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# **Developing tailored study plans for the new higher education environment: ‘Letting go of control’**

Final report 2019

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## List of acronyms used

ACER            Australian Council for Educational Research

GCA            Graduate Careers Australia

## Executive summary

The higher education sector of the education system is at a crossroads. The approaches used for the better part of the last thousand years are no longer working or engaging students, and the problem is only likely to get worse not better. Given this, it is timely that the higher education sector examines paths forward to address and indeed engage in the new environment in which it will work in the future. This fellowship explored two approaches to engage students more deeply in their education. The first approach is generally termed 'interdisciplinary studies' where students define their own program of study; the second approach focuses on topic structure where students are given a wide range of choice and in effect can build a topic that suits their interests.

An interdisciplinary studies degree essentially gives students the chance to customise their program of study. Although most university programs feature required topics that must be taken, the reality is students feel that many topics do not relate to what they want to study or, even more concerning, what they want to do with their degree. Added to this concern is the fact that skills being developed in degrees are likely not those that will be required in the workforce. The university system should be concentrating on delivering thought leaders and students who have progressed through restrictive content-heavy programs.

The program of work explored the systems of delivering these programs in the United States. The framework of developing an interdisciplinary study plan is student driven and in fact very strict and well developed. Although students are given significant support, they are also expected to undertake considerable work in defining their program. In effect, students can propose a program that contains any package of topics within the confines of still meeting prerequisites and finishing with a program that leads to a degree. Most interestingly, these degrees are most often taken by 'struggling' students. These students use the program to define a degree program that is of interest to them. They are far more engaged and there are some great success stories. Finally, many institutions use these programs as test cases for programs they might introduce into their mainstream offerings in the future.

The study of the programs in the US made several things very clear:

1. The approach is not for all students. Many students are happy with the defined programs and feel they will lead to the careers they seek.
2. The program, more often than not, appeals to students who for a variety of reasons struggle with their studies. Ultimately, in most cases, these struggles came down to a lack of engagement in their studies for reasons related to not understanding the relevance of components of the defined program or a feeling that the program was not going to lead along a path the students were interested in.
3. Gifted students thrive in the freedom provided the programs but they tended to be in the minority of the students undertaking the program.
4. The programs required a huge investment in resources on the part of both the student and the institution.
5. The programs clearly save many students who without the option would simply drop out of the system.

6. Institutions happily admitted that they also consider the program as an opportunity to test new program ideas. Of course, they saved enormous effort in working through the process of figuring out a program (students did this) and also got to test the program in the marketplace before undertaking the considerable work to formalise the offering of the new degree.

The second aspect of the program explored the impact of delivering a topic with no lectures, a variety of activity choice and assessment largely through discussion. This first year topic, Modern Chemistry was first delivered at Flinders University in 2016 and has been delivered three times. There is little doubt in the rise of the fraction of students who successfully complete the topic, but this certainly comes at the cost of the extra resourcing. Many students are apprehensive at the start of the topic given it is a complete unknown. However, exit interviews of students show an understanding of the value of the approach and many feel far better prepared for future study.

Work is currently underway to analyse student attitude and response to the topic and the progress of the students will be monitored over the coming years. Some clear messages already:

1. Without the bounds of a curriculum many students acquired a much deeper understanding of the topics covered.
2. The success rate in the topic went from ~ 50 % to about 80 %.
3. Students have concerns at the start of the topic as it is something new but most grow to enjoy the freedom and environment of interaction with other students and staff.
4. Students are now enrolling in the topic due to word of mouth about the enjoyment of the topic. The topic is likely more work than the standard topic—yet students are still signing up.

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# Chapter 1: Interdisciplinary studies

Higher education has always existed in an environment of ever-shifting circumstances. However, the environment now emerging challenges some of the very basic principles that underline the system. As Salmi pointed out some time ago

Higher education is facing unprecedented challenges at the start of the 21st century, under the impact of globalization, knowledge-based economic growth, as well as the information and communication revolution. These momentous changes in the environment are stretching the traditional boundaries of higher education. The time dimension is altered by the requirement for lifelong learning while new technologies are doing away with space barriers altogether. (Salmi, 2001, p. 123)

One major visible impact of these pressures is that student engagement is at its lowest point ever and dropping quickly leading to poor student performance and considerable staff dissatisfaction with their role as educators. The higher education sector in Australia will have to respond to this lack of engagement.

In their report on the 'University of the Future', Ernst and Young's summary of the situation is 'A thousand year old industry on the cusp of profound change'. Despite ever-increasing enrolments, student engagement is declining (Australian Council for Educational Research [ACER], 2012; Norton, 2013). This lack of engagement is a significant issue given that other options to get a tertiary qualification now exist. Environments such as edX (<https://www.edx.org/>), Udacity (<http://www.udacity.com/>) and Coursera (<https://www.coursera.org/>) will undoubtedly attract a larger and larger fraction of the student cohort ('Attack of the MOOCs', 2013; Grossman, 2013; Pappano, 2012). Coursera is a collaboration of world-leading universities, including some in Australia, and hence one must assume the material quality will be equal to that delivered in a local higher education institution.

One common response currently is to simply move a large amount of content and indeed activities online. However, the simple reality is that a student not engaged in their education will also not be engaged online in any meaningful way even though they now have ready access to material. Such access does not mean a student is actually learning. Additionally, what cannot be captured and delivered online are the interactions (both social and professional) that can make the in-class, face-to-face experience unique, and the sharing of perspectives and collaborative problem-solving not only between teacher and student but also equally among students as well. In the face-to-face situation, these interactions are in real time, and prompt immediate feedback is possible and effective and of course, without a doubt, the most important part of higher education engagement. These personal interactions are the cornerstone of student engagement especially for starting students (ACER, 2012; Radloff & Coates, 2013; Trowler, 2010).

Finally, many students who enter the higher education sector are seeking very different outcomes. Should the student, for example, who has a keen interest in working in government to set science policy be asked to complete the same qualification as a person who is keen to work as a bench scientist? In the current system these students would undertake largely the same program. Individualised study plans would allow the opportunity to cater for both the



diversity of incoming students and the variety of desired outcomes for students.

This fellowship examined one option available to the Australian higher education sector to ensure meaningful student engagement. Tailored or interdisciplinary study plans can ensure that students appreciate the relevance and usefulness of their programs and hence how the sector is providing the education and training required for successful careers. Indeed, a study of first-year students highlighted that a lack of relevance was overwhelmingly the most common reason for loss of students (Hillman, 2005). Given the diversity of students now coming to university (Norton, 2013) and the enormous amount of high-quality information available, it is unreasonable to think one study plan works for all students. Institutions will have to explore manageable ways to individualise study plans to engage their student cohort.

Tailored, or potentially individual, study plans are designed by students with the help of a mentor. Each student can if they wish propose a study plan to suit their own strengths, interests, capabilities, experiences and career aspirations. Such study plans might also be industry 'sponsored' or endorsed. Such opportunities are already being offered in MOOCs such as Udacity ('Attack of the MOOCs', 2013). Such a system will no doubt provide more relevant study plans and be of greater interest to students thus making engagement in the local higher education provider much more attractive. As Krause (2005) points out, 'Engagement is a binding of students ... to meaningful learning activities ...' (p. 14). In short, tailored study plans offer students the same opportunity as a flipped classroom—namely, to be involved in the conversation about what academic program will work best for them.

Beyond the simple retention considerations is the reality of the modern workforce. In the 21st century, co-creation and knowledge generation for complex problems is central to innovative development. Amongst others, modern day professional networks, living labs and maker spaces are now commonplace in the workplace, in which open exchange is equally necessary to generate new solutions. Interdisciplinary and transdisciplinary are integral parts of the technological innovation cycles, and they bridge the gap between research, industry and education (Ehlen, 2015).

Graduate Careers Australia (GCA) reports annual data from employers as the Graduate Outlook. The 2014 report, based on responses from 234 employers from a wide range of sectors, identified the most used selection criteria (see Table 1). It is notable that relevant qualifications are 11th in the list. If universities are going to be true to their students, they must have programs in place to ensure students can get the skills required in the workplace.

**Table 1** Most used key selection criteria reported by employers of graduates

Selection Criteria	2014	Selection Criteria	2014
Communication skills	48.6%	Relevant qualifications	14.0%
Academic results	24.3%	Willingness to learn	12.1%
Teamwork skills	22.4%	Problem solving skills	11.2%
Aptitude	21.5%	Passion	10.3%
Interpersonal skills	20.6%	Customer service	8.4%
Leadership skills	19.6%	Analytical skills	6.5%
Work experience	19.6%	Technical skills	6.5%
Cultural fit	18.7%	Integrity	3.7%
Motivational fit	17.8%	Organised	3.7%
Adaptable	14.0%	Extra-curricular activities	3.7%

*Note.* Reproduced GCA, 2014.

## How do interdisciplinary degrees work?

Interdisciplinary degrees are typically programs of study designed by students to fit their particular interests in situations where a 'defined' program does not exist. The process of defining the study is actually in most institutions quite long and requires considerable work on the part of the student interested in undertaking the interdisciplinary degree. Importantly, the students are given considerable support to define their program, and indeed this individualised support is one of the features that likely leads to successful outcomes.

Although there are many variations in the process, the general overview is that students must first apply to undertake such a degree. The application process has two key steps. The first is a justification of creating the study program in the first place. This is in fact the critical step in the process in some ways. Future vision and passion are the key elements here. The desire to avoid certain subject areas a student does not like in the standard program is not an acceptable reason to create a new program. The vision should present a potential outcome for the student in terms of career paths or future study options.

The next step is the definition of the program of study. Table 2 presents two possible models used to guide students through the process of defining their programs. Though an interdisciplinary degree is different from a traditional degree, students still need to select the concentrations or main fields that they want to study. The study program must still adhere to the rules of the various topics involved and lead ultimately to the awarding of a degree. This means that all the normal rules of the number of topics required, assessment requirements, etc., must be met. Finally, the student must define the name of the program. These names are important descriptors, so the student can easily communicate, for example, to future employers the potentially unique set of skills they have acquired. Additionally, in many cases, the institutions have gone on to turn these programs into mainstream programs in cases where there is enough interest.

**Table 2** The Repko model and the Dorst model

<b>Repko, Szostak, and Buchberger (2013) inductive</b>	<b>Dorst (2013) design abduction</b>
1. DEFINE Warrant interdisciplinary education	ARCHAEOLOGY (HISTORY) Historical investigation of problem
2. PRESENT rationale for interdisciplinary education	PARADOX Framing the problem definition
3. IDENTIFY relevant disciplines	CONTEXT Identify research context
4. CONDUCT literary review	
5. DEVELOP Which values/assumptions are being made in each field?	FIELD EXPLORATION Field review
6. STUDY Relate it to the problem definition	
7. DIFFERENCE/SIMILARITIES Recognise patterns	THEMES Recognise themes
8. CREATE Develop a frame for interdisciplinary problems (learning)	FRAMES Develop a frame for interdisciplinary design problems (learning)
9. COMBINE Integrate frames	
10.	FUTURES Explore possible futures with integrated frame
11.	TRANSFORMATIONS Which transformations are realised in practice?
12.	INTEGRATION What can we learn from these changes and use in the future?

After the student starts the program there are meetings at the end of every semester to assess the progress of the student and the proposed program. The student can at any time propose variations to the program but this is again done with the same considerable scrutiny as occurs the original program definition process.

## Why choose an interdisciplinary studies major?

Some students might think that an interdisciplinary studies degree is best for those who do not know what they can study, but these programs can actually help narrow down a student's focus and assist in his or her career. However, these programs allow the student, as opposed to the system, to define that focus. For example, a student who wanted to work with recent immigrants might study a foreign language, social work and government policy.

## Case study

Collin Cavote, graduate of Drexel University  
CEO of Biome

Collin Cavote was a university 'drop out'. He left Temple University and 'went off the grid' to

explore minimalist living. He states, ‘I was studying business, ... [but] I really didn’t see people creating legitimate value. Society was using up resources, creating a high social and environmental cost. I didn’t want to contribute to that’.

