research on the field of education. Pedagogical approaches replicate the strategies that characterise research methods; students are engaged in learning activities that require them to undertake problem posing, that is, generating a research question, data collection techniques specifically those based on observation, and building their capacity to interpret data from a range of theoretical perspectives.

In the third year of the program, research-based activity is introduced to students as they develop and implement a self-reflective action-oriented research project based on their allocated teaching practice placements. This requires students to identify areas of their practice requiring improvement, to undertake a detailed focused literature review in order to understand the issue at a broader level, plan for observation and intervention in their identified area of practice and reflect on their progress across the project's lifespan. Students are required to formally present their projects to their peers and academic staff thereby demonstrating engagement in and exposure to peer critique and peer review. Such an approach supports students' understanding of the research process at a personal level and also creates an understanding of the usefulness of the research process in professional learning and growth. In the fourth year of the program, students then plan and implement a research project in an educational setting. This activity occurs in a subject dedicated to the development of student's research proposals and related activity. Students are supervised to develop a research question in an area that interests them, they submit an ethics application and design their methodology accordingly. Students conduct this project in an educational setting and prepare a research report discussing the processes used and their findings.

Sources: Correspondence with Karina Davis (karinadavis@nmit.edu.au) and Christine Spratt (christinespratt@nmit.edu.au); http://www.nmit.edu.au/courses/bachelor_of_education_early_years

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http://www.lizthomasassociates.co.uk/ind_learning.html

For references in case studies see: Healey (2014). For some useful resources see the Centre for Learner Autonomy at Sheffield Hallam University: <http://extra.shu.ac.uk/cetl/cplahome.html>; they have a longer bibliography at: <http://extra.shu.ac.uk/cetl/cpla%20resources/Towards%20a%20bibliography.doc>.

Some other useful resources

Learn Higher Independent – Resources for staff <http://www.learnhigher.ac.uk/learning-at-university/independent-learning/>

Learning Issues: Encouraging independent learning from the University of Nottingham <http://www.nottingham.ac.uk/pesl/resources/independence/>

The Relationship between Self-Regulation and Online Learning in a Blended Learning context: <http://www.irrodl.org/index.php/irrodl/article/view/189/271>

Characteristics of the Self Directed Learner: <http://www.missiontolearn.com/2011/10/self-directed-learning/>

A Conceptual Model for Understanding Self-Directed Learning in Online Environment: <http://www.ncolr.org/jiol/issues/pdf/6.1.3.pdf>

The case for the self-paced course:

http://www.uwex.edu/disted/conference/Resource_library/proceedings/46330_2011.pdf