After five years, Cavote decided to go back to college to explore building a sustainable business to improve air quality. Cavote chose to apply to Drexel University and its Custom-Designed Major program where he could design his own custom major, which is focused on the use of plants to remove carbon dioxide from the air. He consulted with Drexel’s biology faculty and learned more about this natural process. To put his idea into practice, Cavote’s advisor suggested that he take a course within the School of Entrepreneurship titled ‘Launch It’, and this is where Biome (see <https://www.biome.us>) was born. Before graduating Cavote was already running the company.

Collin was an Udall Congressional Fellow for leadership in urban resilience and human health. His company, Biome, has developed a modular biowall consisting of various types of plants that can be hung in homes and offices. In addition to the aesthetics that a biowall provides, plants absorb carbon dioxide and give off oxygen, refreshing the environment. Research by NASA has indicated that plants also serve as purifiers by absorbing toxins in the air.

The Harvard Business Review says, ‘The productivity benefits from doubling ventilation rates are \$6,500 per person per year. This does not include the other potential health benefits, such as reduced sick building syndrome and absenteeism’ (p. X). Collin’s company is thriving by selling indoor biowalls, which help clean up the air quality in buildings. His degree was in effect tailored to provide knowledge about buildings, plants and business—a combination certainly not on the books.

## Trends

Over the time of this fellowship, interdisciplinary learning is shifting to transdisciplinary learning (Klaassen, 2018). The differences are detailed in Table 3, but can really be summed as a shift to be far more ‘real-world connected’. Problems are defined as they might be in the real world, recognising that there is no one solution, work is often undertaken in the field, and external experts are often part of the program delivery.

**Table 3** Emerging patterns of interdisciplinary to transdisciplinary learning

<b>Outcome</b>	<b>Multi- to interdisciplinary education</b>	<b>Inter- to transdisciplinary education</b>
Drivers in education Program integration features	Bringing fundamental knowledge together for technological innovation	Complex, real-world problems with multiple (innovative) solutions
	Focus on product results	Focus on process
	Themes/issues presented	Open complex environment with multiple questions emerging from students
<b>HOW (Methods)</b>		
Theory	Lectures (lit study)	Field research (lit study) Guest lectures

Approaches	Case study/practice in context	Research: exploration of patterns to frame definition and design solutions
Knowledge	Foundational	Just-in-time learning relevant theory/experts, etc.
Learned skills	Professional skills Application of knowledge in context	Research skills Facilitation skills Interview skills Openness
Assignments	Determined by teachers	Determined by students and teachers
Assessment	Evaluation by experts	Evaluation by staff and multiple stakeholders
Integration is realised at	At program level and at the level of the student	At program, teacher and student level
<b>WHAT</b>		
Problem definition	Meeting at the edge of disciplines for a clear purpose	Complex/real life
Approach	Problem is determined by patient diagnosis and availability of technological solutions	Problem is not predetermined as it is the process that determines the learning outcome
Inquiry process	Induction	Design abduction for problems that cannot be solved by deduction/induction
Solutions	Based on foundational knowledge available Implementation of technical product to help patient (limited amount of possibilities)	Needs to be created by interaction with multiple stakeholders/environment Unlimited amount of solutions
<b>WHOM</b>		
Teachers	Disciplinary experts used for teaching	Teachers disciplinary and interdisciplinary expertise, experienced facilitators
Sources	Disciplinary experts/foundational sources	Multiple disciplines, stakeholders (experts, laypersons), contextual information

## Fellowship activities

A review of practice was undertaken. Appendix B of this chapter provides some summaries of various approaches taken and justifications provided for interdisciplinary programs. The resources provided for the program are very clear but there are significant benefits detailed later in this chapter.

The fellow attended the 7th Annual National Conference on Individualized Major Programs in Amherst, Massachusetts, United States (US), in early March 2015. The meeting brought together a number of staff involved in delivering interdisciplinary programs throughout the US in addition to many students undertaking the programs or students who had completed

the program. The fellow interviewed a number of the students for their insights and to understand their experiences.

The fellow gave numerous talks around Australia both to explain interdisciplinary study programs and to challenge institutions to examine how programs are structured. Talks were given at places such as Curtin University, Deakin University and The University of Adelaide, among others, and also at professional societies such the Royal Australian Chemical Institute (RACI) Heads of School Meeting. The fellow also presented at the Australian Council of Deans of Science meeting.

### **What Jobs Will Exist Ten Years From Now?**

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#### **Abstract**

The simple reality is that most predictions indicate that almost half of the current jobs that exist will not exist twenty years from now. When we talk about “employability” it is critical that the discussion is not about jobs but about future learning and flexibility. These are the skills that will make our students “employable”. If this is the case, then universities as institutions should mirror this future with an education focused, flexible environment where learning outcomes are measured not by time but required competencies in programs that can be defined by students according to their interests.

Workshop Held at Flinders University

## **OLT Future of Tertiary Education Workshop**

**October 2, 2015**

**10:00 am - 4:00 pm**

**Flinders University, City Campus**

**182 Victoria Square, Adelaide, South Australia**

### **What if Students Made up Their Own Programs of Study?**

The Higher Education (HE) sector of the education system is at a crossroads. The approaches used for the better part of the last thousand years are no longer working or engaging students and the problem is only likely to get worse not better. Given this, it is timely that the HE sector examines paths forward to engage students in the new environment in which it will work in the future. This workshop will discuss what are often called “individualised study plans” that provide students with a much greater say in defining their own unique study plans. The workshop talk will present experiences in the US and discuss options open in the Australian environment.

Registration is FREE but required for catering. To register please go:  
<http://www.flinders.edu.au/cut/awards-and-grants/olt-fellowships/workshop.cfm>

For further information contact Joe Shapter, OLT National Teaching Fellow  
(joe.shapter@flinders.edu.au)

#### Guest sSpeakers

**Monica van Beusekom, Director, Individualised Study Programs, University of Connecticut**

Monica van Beusekom is the Director of the Individualized and Interdisciplinary Studies Program (IISP) at the University of Connecticut. She earned a B.A. in History from Tufts University and a Ph.D. in African History from Johns Hopkins University. Her research has focused on colonial development policy and practice in francophone West Africa and includes the book, *Negotiating Development: African Farmers and Colonial Experts at the Office du Niger, 1920-60*, as well as several articles.

**Jenny Lambert, Director – Employment, Education & Training at Australian Chamber of Commerce and Industry (ACCI)**

Jenny has been serving the business community for 30 years as a senior manager within industry associations, including 17 years as a CEO of associations largely in the services sector.

**Professor Dawn Bennett, John Curtin Distinguished Professor and Director, Creative Workforce Initiative**

Dawn's recent research has focused on enacting and enabling employability within higher education learning and teaching. This has incorporated research on employability, identity development, graduate transition and graduate work, retaining a special interest on careers in the creative industries. Dawn serves numerous editorial boards and she convenes the Australian Learning and Teaching Fellows' network.

#### Program

Registration from 9:30

10:00 – 10:45      What are the Major issues Facing the Australian Tertiary Education Sector?

Discussion Leader: Joe Shapter, Flinders University

10:45 – 11:15      Morning Tea

11:15 – 12:00      Individualised Study Programs

Discussion Leader: Monica van Beusekom, Director, Individualised Study Programs, University of Connecticut

12:00 – 12:45      Lunch

12:45 -1:30      What are Employers Looking for in Graduates?

Discussion Leader: Jenny Lambert, Director – Employment, Education & Training at Australian Chamber of Commerce and Industry (ACCI)

13:30 – 2:15      What are Students Expecting from their Education?

Discussion Leader: Professor Dawn Bennett, John Curtin Distinguished Professor and Director, Creative Workforce Initiative

2:15 – 2:45      Afternoon Tea

2:45 -3:45      What Next? What Challenges must be Overcome to Individualise Education?

Discussion Leader: Joe Shapter, Flinders University

3:45- 4:00

Final Wrap

The worship had over 50 attendees from a variety of institutions, including TAFE and smaller tertiary education providers in addition to many from the mainstream tertiary organisations. The needs from industry were again reaffirmed and the benefits of the interdisciplinary programs and its resource implications were very clear.

In the discussions it was very clear that there was considerable support for this approach. The challenges really lie in the resources and the inertia of the current system to keep doing what has been done for decades.

## Findings

The study of the programs in the US made several things very clear:

7. The approach is not for all students. Many students are happy with the defined programs and feel they will lead to the careers they seek.
8. The program, more often than not, appeals to students who for a variety of reasons struggle with their studies. Ultimately, in most cases, these struggles came down to a lack of engagement in their studies for reasons related to not understanding the relevance of components of the defined program or a feeling that the program was not going to lead along a path the students were interested in.
9. Gifted students thrive in the freedom provided the programs but they tended to be in the minority of the students undertaking the program.
10. The programs required a huge investment in resources on the part of both the student and the institution.

For the student, there is the effort of defining a program from scratch. Anyone who has designed a new study program will understand the effort required to do this. Additionally, students must have a very clear vision of the path ahead for them and be able to define and defend it. The exercise in being able to do these things may well be the largest part of the education the programs provide.

For the institutions, considerable resources are required to provide one-on-one support for students both as they work through the process of program definition and then ongoing support for the students. This load can be spread throughout the organisation using academic advisors, which many American colleges do have in place. Staff also felt a stronger connection with students, and the opportunity to explore new pathways was exciting for some. Of course, the workload cannot be underestimated.

It is interesting to consider why institutions would undertake to offer these programs. One hopes that there is a level wanting to offer students the best possible educational outcomes especially for students at risk. This does help address the considerable retention issues at many universities. However, the reality is that there is also a significant financial component. The following case study was presented:



## **East Carolina University (ECU): Interdisciplinary Studies**

ECU started an interdisciplinary studies program in 2014 and attracted 220+ students in 10 months.

### **Retention of current students and tuition:**

One hundred and eighty-two students of 215 students had no other clear path to graduation. The students highlighted reasons such as GPAs, finances due to tuition surcharges, etc.

**All noted they would have left ECU without the interdisciplinary program.**

**ECU added \$1,842,948 in tuition alone via the retention of the students in the program in one year.**

There is little doubt that the investment of individualised support for the students helped to keep them engaged (and enrolled), but there can also be no doubt that there is considerable return on investment for the institution in addition to a successful educational outcome.

11. The programs clearly save many students who without the option would simply drop out of the system.
12. Institutions happily admitted that they also consider the program as an opportunity to test new program ideas. Of course, they saved enormous effort in working through the process of figuring out a program (students did this) and also got to test the program in the marketplace before undertaking the considerable work to formalise the offering of the new degree.

## **Conclusions**

There can be no doubt that the higher education sector in Australia, and indeed globally, must change to respond to the unprecedented environment in which the sector now exists. Indeed, in its recent study Ernst and Young suggest that the dominant university model will prove unviable in all but a few cases over the next 10–15 years (Ernst and Young, 'University of the Future', 2012). Two of the driving forces of the potential changes for the sector are the record low engagement of students (despite record high enrolments; ACER, 2012) and the diversity of the student cohort. These factors mean that the provision of higher education five years from now will be dramatically different than it is currently.

It is now commonplace to see attendances of 20 per cent of expected students at on-campus based activities. This has a significant impact on the educational outcomes for students as well as staff, who have great difficulty reconciling the significant effort made in developing high-quality education material (tutorials, lectures, etc.) only to have a small fraction of students show up for the face-to-face sessions. The question is how to reengage students in the education on offer locally especially when other options are now readily available.

Interdisciplinary studies is an approach that the higher education sector could use to reengage students. It will also be a mechanism to cater to the great diversity of students now undertaking tertiary study. The challenges lie in the commitment of resources to effectively deliver the program and overcoming the notion that only university academics have the knowledge to define effective programs.

The commitment of resources is in fact a simple argument. There are clear, significant returns on investment. In a system where retention is still a huge issue, these programs do represent an opportunity to lower attrition rates. This of course goes straight to the bottom line. Additionally, interdisciplinary programs could be a catalyst to drive institutions to simpler program rules saving thousands of hours of staff time in compliance checking. Ultimately, the true goal should be successful outcomes for our students and these programs represent a clear pathway to make this happen.

The harder challenge to overcome is in fact the cultural challenge. Staff members often feel only certain sets of topics represent a true preparation for a degree in certain areas. The educational experience is not unlike their own experience as a student but there is growing evidence that this will simply not serve modern students well. Students will need to be lifelong learners with skills that will enable them to change roles and adapt in changing environments and may well require different combinations of skills. An interdisciplinary program offers students the opportunity to grow or define their own unique course of study to build these skills. Given the rapid pace of change in the workforce today, it would be completely dishonest to suggest that academics have unerring insight into the future needs of students, and hence offering students a much greater say in their program, with some guidance, would be a significant positive step forward.

Individualised or other innovative study plans will directly address issues of a demand-driven system and the diversity of the current student cohort. In short, study plans tailored to student need and capabilities will ensure continued relevance of the higher education sector offerings to students while addressing the range of student backgrounds to ensure high progression rates and ultimately successful completions of high-quality tertiary qualifications. These study plans would also allow individualising of study programs for a wide range of students including second-chance, low-socioeconomic status, mixed ability, and Indigenous students. Such plans would allow more relevant programs to be built. This would undoubtedly increase student engagement and the chances of successful completions by these students.

## Chapter 2: Development of Modern Chemistry

This fellowship was focused on better engagement of students. The interdisciplinary studies explained in Chapter 1 present a clear strategy Australian universities could implement. This chapter focuses on a second approach implemented at Flinders University during the fellowship where students were given far greater say in their curriculum to ensure they were partners in their education and not simply passive participants who were ‘being educated’.

### Modern Chemistry

In science courses in general, but especially in first-year chemistry classes, the amount of content that is delivered is often overwhelming and too complex for the student to easily cope with. Students not only have to gain knowledge in a variety of different fields but also have to learn new laboratory skills and analytical techniques. In addition to the academic content, it is often difficult for students to connect the fundamental concepts covered to any ‘real-life’ scenario or application. The view of the ‘big picture’ is often lacking, even if the lecturer tries to convey this in a lecture, which is in most cases still the most common form of teaching.

Additionally, there is an issue with more and more information being available to everybody through the internet while our education often still focuses on delivering ‘knowledge’, rather than exploring ways that students can be guided to understand and use the knowledge provided. Industry has been telling the tertiary sector for 20 years that they are not interested in graduates with knowledge alone and other skills such as the ability to learn are far more highly valued (Wrigley & Straker, 2017).

There have been different approaches on how to make ‘dry’ scientific concepts more interesting and how to enhance student engagement, ranging from problem-based learning approaches (Stentoft, 2017) to case studies (Howitt & Pegrum, 2015) or flipped classroom (Loveys & Riggs, 2019; O’Flaherty & Phillips, 2015) models.

Finally, it is very clear that the retention of knowledge in the standard system is very poor, with material often needing to be re-covered in later topics (Emke, Butler, & Larsen, 2016).

### Approach

We have turned a fairly traditional first-year chemistry course into something where students are gaining knowledge and understanding purely through completion of a range of challenges. We have removed all lectures, tutorials and the final exam, and every interaction with the student happens in the laboratory. Throughout the semester, students attempt a range of challenges, both theoretical and practical, find relevant information, propose approaches to solving the challenges, and discuss these and subsequent outcomes with academic staff. Non-graded passes are awarded for completed challenges, and the students complete the course by finishing a set number of challenges.

Challenge-based teaching approaches offer the benefit that ownership of the learning experience is put into the hands of the student. In a typical approach, students will be exposed to a problem or challenge, and through attempting to solve this problem, students not only

develop problem-solving skills and strategies but also discover content knowledge. Challenge-based teaching approaches lend themselves very much to a flipped classroom model, where students work in teams to tackle the problems they need to solve. However, in most cases these teaching approaches are limited to more theoretical concepts and not necessarily to laboratory exercises.

The approach fosters and promotes self-directed and peer-assisted learning over classical accumulation of knowledge. Although the curriculum is less broad in terms of topics covered, students get a deeper understanding in a selected number of areas. Additionally, students are encouraged to become more independent learners. All this focuses on preparing our graduates for their future when they will be applying for jobs that today might not even exist.

## Details

The new structure was first implemented in 2016.

The educational aims and teaching learning outcomes are as follows:

- Reinforce and expand upon Year 12 chemistry in South Australia while introducing students to new areas of chemistry
- Together with related higher year topics, provide students with the full complement of theoretical and practical skills that are essential to a career as a professional chemist
- Provide the necessary grounding in basic chemistry for students who will eventually major in other disciplines
- Meet the conditions for accreditation with the Royal Australian Chemical Institute
- Explore modern methods of molecular identification, redox and organic chemistry, kinetics and physical chemistry
- Prepare students to undertake higher year studies in chemistry.

At the completion of this topic, students are expected to be able to

- develop independent study skills
- have a sound knowledge of the material delineated by the topic description statement
- develop useful generic and scientific skills in chemistry and start to develop chemical intuition for types of reactions or chemical transformations that might occur
- develop skills in handling chemicals, apparatus and instrumentation and, by working together with other students, begin to develop teamwork and problem-solving skills in addition to strengthening their own self-learning skills
- develop communication and problem-solving skills and build on their self-confidence.

The topic consists of 14 challenges (Table 4), and students have to pass all challenges in order to receive a pass grade for the topic (non-graded pass). For each challenge, there are various options and alternatives the students can choose from.

**Table 4** Overview of the different concepts used in the various challenges

White challenges	Yellow challenges	Black challenges
Colour and electron transitions	Buffer, acid/base chemistry	Organic synthesis
Separation of molecules, organic chemistry	Crystallisation	Water analysis
Acid/base chemistry	Organic synthesis	Natural product extraction
Thermodynamics	Natural product extraction	Polymer chemistry/ Electrochemistry
Electrochemistry	Analytical chemistry	Analytical chemistry, bio- organic chemistry
Bio-organic chemistry		Analytical chemistry
Applied chemistry		Polymer chemistry Physical chemistry

*Note.* Students will have to complete all white, all yellow and two black challenges.

In seven theoretical challenges (white challenges), students explore fundamental concepts. They work in pairs (or individually, if they choose to) and answer questions that are designed to elaborate on specific aspects of the curriculum. The pairs are not assigned, but students are encouraged to choose their own partners. All questions are deliberately kept relatively open ended. For example, when assessing the concept of colour, electron configuration and the relationship between energy transitions, absorption and wavelength, we ask the students the question, ‘Why is Mars red?’. A quick internet search will reveal that Mars is red because its surface consists largely of iron oxide. Once the student gives that answer, we will ask the follow-up question, ‘Why is iron oxide red?’. This will lead to the discussion of the quantum nature of energy levels, which is one of the fundamental concepts in first-year chemistry. All these challenges are designed to lead students to discover such fundamental concepts as opposed to being told them.

All assessment is done orally. Once a student thinks they have found an answer to a question, they will talk with an academic or demonstrator about it, who will assess whether there is enough understanding shown or whether additional research is needed. These interactions can range from one minute to about 10 minutes, and often include individual coaching and tutoring of the students. This allows a personalised approach: different background knowledge and different levels of understanding can be catered for, and the students can choose how they want to present their results.

In most cases, students came with some initial findings about a certain question, could answer a few follow-up questions, but were lacking a few details. In these cases, the instructor would formulate a few specific, more detailed questions for the students to further research. Once they had done this, they could continue the discussion (with the same or a different instructor) until they had shown adequate understanding of the concept. In order for this process to be possible, a documentation process has been set up within the learning management system where every student–instructor interaction is documented and handover notes for follow-up discussions are kept.

In addition to the theoretical challenges, the students also complete seven practical challenges. Five of these are done individually and focus on the development of critical laboratory skills such as titration, pipetting, preparation of solutions, synthesis and data

analysis. Again, students are given some flexibility and freedom. Given the broad concept of each challenge, the student has to develop their individual approach to each challenge. The students prepare a proposal, where they outline their experiments, and specify needed chemicals (often with set limits) and potential associated risks. Once this has been approved by a demonstrator, they then perform the experiments, analyse the outcome, and, if successful, pass the challenge. If the outcome is not successful, they have to repeat the experiment. The idea is to make students do an experiment until they do it right. For example, one challenge involves the synthesis of an ester, and reactants can be selected from a prescribed list. The challenge is completed if the student can prove that their product is the ester they intended to make. This is typically done through adequate chemical identification techniques.

The remaining two experimental challenges are done in groups of up to four students and are designed to be larger projects that can span multiple weeks. Again, there is a selection of topics students can choose from, and in the design of these projects we have tried to cater for the diverse range of courses and interests the students have. There are challenges that are more appealing to students with more synthetic interests, whereas others have more of an analytical or even technological focus. These final group challenges are more complex, longer with more involved experiments, where students go through the entire process of designing an experiment, deciding on how to analyse their results and finally collate, discuss, evaluate and present their findings.

## **Evaluation**

The topic has now been offered three times, in 2016, 2017 and 2018.

In the first year, it became apparent quite quickly that time management would be a major issue for most students. Most students struggled with the idea of having to organise themselves, having to decide which experiments to do and when and where to put effort into the topic. In 2016, there were a lot of students who finished all challenges at the last possible minute, even with extra time allowed. This issue has been addressed in subsequent years by making students aware of the time-management problem from the beginning. Most helpful were video recordings of students from the previous class saying that time management was a crucial factor in succeeding in the topic. The number of students that struggled to complete has since then significantly reduced.

Other small improvements from the first attempt were the introduction of a more structured proforma for students to propose experiments, which provided more guidance and ensured that essential parts of the proposal such as reaction equations, quantities, and safety issues are always addressed.

Additionally, the set-up of the laboratory has been adapted, with a lot of glassware and standard chemicals now being freely available to students, which eased the burden on the laboratory staff for preparation before the practical sessions. The shelves with the most commonly used chemicals have been the single most significant timesaving change. While planning their experiments students are encouraged to check for available chemicals, as would be the case in a research or industry lab, and only if they require additional material do they have to fill in an order form and seek approval from an instructor.

We have conducted structured interviews with students from 2016 to 2018. Detailed data analysis is ongoing but initial assessment of the data suggests a high level of engagement of the students, paired with a better preparation of students for their subsequent studies. Students enjoyed having the freedom to choose and design their own experiments. Additionally, students improved significantly in non-content-related aspects such as time management, organisation, planning and self-learning, with notable impact on their learning in higher years.

## Analysis of impact and student experience

The failure rate in Modern Chemistry before the new structure was implemented was very high. In most years, just over 50 per cent of the students who started the topic managed to pass the topic (see Table 5). This was clearly an unacceptable situation, and the experience was that the students who did pass retained little of the knowledge. The change of topic structure had two major impacts immediately. The first was that the number of students withdrawing from the topic was more than halved. The second important impact was that the pass rate increased by about 25 per cent on average. It is important to realise that beyond the very important aspect of increased student success in this topic, there is a significant financial consequence for the school. The extra students passing mean that students can carry on into second-year topics that follow directly from Modern Chemistry. The connection to research is also important, as clearly successful undergraduate students will progress through their undergraduate studies to become honours and PhD students. Ensuring that students get a sound grounding in learning techniques will be critical for their future success in undergraduate studies, graduate studies and indeed in any future endeavour.

**Table 5** Enrolment and performance statistics for Modern Chemistry

Topic enrolments	2013	2014	2015	2016	2017	2018
Sem 2 census date	125	121	132	121	113	131
Topic completion status						
Passed	65	53	71	96	93	107
Percentage passed (%)	52.0	43.8	53.8	77.4	80.9	81.7
Withdrawn	28	13	15	6	4	
Failed	32	55	46	19	16	14
Percentage failed (%)	25.6	45.5	34.8	15.3	13.9	10.7

Interviews of 38 students who undertook Modern Chemistry have been carried out. This represents approximately a 10 per cent sample of the students who were initially enrolled in the topic from 2016 to 2018. Analysis of the open-ended responses is still ongoing and a high-level overview is provided here.

The most common topic raised by the students was the new learning approach. In some cases this was a positive and in other cases a negative. At the start of the topic, most students were apprehensive given the new paradigm being used in the topic. However, many students did say by the end of the topic that they enjoyed the new approach and recognised its value. Many students also said the new approach did help with their confidence both in terms of facing challenges in the future and being able to learn at a high level on their own. The part of the enjoyment for many students came from the ability to define their own study topics. Students highlighted the importance and challenges associated with several key aspects of the topic. The use of group work and the importance of developing time-management skills

were raised as important developmental aspects of the topic. Students also got firsthand experience in the challenges of group work and suggested this was of great value.

Finally, it was interesting to note that many students enjoyed the parallels between gaming and the topic structure. The topic had challenges to be checked off to make progress through the topic in much the same way many games have quests that players have to work through to progress through the game.

## **Communication of results**

The concept of the innovation and results have been presented at the 2018 Australian Conference on Science and Mathematics Education Conference, Flinders University, Adelaide.

Other presentations and peer-reviewed journal publications are planned.

## **Conclusions**

The new approaches used in Modern Chemistry came with considerable challenges for both staff and students. Staff have over the three years of the topic learned to manage these challenges and many often comment on the enjoyment of being involved in the topic and its far greater interactions with the students. Student success in the topic increased dramatically, but the true test will be the performance of the students in their future studies. It is important to point out that this student success came with a considerable investment of resources by the school. The impact of this investment will only be known as the students progress through higher years. Students who stayed enrolled for longer and perhaps stay for postgraduate work will have a significant positive impact for both the research and finance of the school.

For the students, the initial impressions of the topic are clearly very daunting. This is largely due to the concept of being asked to do something new and different. Despite these concerns, a majority of students did grow to enjoy the topic with many embracing the opportunity to try new things in the projects and explore concepts with examples related to their own interests. Of course, the very simple reality is that there are many more successful outcomes for the students, and hence they do have the opportunity to continue their studies. This can only be considered a positive outcome.



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# Appendix A

## ***Certification by Deputy Vice-Chancellor (or equivalent)***

I certify that all parts of the final report for this OLT fellowship provide an accurate representation of the implementation, impact and findings of the project, and that the report is of publishable quality.

Name:

.......... Date: 8/5/19

## **Appendix B: Overview of individualised majors**

There is a network of organisations offering an overview of programs around the world. A list of the available programs is available at <https://impnetwork.wordpress.com/im-programs/>

### **What is the Individualized Major Programs Network?**

The Individualized Major Programs (IMP) Network is an informal organization of individualized major programs at colleges and universities across the United States and beyond. In 2008-09, conversations among the directors of IMPs at the University of Massachusetts, Indiana University, University of Connecticut, and New College at the University of Alabama led to a conference in Bloomington, Indiana and the emergence of this network.

### **What are Individualized Major Programs?**

Individualized major programs offer highly motivated and self-directed students the opportunity to design their own major. As an alternative to traditional majors, IMPs allow students to pursue their educational goals in areas not available within an existing departmental curriculum. Students, with the help of faculty and professional advisors, focus their major and select courses on the basis of a unifying issue, topic, theme, culture, period, or question.

An individualized major is typically highly interdisciplinary and combines at least two distinct areas of knowledge. Also characteristic of an individualized major is the ability to integrate experiential learning and professional training with the liberal arts and sciences.

### **What are the goals of the IMP Network?**

1. to share information among individualized major programs about best practices and solutions to common challenges
2. to organize a regular conference to bring together faculty, staff, and students of individualized major programs
3. to serve as a resource to colleges and universities considering the creation of an individualized major program
  - The website is a resource for colleges and universities that do not have individualized major programs but are thinking of developing them.

### **University of Iowa- Individualized Plan of Study**

The self-defined B.A. in Interdepartmental Studies is an individualized major program offered by the College of Liberal Arts and Sciences. A student plans his or her own area of intellectual focus with the help of the Interdepartmental Studies Adviser. The program allows students to design their own majors, in an interdisciplinary area that does not exist as an academic department at the University. Interdepartmental Studies students have designed individualized majors in areas as varied as aging studies, international business, diversity studies, environmental issues and health issues.

### **University of Connecticut**

An individualized major is a self-designed, interdisciplinary major that allows you to create a program of study to fit your own specific interests. It is particularly appropriate if your interests cross disciplinary boundaries and are not met by an existing major at the University of Connecticut. The Individualized Major (IMJR) Program was established in 1974; since then more than 1900 students have graduated with a self-designed major. Some of the more common themes have been: international studies, health studies, criminal studies, film studies, and neuroscience. Some of the unique majors have been: environmental writing, social interaction and new media, and information ethics.

An individualized major is a structured plan of study that incorporates at least 36 credits of courses at the 2000-level or higher, is thematically focused, draws from at least two academic departments, and often includes an internship, research, or study abroad. It concludes with a final capstone project.

The Individualized Major Program is available to undergraduates in the University of Connecticut's College of Liberal Arts & Sciences or College of Agriculture, Health, and Natural Resources. Acceptance into the Program is based on submission of a formal proposal, for approval by the Individualized Major Advisory and Admissions Committee.

### **Cornell University**

The primary purpose of the Interdisciplinary Studies (IDS) major is to provide students with an opportunity to develop a set of courses around interests that are not well addressed by other majors in the college. A student may not be admitted into the major when entering the College of Agriculture and Life Sciences. The change to the major evolves after a student finds his or her interests diverging from the current major, and when a clear idea of a new educational objective is realized.

As is the case for other majors, there needs to be educational goals and a set of courses that will meet these goals. Unlike other majors where these goals and courses are established by faculty, students are responsible for developing their goals and courses. Faculty advisors can help with this. Generally, students should be drawing courses from across multiple disciplines. It also is expected that the courses taken will move from general introductory courses to advanced courses with greater focus and depth.

There must be a faculty advisor identified by the student willing to help with the proposed program. All CALS faculty can serve as advisors for this major. The Declaration of Intent form should be submitted after an advisor is identified. A student may choose to keep their current advisor, or may choose a new advisor. Assistance identifying an appropriate faculty advisor is

available by scheduling an appointment with a Student Services academic advisor.

### **University of Indiana Bloomington**

The Individualized Major Program gives you the freedom to create a multidisciplinary major that addresses issues and explores topics of your own choosing. The ability to select major courses from Indiana University's many schools and departments puts you in charge of your education in ways that conventional majors don't allow. As a student in the IMP you'll have the opportunity, rare in an institution of IU's size, to develop a close working relationship with one or more faculty sponsors who will guide you throughout your academic career. And, when you graduate, you'll have the distinction of having pursued a personalized course of study.

### **Program Overview**

If you are a highly motivated, independent student and you can't find a major that suits your particular needs, then the Individualized Major Program (IMP) might be right for you. In the IMP you can shape your own major, select courses from among IU's many schools and departments, design independent-study courses, undertake a challenging and important final project of your own creation, and do it all while completing requirements for a bachelor of arts degree from the College of Arts and Sciences. You'll have input from one or more faculty sponsors and committee members, as well as the IMP administration and staff, but what makes the IMP special is that it puts you in charge of your own education.

Many students who apply to the IMP do so during their sophomore or junior years, although you may be ready to apply as early as the second semester of your freshman year. You should start by meeting with the IMP assistant director to discuss your ideas, identifying one or two faculty members to serve as sponsors and securing their cooperation, designing your curriculum, and participating in an admission interview scheduled by the IMP office.

Once you're accepted into the program, you'll take courses and complete tutorials for the major and fulfil requirements for the BA degree. Along the way, you can take advantage of internships, overseas study options, and financial aid in the form of grants. The IMP culminates with a final project, final project review, and ultimately graduation.

Our graduates go on to successful careers in the professions, the arts, academia, and a variety of business fields. Many also continue their educations in graduate or professional school. But whether you plan to enter the working world or continue your studies, a successful experience in the IMP will prove to be an asset in your future. It will set you apart as an independent thinker with initiative, creative interests, and motivation.

### **Penn**

Students may apply for an individualized major if they have:

- Earned a minimum cumulative grade point average of 3.5.
- Declared a standard major by the end of their sophomore year. (They must continue on to complete at least a minor in that area.)

As part of the application students must:

- Meet with an advisor in the College Office no later than their fourth semester to discuss details of the major and the application process.
- Establish the fact that the goals of the proposed major cannot be met within the boundaries of a current offered College major or its combination with another major or minor(s).
- Plan a tentative coherent course of study for the major, with at least 14 credit units, to culminate in a major research project which, upon completion, will be presented to the University community in a public lecture. (This should be done in consultation with two faculty advisors. See below.)
- Find at least one standing faculty member in the School of Arts and Sciences who recognizes merit in the proposed individualized study and accepts the responsibility of acting as the student's main advisor for the individualized major and for sponsoring and overseeing the thesis.
- Find another faculty member whose specialty is in some way related to the major, but is different from the first advisor's and who is willing to serve as a second advisor.

### **Indiana University**

#### *Individualized Major Program*

The Individualized Major allows disciplined and self-motivated students to design unique majors of their choice with faculty supervision. It serves two groups of students:

- Those who wish to major in traditional disciplines or interdisciplinary areas for which majors are not currently available at IUPUI
- Those who wish to fashion unique and original interdisciplinary majors that reflect their individual experience, interests, and needs.

The Individualized Major provides a structure which allows students, in consultation with faculty members, to design majors that meet their own educational needs. Each major course of study varies in accord with the needs and interests of individual students. Students work closely with faculty advisors, and all Individualized Majors are overseen and approved by a faculty committee which ensures the integrity and rigor of each Individualized Major.

### **University of Washington**

At UW, an Individualized Studies major is a special interdisciplinary major designed by an individual student. Each Individualized Studies program is unique. The Individualized Studies program allows highly motivated and self-directed students to pursue the questions about which they are most passionate when those questions cannot be pursued in current UW programs.

A university education is about learning to ask and answer complex questions. The Individualized Studies program allows highly motivated and self-directed students to pursue the questions about which they are most passionate when those questions cannot be pursued in current UW programs. Individualized Studies students epitomize the intentional intellectual engagement at the core of a great liberal education: focused, rigorous, disciplinary learning, even when integrating multiple disciplines.

The Individualized Studies program is not a means to vocational or applied versions of existing degrees; nor does it provide a secondary alternative to (or a 'light' version of) existing majors. It is, instead, a place for intellectually curious, reflective, and highly self-directed students who embrace learning for its own sake. This program is not a place to 'get a degree'; this is a place to pursue deep learning.

### *Applying to the Major*

Pursuing Individualized Studies is a major commitment, and that commitment is reflected in the application process. To apply, you must construct an Individualized Learning Plan articulating the rationale, learning goals, and coursework, and a plan for assessing your learning. None of these things are easy for students to articulate on their own, precisely because this is the work faculty do on students' behalf. And that is what becoming an Individualized Studies student means: taking on the work normally done by faculty. In many ways, this is the hardest major on campus.

### *The Individualized Learning Plan*

The heart of the application is your Individualized Learning Plan. The learning plan articulates, very specifically, what you want to learn, why those things are worth learning, how you are going to learn them, and how you are going to demonstrate that you have learned them.

These goals constitute the most important part of the learning plan, and the most important factor in determining whether you are admitted to the program.

The learning plan must include all of the following. More details are included in the separate *Learning Plan Guide*. Incomplete plans will not be considered.

1. **Statement of purpose.** This is the rationale for your program. In broad terms, what do you want to learn, and why? Why can't you learn this in an existing UW program?
2. **Learning goals.** This is the heart of the learning plan. Here you must translate your broad interests into specific learning goals. Everything in Individualized Studies centers around these goals. You must also identify a clear plan to assess your learning – which you cannot do without clear goals.
3. **Annotated course plan.** This is where you explain **how** you will meet your learning goals, including a brief discussion of how each proposed class connects to your learning goals. These are not course descriptions (which you should also include as an appendix; see below); this is **your explanation** of how each course will help you meet specific learning goals. This section will also include a tentative quarterly plan.
4. **Additional appendices.**
  - Catalog course descriptions (from the UW catalog).
  - Your 'Plan B.' You must explicitly address what major you will study if you are not admitted to Individualized Studies.
  - *Signed faculty agreement form*; must be a regular, full-time (tenure-track or permanent lecturer) UW Seattle faculty member.
  - Approval by key departments, where appropriate.

See the Learning Plan Guide for more details on the above elements.



If this sounds like too much work, then Individualized Studies is not the right major for you, because this is what it means to be explicit and intentional about your own learning; this is the work of Individualized Studies. In most majors, this is the work that the faculty does for you. Being an Individualized Studies major means doing that work on your own.

### *Timeline and Criteria*

**The deadline for applications is the second Friday of the quarter.** The committee will review the applications and notify applicants before registration begins for the following quarter. The review will result in one of three outcomes:

1. **Approval.** The plan is approved and you are admitted to the Individualized Studies program. The learning plan becomes the graduation plan; all elements must be completed in order to graduate, in addition to the general graduation requirements (see below).
2. **Denial.** The plan does not meet the goals of the Individualized Studies program.
3. **Conditional approval.** The committee may offer a revised plan. You may choose to accept this plan (and be admitted to Individualized Studies), or choose a different major.

**Note that there is no reapplication.** If your learning plan is not approved, Individualized Studies is no longer an option. You should proceed to your 'plan B' major. We do not allow students to reapply because the timeline does not allow it; we cannot allow students to continue indefinitely without a clear academic plan.

For similar reasons, students **may not double major with Individualized Studies, and we do not admit students with more than 135 credits.**

### *Graduation Requirements*

Students admitted to the Individualized Studies program will, in addition to completing their learning plans, complete the following:

- Completion of all approved courses; minimum 2.0 in each course.
- Completion of a learning portfolio demonstrating that all learning goals have been met.
- Completion of the *senior study (INDIV 493)*.
- Complete the *General Education Requirements* for the College of Arts and Sciences.

## **University of Minnesota**

### *Individualized Degree Programs in the College of Liberal Arts*

The Bachelor of Individualized Study (BIS) and the Individually Designed Interdepartmental Major (IDIM) are individualized programs of study in the College of Liberal Arts for students who want to tailor their educational programs to their own interests and goals. The Bachelor of Individualized Studies (BIS) is a degree program in which you combine three areas of concentration rather than have a major. One concentration may be from outside CLA, and the concentrations may be unrelated to each other. An Individually Designed Interdepartmental Major (IDIM) for the BA degree enables you to focus on a unifying theme by combining courses from three or more CLA departments.

## **Butler University**

Be a Part of Individualized Major Program (IMP) and Do Your Own Thing! Are you having trouble finding just the major you want to fit your unique interests, talents, and career goals? Then you may wish to consider the Individualized Majors Program of the College of Liberal Arts and Sciences, Butler University. If your interests cut across normal disciplinary boundaries and you find any one department's major too confining, then this alternative may be for you. Or you may wish to combine it with a traditional major or minor.

### **University of California at Santa Barbara**

The major in interdisciplinary studies offers students an opportunity to develop an individualized program of study in three separate departments within the College of Letters and Science. The major provides a means to achieve a sharply focused academic goal that cannot be met by the combination of any existing major and upper-division electives. Potential applicants are urged to consult with an advisor in the College of Letters and Science (Cheadle Hall 1117) early in their academic careers for assistance in formulating their objectives within the major and in identifying the courses at UCSB that will best fulfill their goals. Because interdisciplinary studies is declared primarily at the upper-division level, students should plan their program carefully during their freshman and sophomore years in order to meet the lower-division requirements stipulated by individual departments. Students who attempt to 'pull something together' late in their undergraduate years or to create a theme to fit courses already completed are outside the spirit of the program and will not be accepted into the major.

### **Binghamton University**

The Individualized Major Program (IMP) provides Harpur College students an opportunity to design a program of study not presently available within the established university structure. These innovative majors must be academically sound, must show breadth and depth, and must provide a theoretical and conceptual framework for a particular course of study. Acceptable majors are interdisciplinary and typically combine courses from three or more disciplines.

Students are advised to apply for an IMP major in their SOPHOMORE year, and **NO LATER THAN THE FIRST SEMESTER OF THEIR JUNIOR YEAR**. Applications after this period may mean that additional semesters may be required.

Interested students should begin the process by visiting the Academic Advising Office and obtaining the preliminary proposal application form from the IMP secretary. Once the form has been completed it should be returned to the IMP secretary and an appointment scheduled with the IMP Coordinator. The IMP coordinator reviews the idea for the major with the student, offering assistance and helping clarify ideas before students approach the faculty adviser they select to guide their individualized major. Under the guidance of their faculty adviser students expand upon their preliminary proposal and write a formal major proposal. Once the proposal is ready it is submitted to and reviewed by the IMP coordinator before being passed along to the IMP committee—a committee of eight comprised of faculty, staff, and students—for review and action. During the review students are invited to appear before the IMP committee to engage in discussion and obtain further direction.

An IMP major becomes official once it has been approved by the IMP committee. The approval is recorded by the IMP coordinator and this constitutes the declaration of major. Students work toward completion of the major as they would any of the established Harpur College majors.

Recent IMP students have designed some fascinating majors—Scientific and Technical Progress and Culture (combining courses from philosophy, history, anthropology, psychology mathematics, and physics), Religion and the Law (combining courses from history, Judaic studies, and philosophy) Human Social Interaction (psychology, sociology, anthropology genetics (biology, psychology, anthropology, and philosophy).

The IMP Proposal Consists of the following elements:

1. IMP proposal cover sheet
2. Endorsement letter from the faculty sponsor.
3. Three to five (3–5) page essay.
4. List of twelve to fifteen (12–15) courses which will constitute the major.
5. Course descriptions (or an ‘annotated course list’).

***They should be in exactly the order listed above and the entire document must be submitted to the IMP coordinator via e-mail attachment.***

#### **Fordham University** *Individualized Major*

##### **LINCOLN CENTER | ROSE HILL | WESTCHESTER**

To allow you to design a bachelor’s degree program that fits your own needs and interests, Fordham School of Professional and Continuing Studies provides the option of a personalized interdisciplinary major.

##### **Steps for getting an individualized major approved:**

1. Submit a plan of studies in a concentration that involves courses in two or more departments.
2. Faculty from those departments will consider your proposal and, if they decide that it is both academically sound and feasible, will pass it on to the class dean.
3. If the class dean approves the proposal, you may undertake your intended major.
4. A faculty committee will supervise your studies, make necessary changes, and, along with the class dean, recommend graduation

The individualized bachelor’s degree program is available at the Lincoln Center and Rose Hill campuses.

#### **West Virginia University** *Individualized Major Program*

##### **Degree Offered**

- Bachelor of Arts

##### **Major: Interdepartmental Studies**

The individualized major program provides highly motivated undergraduate students with an opportunity to complete an individually tailored program when their educational aims fall

between established department or program boundaries. Students interested in this program should first explore the possibility that their aims can be met through a combination of established majors and minors, or through the Multidisciplinary Studies Program (<http://mds.wvu.edu/>). The Multidisciplinary Studies Program allows a student to combine three minors to create an interdisciplinary major.

An individualized major involves two or more academic areas, at least one of which must be in the Eberly College. The major program should be planned so that the academic depth and rigor meets or exceeds that of a traditional major. Since its approval in 1972, the individualized major program has attracted a number of interesting and challenging student proposals. Representative examples include a program in religious studies including courses in both religious studies and communication studies, a psycho-biology program focused on the integration of knowledge about the physiological and psychological mechanisms involved in learning, and a European culture program which combined elements from the Departments of History, World Languages, and Political Science.

The individualized major program is administered by the associate dean for undergraduate studies of the Eberly College of Arts and Sciences. Students interested in pursuing an individualized major should read the information at <http://eberly.wvu.edu/undergraduate/individualized-major> carefully and then make an appointment to meet with the associate dean for undergraduate studies of the Eberly College of Arts and Sciences by calling (304) 293-7476 to discuss their goals and the procedures they will need to follow to develop their program. Students should obtain approval for their major program no later than the end of their sophomore year as they are normally expected to embark on this program by the beginning of their junior year. This program may not be used to 'patch together' courses already taken to create an individualized major. More information about this program and the application process is available at: <http://eberly.wvu.edu/undergraduate/individualized-major>.

## **St. Mary's College**

### *Individualized Major Guidelines*

The student wishing to pursue an individualized major consults with his/her current academic advisor and faculty in the appropriate fields to develop the individualized major proposal and develops the proposal, per the guidelines below.

### *Approval Process*

- In order to assure that the student can complete her or his degree in a timely manner, the student is strongly advised to complete this process as soon as possible, and certainly no later than the Fall Term of the Junior Year. In the proposal, an academic advisor for the major is identified.
- Chairs of the departments included in the proposal review and authorize the inclusion of the courses in the individualized major.
- The student submits the proposal, attached to a 'Petition for Special Action' to the Office of the Registrar.
- The Registrar reviews the proposal and confirms that it meets requirements for an undergraduate degree at Saint Mary's.

- The Registrar forwards the proposal to the Chair of the Undergraduate Educational Policies Committee for his review and approval. The Chair may consult with members of the committee and appropriate department chairs prior to a final decision. If the Chair approves the individualized major, he/she informs the Registrar so that an appropriate GaelExpress program evaluation can be created. If the Chair does not approve the individualized major, he/she communicates his/her decision to the academic advisor and the student, with possible recommendations.

#### *Proposal Guidelines*

- List student name and ID number.
- List proposed academic advisor name and department.
- List title of proposed major.
- Write a justification for the proposed major.
- A set of learning objectives to be achieved in this major.
- A rationale for why this major is valuable for the student.
- Provide a proposed program of study. List each course name, number, and department.
- A set of lower division courses that represent the introduction to the discipline, and any skills or competencies necessary for advanced study in the discipline.
- A set of upper division courses that represent breadth and depth in the discipline.
- Any experiential learning that should be included in order to have advanced understanding of the discipline (e.g., study abroad, art production).
- An integrative experience, culminating experience, or capstone experience and/or project that provides opportunity for the student to demonstrate their knowledge and competencies in the discipline. This may be but is not limited to an independent research methods course, a capstone seminar, or an independent thesis project.
- Provide a description of how this program of study was developed (e.g., comparable to similar majors that exist in the Catalogue, comparable to the same major that exists at another institution).
- Include attachments of similar majors, if available.
- Include an explanation of how courses were chosen, with attention to the number of courses, the selection of lower division courses, prerequisites, upper division courses, and integrative experience.
- Include a signature page of faculty and/or staff consulted in the development of the major.
- Include a signature page of chairs of the departments with courses included in the major.

#### **University of Louisville**

##### *Example Programs*

The Liberal Studies B. A. is an interdisciplinary degree meant for those students who (1) prefer an individualized, interdisciplinary major as opposed to a traditional single-discipline major or (2) are preparing for a graduate/professional program which benefits from undergraduate study

across disciplines.

When designing a Liberal Studies major, two students with similar ambitions might build very different programs. For example, one pre-law student might combine Political Science, Justice Administration, and English; a second pre-law student might combine History, Psychology, and Military Science. Each is preparing for the LSAT and professional school; they are just arriving via different routes which reflect their interests.

A minimum of three concentrations is required for each program; some students extend this to four or five. An Arts and Sciences minor (or approved substitution) is the cornerstone of each LBST degree. As long as at least two concentrations are within A&S additional, relevant areas may be incorporated from university colleges outside A&S. It is possible for transfer students or students studying away from the university to bring in completed concentrations of college-level coursework which have no equivalent course at UofL.

## **Rutgers**

### *Individualized Major in Cognitive Science*

The Individualized Major in Cognitive Science that is administered through the Rutgers Center for Cognitive Science (RuCCS) offers an opportunity for exceptional, creative, self-motivated students to explore innovative and multi-disciplinary approaches to the study of the foundational and computational workings of the mind. The Undergraduate Director helps students choose a Cognitive Science faculty member with whom to work and consider the line-up of courses that is most suitable for a student's interest. Currently, there are 22 jointly appointed faculty advisors and an additional 28 faculty affiliates housed in various departments. Most play an active role in the life of the Center.

If interested in Cognitive Science, Students are encouraged to take our fall Intro to Cognitive Science course (01:185:201) with associated recitation course 01:185:202 **and/or** our spring Cognition and Decision Making course 01:185:301 **and/or** our spring Advanced Topics in Cognitive Science course (01:185:411). The Cognitive Science 201/202 is a lecture/recitation course taught by a single instructor. This course introduces students to the diverse set of concepts and formal and experimental techniques used in cognitive science. The Cognitive Science 301 is a lecture/recitation course taught by a single instructor. This course introduces students to the subjects of reasoning and decision-making as a means of exploring a number of issues central to the field of cognitive science. The Cognitive Science 411 is a seminar course team-taught by faculty affiliated with the cognitive science center. Faculty from computer science, linguistics, philosophy, and cognitive science will give single seminars in which they show how these diverse set of concepts and formal and experimental techniques used in cognitive science are used to address a particular problem within cognitive science. All three courses have an accompanying recitation/discussion session.

### *General Description*

An individualized major option is available to students who wish to pursue a specialized area of study in the liberal arts and sciences that is not normally available. Students who decide to create an Individualized Major will select a track from one of the four we offer or create a track based on your particular interests in Cognitive Science. Currently the tracks are **Cognitive Neuroscience, Generalist, Language, and Vision**.

(See Individualized Major Form)

Satisfactory completion of this individualized major leads to a Bachelor of Arts degree.

*The following requirements apply to all individualized majors:*

- The major must consist of at least 36 credits.
- Two thirds of the total credits must be from courses offered by the School of Arts and Sciences.
- Three fourths of the total credits must be at the 300 level or above.
- At least one course must be taken as an independent study directed by the primary faculty advisor. This course substitutes for a senior seminar and should provide a coherent view of the program of study.

*Additional requirements for students doing an individualized major in cognitive science under the auspices of the Rutgers University Center for Cognitive Science:*

- Students must take 01:185:201/01:185:202 (Cognitive Science: A Multi-disciplinary Introduction plus recitation) **and/or** 01:185:301 (Cognition and Decision Making) **and/or** 01:185:411 (Topics in Cognitive Science).
- Students must take at least one course that fulfills the cognitive science minor formal/analytic requirement  
<http://ruccs.rutgers.edu/ruccs/index.php/academics/undergraduate-minor> (see #2 for a list of approved courses).
- The director(s) of undergraduate programs in cognitive science must be one of the faculty sponsors, currently they are Dr. Mary Rigdon and Dr. Ernest Lepore.
- At least 2 of the 3 faculty sponsors must be affiliated with the Center for Cognitive Science.

*How to apply:*

Students must submit a written application no later than the first term of the junior year, part-time and transfer students may extend this deadline to the completion of 75 credits.

*Application must include:*

- **A 1-page Statement of Purpose and Learning goals** describing the student's academic objectives and clearly explaining why they cannot be accomplished within the current structure of majors, minors, and electives open to SAS students.
- **A proposed individualized program listing the courses** student intends to complete and the semester when the student intends to take the courses. Students may include short lists of 'elective courses' within the major from which they will choose a set number. For example, a student may list six specific courses and indicate that s/he will take a minimum of four courses from that list. The total number of minimums must equal no less than 36 credits. The curriculum will be binding once approved. Students should consult with the faculty regarding the availability of the courses they are considering including.

In creating your individualized program listing of courses, you can use these **SAMPLE TRACKS**, or simply use them as a guide. The approval and signature of the **primary faculty advisor and**

**two additional faculty sponsors.** Of these three, at least two must be members of the School of Arts and Sciences.

## **Tufts University**

### *Interdisciplinary Studies Major*

The Interdisciplinary Studies major has been open to all Liberal Arts students since 1968, offering them an opportunity to tailor their own multidisciplinary areas of concentration to pursue courses with greater freedom of choice than in the listed majors. A major that is truly interdisciplinary is one that represents an integration of traditional disciplines, a melding of fields that cannot be accomplished by the usual structure of a major/minor or a double major/minor.

An interdisciplinary major requires a high degree of both independent initiative and self-discipline from the student. The Interdisciplinary Studies major draws on courses from at least two of the following six areas of study: humanities, arts, social sciences, natural sciences, mathematics (quantitative), and engineering, plus a senior-year thesis project chosen to integrate the student's program. The thesis topic should therefore not be one which could be done within a regular departmental program. Rather, it represents a separate field of study with an identifiable methodology appropriate to the topic.

An interdisciplinary major is not a fallback or a substitute for those who cannot decide on a major, nor is it necessarily a way of creating a major that at present does not exist at Tufts. Rather, it is a serious undertaking for the student who is committed to blending disciplines in a way that is demonstrably relevant to an identifiable area of intellectual inquiry.

Candidates who are applying for an Interdisciplinary Major should have a minimum GPA of 3.4. If accepted, students may not double count more than two credits from their Interdisciplinary Studies Major towards another major or minor.

## **Cal**

The ISF is an interdisciplinary major and **research-driven program of liberal education**. It offers students the unique opportunity to develop an individualized cross-disciplinary **Research Program** that includes a **Course of Study** and a **Senior Thesis**. The Course of Study is made up of courses taken in the social sciences, the humanities, and/or the professional schools and colleges, alongside the required courses in ISF. The capstone experience a scholarly, rigorously-researched 40 page required Senior Thesis, a sustained inquiry in the social sciences and humanities based on original, cross-disciplinary research. Read more about the major

The ISF Major is part of the Division of Undergraduate and Interdisciplinary Studies (UGIS) of the College of Letters and Science. It is one of many interdisciplinary programs, but only one of two (with American Studies) that requires a senior thesis of each major. ISF offers students the unique opportunity to develop an individualized cross-disciplinary **Research Program** that includes a **Course of Study** and a **Senior Thesis**. The Course of Study is made up of courses taken in the social sciences, the humanities, and/or the professional schools and colleges. Each student, with the help of a faculty adviser, follows a coherent Course of Study drawing on upper division courses. And each student, under the direction of a faculty adviser, produces a 30–40 page Senior Thesis, a sustained inquiry based on original, cross-disciplinary research.

ISF has identified a number of **Interdisciplinary Research Fields** that have engendered



excellent scholarship and attracted students across campus. Although ISF students may pursue other research fields identified in consultation with ISF faculty and academic advisors, these ISF Research Fields provide models and resources about scholarly interests shared by many ISF students and across campus. Research fields are dynamic bodies of knowledge that form and develop through a series of debates articulated around a given set of interdisciplinary topics, research questions, and theories. The Research Fields found on this website are here **to help ISF students identify their own research interests and customize their own research program and course of study.**

#### *Admission:*

Students must apply to the ISF Major with a well-conceived Research Program, including a proposed course of study and an intellectual justification of their proposed study. Research programs must be interdisciplinary, integrating methodological or theoretical approaches from at least three academic disciplines (departments or programs). Interdisciplinary work may be comparative, historical, regional, thematic or problem-focused. The Research Program should not replicate an existing major. The purpose of the ISF major is to allow undergraduates to combine work across disciplines in courses and with faculty where no other structured program exists. Finally, The Research Program must be feasible, and the Senior Thesis must answer a manageable research question in a semester's hard work (ISF 190). Each student's proposed Research Program is discussed with and approved by a faculty adviser to assure feasibility, but the final responsibility is the student's.

The ISF Major emphasizes the role of the faculty adviser and the student-adviser relationship. The nature of the major requires repeated elaboration of the proposed Research Program, Course of Study, and Senior Thesis that best combine students' individual research interests and the ISF program goals. Students are assigned an adviser upon acceptance into the major, although faculty members outside ISF may serve as advisers when appropriate, as approved by the ISF Director. For more on advising, see the Student Handbook.

### **Michigan State**

#### *About Interdisciplinary Studies*

##### *The Idea of the Major*

The undergraduate major in Interdisciplinary Studies in Social Science (IDS) recognizes that many students do not wish to limit their studies to the specialization of a single disciplinary department or professional school. Rather, these students seek a well-rounded bachelor's degree program that will provide broad exposure to several of the social sciences, even as it prepares them to enter the career market or undertake advanced studies. The IDS major offers students the opportunity to make full use of both the commonality and diversity inherent in the social sciences and to construct from them a well-integrated, multifaceted liberal arts education.

Many important and rewarding topics in the study of human beings, their social organizations and behavior, and their physical and biological environments do not fall exclusively within the boundaries of any single social science discipline. While individually distinctive, the social, behavioral, and economic science disciplines from which students in this major construct their programs collectively form a closely interlocking set of disciplines with many basic concepts and points of origin in common. Each discipline complements and modifies the theoretical perspectives and findings of the others. Because of the overlapping boundaries of the social

sciences, many faculty in the College of Social Science participate in instruction, research and public outreach projects with colleagues in related disciplines within the college, across the campus, and around the world. For these reasons, the college offers a broadly based, multi-departmental undergraduate major in interdisciplinary social science.

### *The Structure of the Major*

The major in Interdisciplinary Studies in Social Science requires a minimum of 40 credits, with at least 15 credits included in an interdisciplinary concentration (Community Governance and Advocacy, Health and Society, Human Capital and Society, International Studies, or Liberal Studies) and at least 12 credits included in a disciplinary cognate selected from one of the following departments: Anthropology, Economics, Geography, History, Political Science, Psychology, or Sociology. The course work in the interdisciplinary concentrations establishes the basis for students to pursue the integrated study of complex social issues and phenomena. The course work in the disciplinary cognates develops more specialized skills in problem analysis, research methodology, and critical thinking. Together, the two complementary parts of this major combine breadth and depth in imaginative ways that have multiple applications to both professional careers and advanced study.

Liberal Studies students design an interdisciplinary program of at least 27 credits in the departments and professional schools in the College of Social Science, combining a customized concentration and cognate.

**The Business Emphasis:** IDS students may complete a *Business Emphasis*, composed of a group of courses offered in the Eli Broad College of Business. The *Business Emphasis* can be a valuable complement to the student's interdisciplinary program of study. Many employers in the public and private sectors and many graduate programs in public policy, law, or business are especially interested in students who have included a significant portion of business-oriented course work in their undergraduate degree programs.

**Teacher Certification:** The IDS major is designated as a major in which students may pursue teacher certification (secondary school level). Students must be accepted into the College of Education, and are required to complete specified course work in four academic disciplines - economics, geography, history, and political science.

### *Points of Pride*

**A Tradition of Excellence and Innovation:** For over 65 years, IDS has offered students the opportunity to discover effective ways of combining varieties of academic interests into individually tailored, coherent programs of study. The major—first known as the Social Science Divisional Major, later as the Multidisciplinary Program (MDP), and since 1992 as IDS—has been available at MSU since 1944.

**A Popular Major:** IDS is one of the largest interdisciplinary undergraduate degree programs in the country. At present, over 950 students are enrolled.

**Topical/Thematic Focus:** IDS is unique. It differs from many interdisciplinary or interdepartmental degree programs in that it offers students the opportunity to select a specific focus (e.g., Health and Society, International Studies). In the course of their studies, students gain both a strong, liberal arts foundation and in-depth knowledge in the selected topical or thematic area.

IDS offers a wide range of options. Each student selects and completes the requirements of one of these interdisciplinary concentrations:

- Community Governance and Advocacy
- Health and Society
- Human Capital and Society
- International Studies
- Liberal Studies

**Student Accomplishments:** Over the years, IDS students have received a number of prestigious academic awards and citations. Two graduates have won Mellon Fellowships for graduate study, the first recipients of this award in the history of Michigan State University. During the past five-year period, IDS students have received sixteen College of Social Science Undergraduate Distinguished Scholarships, one Richard Lee Featherstone Endowed Prizes, awarded each year to outstanding graduating seniors at MSU who possess an unusually well-articulated combination of academic interests, along with a record of service that reflects those interests. In addition, three recent IDS students have received Board of Trustee Awards for graduating with a perfect 4.0 grade point average.

**Alumni Accomplishments:** IDS alumni pursue a wide range of career interests. IDS graduates are exploring new frontiers in a variety of interrelated and overlapping fields. Alumni of the major number in the thousands and include a U.S. Senator, a former governor of the State of Michigan and ambassador to Canada, a leader in the U.S. civil rights movement, the former U.S. ambassador to Brazil, a past president of the MSU Board of Trustees, three university presidents, the former Vice President of the Corporate Trust Department of one of America's largest banks, a professional photographer who has been in the forefront of developments in computer imaging, a large number of men and women who have served the public in various capacities at the local, State, and national levels, and corporate and community leaders across the country and around the world.

**Alumni Pursuing Graduate-Professional Schools:** In recent years, a large number of IDS alumni have pursued graduate-professional programs of study. These include schools of law, medicine, public health, social work, human resources/labor relations, health care administration, public policy, public administration, urban planning, and business. Graduates in the past few years have attended a wide range of colleges and universities, including many major research institutions.

**Academic Advising:** The IDS program continues to place strong emphasis upon the quality of its academic advising. IDS advisors assist students in developing imaginative and intellectually stimulating programs of study. IDS advisors have in-depth knowledge and understanding of courses and course content in the various departments/schools within the College of Social Science and elsewhere in the university.

## **Utah State University**

### *What Can I Do with an Interdisciplinary Bachelors Degree?*

Graduates of interdisciplinary studies programs may embark on a variety of career opportunities. Some students enrol in undergraduate interdisciplinary programs strictly for educational purposes,

while others seek to advance or change careers. Schools may offer interdisciplinary studies either as a standalone program or integrated into specific degree programs.

#### *Careers for Bachelor's Degree Holders in Interdisciplinary Studies*

By nature, interdisciplinary degree programs cover many academic areas, providing students with solid academic foundations for multiple careers and various graduate programs. Popular career choices for programs with combined fields of study include business and teaching.

Students interested in business careers may benefit from studies in international finance, psychology and management, for example. Studying business from a variety of academic angles may offer greater insight into areas like company growth management, employee relations and consumer trending. Working students can use their studies to further their careers or start their own businesses.

Teachers of elementary and secondary schools, where only a bachelor's degree may be required, can utilize their interdisciplinary knowledge to teach multiple subjects. The ability to instruct several types of classes may prove to be a valuable asset to a school and may lead to rewards like higher salary or tenure.

#### *Undergraduate Programs in Interdisciplinary Studies*

The phrase 'interdisciplinary studies' infers multiple subjects within a single program. Several colleges and universities offer bachelor's degree programs in interdisciplinary studies, allowing students to fully customize courses based on their interests. Other schools formulate a varied curriculum for a specific degree program with particular career goals in mind.

Adult learners make up the general population of students enrolled in interdisciplinary study programs. Many schools offer part-time attendance, flexible scheduling or distance learning options.

#### *Areas of Study*

Some academic combinations for interdisciplinary programs include the following:

- Information technology, business and networking
- Media, communications and film
- Performance art, art theory and graphic design
- Anthropology and physical science
- Psychology, sociology and history
- Business, international studies and finance
- Cultural studies, political science and economics
- Biomedical engineering, chemistry and technology
- Social sciences, human services and developmental behavior
- Religious studies, technology and science

As with most bachelor's programs, a sufficient number of credit hours in general education must be included, though the majority of studies come from areas of interest to the student. While many programs consist of prearranged course offerings, students are often free to select from

an assortment of humanities, arts, sciences and technology courses to satisfy the requirements of the degree program. Many interdisciplinary programs limit the number of courses one can take in an academic area, ensuring that students receive sufficient exposure to two or more fields of study.

### *About This Degree*

The Interdisciplinary Studies major is intended to serve the needs of students who want to design a unique individualized academic program, obtain a broadly-based education, and diversify their professional potential. The degree is not intended to replace existing majors or curricula. Rather, it is designed to provide the *small number* of students whose degree needs cannot be met with other majors with a program which is less restrictive and more responsive to their individual plans and interests.

The Interdisciplinary Studies major is available through the following six colleges: Agriculture; Caine College of the Arts; Education and Human Services; Natural Resources; Science; and the College of Humanities and Social Sciences.

Students can pursue a **BA** or **BS** degree.

### **University of Illinois College of Liberal Arts and Science**

Individual Plans of Study Major (IPS) invites students to create an original major that is appropriate for their individual educational needs and is characterized by a unique pattern of upper-level courses with a new academic direction. The development of an IPS major begins with a student's perception that a more appropriate field of study could exist beyond the present majors. Consultation with the secretary of IPS the Advisory Committee and with faculty members in related fields will soon establish whether an original major is worth pursuing. With the cooperation faculty who serve as advisors for this IPS program, an IPS major is planned and justified as carefully as if this were a departmental major.

### *Interdisciplinary Majors*

The departments within LAS sponsor an interdisciplinary program of study that acquaints students with topics that cross disciplinary boundaries. Enrollment in the Interdisciplinary Major requires selection of one of the available options. Each option is supervised by faculty members whose scholarship and educational interests have involved them in interdisciplinary teaching and research. An advisor is available in each option and is responsible for approving plans of study.

All of the college's graduation requirements for the Sciences and Letters Curriculum apply.

**Degree Requirements:** To graduate, students must fulfill a core set of requirements established by the college as well as the requirements specific to their major. See LAS's degree requirements as well as the campus's Programs of Study.

### *Interdisciplinary Minors*

There are several interdisciplinary areas in which scholarly needs or employment demands require recognition. In these areas, LAS offers an interdisciplinary minor. Students interested in these minors should contact the appropriate advisor. The interdisciplinary minor differs from the standard minor in that it may require attainment of a predetermined and approved grade-point average in the courses for the program.

Students are required to consult with the advisor regarding the selection of course work.

### **NC State University**

Would you like to learn how to address the world's challenges from a variety of perspectives? Would you like to explore the arts, learn about diversity and gender issues, create your own plan of study, become conversant in foreign cultures, or understand the complex connections between science, technology and society? Then you've found the right place. The major and minor programs and dual-degree programs we offer in Interdisciplinary Studies let you do all that.

### **University of Virginia**

#### *A Part-Time Degree*

The Bachelor of Interdisciplinary Studies (BIS) makes it possible for working adults to complete a degree from the University of Virginia in the evenings, on a part-time basis.

#### *Multiple Learning Environments*

Instruction occurs primarily face-to-face in a seminar environment. Various learning environments are also available for added flexibility.

#### *Curriculum*

The Bachelor of Interdisciplinary Studies curriculum is designed to foster a broad interdisciplinary education with concentrations in:

- Business
- Liberal Arts
- Individualized Concentration

All students are required to complete an independent research Capstone Project guided by a faculty mentor.

#### *60 Credit Hours Required for Entry*

The Bachelor of Interdisciplinary Studies program requires 60 transferable credit hours to enter the program. The University then requires a minimum of 60 hours of UVa credit in order to earn a baccalaureate degree.

Applicants for the off-Grounds program offered with the Northern Virginia, Thomas Nelson (starting Fall 2015), and Tidewater community colleges need to have earned at least fifteen (15) transferable credits from the host community college.

**Note:** *this may not be the program of choice for some individuals who are eager to enter a program sooner and/or may want to bring in more hours that will count toward a degree completion.*

### *Support Starting Today*

In an effort to maximize potential success and satisfaction for each student throughout a very challenging academic experience, the Bachelor of Interdisciplinary Studies provides a high level of support and individualized attention, starting at the pre-application stage. Pre-admission counselors are available to meet with prospective students, then, academic advisors are available after admission to the program.

### **University of Florida**

#### *Interdisciplinary Studies*

The College of Liberal Arts and Sciences recognizes that undergraduate students' academic and professional interests may lie within more than one discipline. As interdisciplinary approaches, research, and curricular activities become increasingly more popular, the college is pleased to offer the opportunity for students to develop and pursue interdisciplinary majors that cross the boundaries of various disciplines.

Students whose academic and/or professional interests are not met by a traditional academic department may apply to the IDS Program through the CLAS Dean's Office. IDS applicants can initiate and design an individualized interdisciplinary program of study with the help of at least (2) faculty sponsors. For more information on faculty sponsors, please click [here](#).

Many IDS students opt to apply for one of our pre-established concentrations, each of which allows latitude for them to develop course work and research programs that suit their individual interests. Please click on the concentrations below for more information:

- American Indian and Indigenous Studies
- Biochemistry and Molecular Biology
- Biological Illustration
- Film and Media Studies
- Latin American Studies
- Medieval and Early Modern Studies (MEMS)
- Middle Eastern Languages and Cultures (MELC) – Arabic
- Middle Eastern Languages and Cultures (MELC) – Hebrew
- Modern European Studies
- Neurobiological Sciences

Before applying, please review all **requirements** and **information for students**.

\*Note that this major ***CANNOT*** be transferred into from another institution. You must be a College of Liberal Arts and Sciences student and have completed at least **ONE** semester at UF prior to applying. Interested transfer students are encouraged to call (352)-392-2264 and set up an appointment with Joe Wolff during their first semester to discuss the program and potential areas of study.

### *Minor in Interdisciplinary Studies*

The College of Liberal Arts and Sciences also offers an IDS minor in Sustainability Studies. You do not need to be an IDS student in order to apply. For more information, please click [here](#).

You may apply to pursue a minor in CLAS via the Academic Advising Center in Farrior Hall. Minor application forms can be found here: <http://advising.ufl.edu/information/minors.html>

### **University of Pittsburgh**

Interdisciplinary Studies Major Revised: 06/2008 The Interdisciplinary Studies major is an alternative to the traditional majors and other upper-class options regularly available to students in the School of Arts and Sciences.

Its purpose is to provide students with the opportunity to devise a coherent course of study with the breadth and depth appropriate to an Arts and Sciences major that is either (1) designed to lead to competence in a recognized discipline or sub discipline not now officially recognized as a major in the School of Arts and Sciences or (2) focused on a significant theme or group of problems whose understanding would require a multidisciplinary yet integrated curriculum.

### *Regulations*

1. Each interdisciplinary studies major should consist of at least 42 credits of work earned in courses from at least two Arts and Sciences departments. The major should aim at integrated and cumulative learning. To this end, each major must have the following characteristics: a) At least 21 credits must be earned from courses numbered 1000 or above; b) Courses must be arranged in one, two, or three clusters or thematic groupings; c) Each cluster must contain a minimum of 12 credits.
2. A W-course approved by the faculty sponsors must be completed as part of the major. 3) Up to 12 credits of independent study, directed reading, directed research, undergraduate teaching, and internships may be counted toward the major.
3. Except in special circumstances, no proposal for an interdisciplinary studies major that contains non-Arts and Sciences courses will be approved if the intent is to use the interdisciplinary studies major as the sole major. If the interdisciplinary studies major will be the second major, up to six non-Arts and Sciences courses may be utilized. Students should note Arts and Sciences regulations regarding non-Arts and Sciences courses.
4. A student pursuing the interdisciplinary studies major is exempt from the School of Arts and Science's related area requirement.
5. If the interdisciplinary major is a second major, up to 12 credits, if appropriate, may be counted for both majors.
6. Every student pursuing interdisciplinary studies major must have an advisory committee consisting of two full time Arts and Sciences faculty members from two different departments. The responsibilities of the advisory committee shall be as follows: a. Approve the student's interdisciplinary studies major proposal; b. Approve changes to the proposal; c. Provide academic advising to the student at least once per term; d. Certify completion of the major to the Office of the Associate Dean of Undergraduate Studies in the student's senior year.



7. Every student pursuing the interdisciplinary studies major must have his/her registration approved and signed by one member of his/her advisory committee.
8. All interdisciplinary studies major proposals must be submitted to the Director of Advising for final review and approval.
9. A student should declare the interdisciplinary studies major in the second term of the sophomore year or the first term of the junior year (i.e. before completion of 75-degree credits).
10. The following additional requirements apply: a. A minimum 2.0 GPA must be maintained for all interdisciplinary studies course work; b. Students may achieve honors in interdisciplinary studies by earning a minimum GPA of 3.5 in the courses for the major and approval of a final paper or thesis; c. All regular Arts and Sciences degree requirements must be satisfied (e.g. minimum 120 credits, foundational skills and disciplinary approaches, 2.0 overall GPA).

#### *Procedures*

1. A student wishing to declare an interdisciplinary studies major should seek advice from relevant faculty members, the Advising Center, and the Dean's office.
2. The student should draft a proposal to explain and justify the proposed course of study and revise the proposal in light of comments from his/her advisor(s). (See below for 'Guidelines for Drafting the Interdisciplinary Studies Major Proposal').
3. The proposal must be approved by of two full time Arts and Sciences faculty members from two different departments, who would thereafter constitute the student's advisory committee.
4. The proposal should consist of a detailed explanation and justification of the major, together with a proposed curriculum (course list). So far as practicable, alternative courses should be specified in the event of scheduling problems.
5. The proposal, with the signatures of the student and the two faculty sponsors, must be submitted to the Director of Advising for approval.
6. If either faculty advisor should for any reason cease to function in that role, the student must find a replacement. In such cases, the faculty member should inform the advisee in advance of his/her impending resignation from the advisory committee, and so far as possible assist the student in finding a replacement. It is the student's responsibility to fill vacancies in his/her advisory committee whenever they occur, and to inform the Director of Advising of any changes.
7. Approval of changes in the major must be certified to the Director of Advising by both members of the advisory committee no later than the first week of the term prior to the term in which the student plans to graduate. The changes should be indicated on a copy of the original course list and initialed by the faculty sponsors before being submitted to the Director of Advising.
8. Both faculty sponsors must certify completion of the major to the Office of the Associate Dean in the student's final year.

#### *Guidelines for Drafting the Interdisciplinary Studies Major Proposal*

In general, the proposal should have three parts, normally three pages in length, although the

second part may consist of more than one page.

1. The Title Page should contain the following information: (a) The title of the proposed major; (b) The date of the proposal; (c) The student's current mailing address, phone number, and e-mail address; (d) The names, departments, campus addresses and phone numbers of the two faculty sponsors.
2. The Proposal itself should be a clear statement of the purposes of the proposed course of study, the reasons for wishing to pursue this course of study, and how the various proposed courses would contribute to the achievement of those purposes. The statement should explain clearly the particular themes or problems that the major is designed to address. If this is not already obvious from the statement, explain why an existing departmental major would not accommodate those interests. The Course List should contain the courses considered necessary or relevant to the major. Provide the course number, title, and number of credits for each course. Arrange the courses in one, two, or three clusters (thematic groupings), and use an asterisk to identify the courses that have been completed. The list must include at least 42 credits, 21 of which must be for courses numbered 1000 or above. Each cluster must contain a minimum of 12 credits.
3. The student should discuss the course list in detail with the faculty sponsors to determine which courses are required, and which are optional. The course list may be changed after the proposal has been approved only if the changes do not substantially alter the overall coherence of the major (see Procedures #7). Substantial modifications of the curriculum, if not approved by the faculty sponsors, may result in nullification of the major.

### **University of Missouri**

#### *Interdisciplinary Studies—Traditional Program*

The Interdisciplinary Studies major is composed of 39 credit hours, 3 of which are the senior capstone. The remaining 36 hours are to be distributed in one of the following four ways:

Students may select either two or three disciplines in the major, which are called components. For students who choose two components, they may either break the credits into 21 hours and 15 hours, OR 18 hours and 18 hours. For students who choose three components, they may either break the credits into 12 hours, 12 hours, and 12 hours, OR 15 hours, 12 hours, and 9 hours. Any undergraduate discipline on campus could be considered a component option. Students should consider not only what course work they may have already completed that can count in the major, but also the courses or disciplines they would like to add when determining their components. Every Interdisciplinary Studies student's major is structured differently; the Interdisciplinary Studies advisor will act as a guide to help each student craft his/her major in a way that will best serve his/her goals.

Within the 39-hour major, students must make sure that the following policies are upheld:

All course work in the major must be at least 2000-level. This means that transfer credit must be at least sophomore level to count in the major.

At least 18 hours of course work in the major must be from the College of Arts and Science. See the campus list of majors to determine which departments are considered to be Arts and

Science.

Grades in the major must average at least a 2.0 GPA in each component. Ideally, no grades below C- will be accepted in the major.

At least 15 hours in the major must be 3000-level and above.

Course availability in some campus departments may be limited to students in those majors. Some departments on campus will allow non-majors into their courses, but only after students majoring in that area have an opportunity to register first. Below is a summary of some of the most common MU departments that limit course access to students in their own majors:

**Communication:** Most 3000-level and higher Comm courses are restricted to Comm majors only during early registration. Interdis students wishing to enroll in Comm courses should be aware of the date in which the Comm restriction will be lifted each semester. It is usually lifted the day after the last early registration date. If students are still not able to get into a Comm course after the restriction has been lifted, the best strategy is to keep checking in myZou to see if someone drops a class. If a student is still in need of a Comm class by the time the semester begins, one COULD show up to class the first day and ask the instructor for a permission number to add the class. Please keep in mind that professors are under NO obligation to award permission numbers to students, so it is critical to have a backup plan in mind. Also, it is up to the student to make sure he/she has already completed any prerequisite course work required or recommended for each class.

**Business:** Courses in a Business component may consist of any combination of management, marketing, finance, accounting, economics, personal financial planning, and agriculture economics classes of 2000-level or above. Most 3000-level and higher Business courses are restricted to Business majors only during early registration. Interdis students wishing to enroll in Business courses should be aware of the date in which the Business restriction will be lifted each semester. It is usually lifted the day after the last early registration date. If students are still not able to get into a Business course after the restriction has been lifted, the best strategy is to keep checking in myZou to see if someone drops a class. If a student is still in need of a Business class by the time the semester begins, one COULD show up to class the first day and ask the instructor for a permission number to add the class. Please keep in mind that professors are under NO obligation to award permission numbers to students, so it is critical to have a backup plan in mind. Also, it is up to the student to make sure he/she has already completed any prerequisite course work required or recommended for each class.

**Psychology:** Most 3000-level and higher Psych courses are restricted to Psych majors only during early registration. Interdis students wishing to enroll in Psych courses should be aware of the date in which the Psych restriction will be lifted each semester. It is usually lifted the day after the last early registration date. If students are still not able to get into a Psych course after the restriction has been lifted, the best strategy is to keep checking in myZou to see if someone drops a class. The Psych advisor typically evaluates class capacity just before the beginning of each semester, and sends an email to the Interdis advisor outlining which Psych courses still have availability. The Interdis advisor forwards any emails regarding course accessibility to all assigned Interdis students. If a student is still in need of a Psych class by the time the semester begins, he/she should follow the guidelines from the email. The Psych advisor typically handles

permission numbers for entry into MOST Psych courses. Please keep in mind that the Psych department is under NO obligation to award permission numbers to students, so it is critical to have a backup plan in mind. Also, it is up to the student to make sure he/she has already completed any prerequisite course work required or recommended for each class.

Other MU Departments: Certain MU departments restrict their courses ONLY to students in that degree program, and therefore, the only way for a student to have a component in a discipline such as this is if they were in that program PRIOR to changing their major to Interdisciplinary Studies, and had already completed course work. Examples of this may include journalism, engineering, architectural studies, education, or other competitive degree programs. Departmental consent may be required to enroll in courses that are restricted to students in that major only.

## Appendix C: External evaluator's report

Independent evaluation report for the OLT-funded National Teaching Fellowship *Developing tailored study plans for the new higher education environment: 'Letting go of control'*.

**Fellow:** Professor Joe Shapter, Flinders University

**Evaluator:** Professor Martin Westwell, SACE Board of South Australia

### Background

This fellowship was focused at its core at addressing student engagement in the tertiary sector. This may be the most important issue facing universities today. The lack of engagement is having a significant impact on student retention and student success. Given the huge resources used to attract students in the first place, it is critical that universities explore all options available to meaningfully engage with their students to give them every chance of success. The work in this fellowship explored an approach for program design known as interdisciplinary studies, which is used extensively in the United States (US), and also pioneered a new approach to the delivery of a first year science topic.

The fellowship had two main streams. The first stream explored interdisciplinary studies to understand how these programs of study work in the US. After undertaking the work to gain a detailed insight into the program, the fellow gave several presentations around the country to explain the system and encourage uptake of this approach. A workshop was also held with international academics and industry representatives to explore the barriers and potential implementation impacts.

In parallel, a new topic was developed to explore one approach that would both improve student retention and provide learning skills critical for future success. This topic took two years to develop and was first delivered in 2016. Since then the topic has been refined and student insights, opinions and feedback continuously obtained and considered.

The purpose of this evaluation was to consider the potential impact of the work undertaken in this fellowship.

Tertiary institutions are the core stakeholders and audience for this fellowship. The fellowship set out to challenge some current approaches used in the tertiary sector and provide alternatives to these approaches. Given the poor retention rates at many institutions coupled with very poor student engagement for those students who do remain, it is very clear that the sector has to explore new approaches if only simply for financial reasons. Of course, there are many more important reasons and this fellowship tested and will continue to test student outcomes in the new approaches.

## Evaluation questions

- **What is the potential impact of this work?**

This work places students at the centre of their own decisions about their undergraduate learning. In doing so it has the potential to have a range of impacts:

*Increased engagement:* The main focus of this project was to investigate the relationship between an integrated studies approach and student engagement. The first stream of the project looking at US institutions as case studies clearly demonstrated the very strong potential for approaches including integrated studies to engage students in their learning, retain students in university degree programs and thus improve the educational outcomes of students while providing a financial return to the university. The second stream explored a new approach to the delivery of a large first-year science topic with few lectures and provided students with much greater choice in their pathways through the curriculum. The improved retention of students is clear from the statistics, but long-term impacts will still need to be evaluated.

*Sense of belonging:* The improved engagement indicates that students can develop a sense of belonging to an institution and a program of study that might otherwise not be achievable through the traditional disciplinary offerings. By putting (curated) choice in the hands of the students, it allows them to find an undergraduate program or topic that aligns with their aspirations and values. This is an important factor for female students to take up traditionally male-dominated areas such as physical science, mathematics, engineering and the various incarnations of computer science. The case studies indicate that this sense of belonging is developed in many ways through the integrated studies programs including through the relationship between student and mentor.

*Metacognitive development:* The planning and reflection required to be successful in an integrated studies program are likely to develop metacognitive capacity in students. Where have I been? Where am I now? Where do I want to go? How might I move forward? All of these, and similar, questions are likely to be asked by students in an integrated studies program but much less so through a traditional program where students may go with the flow. As noted in the program report, *'The exercise in being able to do these things may well be the largest part of the education the programs provide.'*

*Responding to the market:* The societal, cultural, and intellectual demands upon education continue to broaden and deepen. Regardless of their post-university pathway, graduates will find themselves in increasingly complex contexts in which the distinction between disciplines is increasingly difficult to see. Disciplinary knowledge remains important, but the profile of a cohort of graduates needs to have diversity within it. The case studies indicate that integrated studies programs allow student cohorts to develop this diversity through the choices made by individuals. Each university will be able to analyse the choices students are making to inform their marketing and messaging to both prospective students and graduate destinations (such as employers) about the diverse characteristics of the graduates from that institution. At the topic level, students are developing skills such as teamwork and time management that will be central to managing the complex contexts in which they will work.

- **Will it make any difference to the delivery of high-quality education in the Australian tertiary education system?**

It is clear that integrated studies programs are not likely to displace the traditional discipline-focused offerings of universities. However, this project has demonstrated that such programs could be an important addition to the Australian tertiary education system as they create new ways of providing educational value from the intellectual property and capital of universities. The topic developed as part of this project does demonstrate new approaches to the delivery of large topics. Further analysis is required, but the work provides important insights into how future university topics could be delivered to keep students engaged and maximise the effective use of resources for the sector.

This value is realised through the impacts listed above and in particular through the engagement of students in their learning and their improved outcomes through greater retention at university. It is likely that in facilitating young people to have control over their own learning journey, integrated studies programs will develop graduates who are likely to be able to use their knowledge, knowhow and self-directed learning to respond to the complexity and uncertainty they are likely to experience beyond their undergraduate years.

- **What will be the benefits to students?**

Many of the benefits for students are outlined above. In addition, the work described in this report demonstrates that integrated studies programs are likely to be particularly beneficial to students who either:

- have a clear post-university pathway in mind, however niche that may be, who can create a bespoke undergraduate experience for themselves;
- are high performers who are looking to stretch and develop themselves in multiple dimensions; and/or
- are not likely to engage with traditional offerings.

Of course, this is not a comprehensive list of students who may benefit from such a program.

It is important to emphasise that as well as the benefits of a university education and the opportunity to tailor a degree or topic to one's own needs, integrated studies programs or student-defined topics may provide benefits that would be more difficult to achieve in more traditional programs. For example, the threshold learning outcomes for every discipline include self-directed learning in one form or another. Developing a strategic approach to learning is a core outcome of integrated studies but peripheral to other, more traditional programs.

## **Conclusion**

This fellowship was undertaken in an appropriate manner with sound methodology and has demonstrated that integrated studies programs can have significant benefits for universities and students. The work described in the report has demonstrated that an opportunity exists through integrated studies for the Australian tertiary education system to innovate and deliver further value to students while providing a financial return to universities.