Learning together

• Students’ assessed coursework
• Engage with the students
• Help them to improve their coursework assessment for one module
Overview

• Overview of module & coursework
• What I did
• Example materials
• My Reflection
Module
• China Partnership Programme students (3+1+1)
• 2 x Credit bearing modules
• English Language 1 and English Language 2
• English Language 2 (semester 2)
• 2015 – 2016 academic year
• In progress 2016 – 2017 academic year
Module Coursework

Individual Presentation
- 25%
- A presentation on an aspect of technology
- 5 -6 minutes

Literature Review
- 25%
- 1,400 - 1,800 words
Literature Review and Presentation

Technology:

Literature Review:
- Topic:
- Specific Focus:

Presentation:
- Topic:
- How it works:
- Evaluation:
The Problem

• Module coursework:
  – Changed the coursework (no examples from previous years)
  – Guidelines (you think are clear)
  – Students can struggle to follow the guidelines / ask a lot of questions / need additional guidance
  – Students want/need to see models of what is required
The Solution

• Complete the coursework assessment myself for the module
• Helped to develop teaching materials
• Helped guide the students through the process of producing their coursework
Aims of the Literature review

• Researching a topic through reading
• Summarising, paraphrasing, quoting and synthesising from a number of sources
• Analysing the views/arguments of others
• Writing correctly formatted ‘references’
• Writing in appropriate academic style
• Following layout instructions
• Proofreading and editing your writing
Task details

• Explore chosen topic in depth
• Overview the **main themes** associated with your chosen technology
• **Focused** (narrow the scope).
• Requires **synthesis, analysis and evaluation** of the sources identified
• The Literature should have a clear **thesis statement**.
• Minimum of 3 academic sources
English Language Support Service

My process
Three things happening at the same time:

1. Write the coursework
2. Develop the materials
3. Write the coursework guidelines
Decide on initial coursework requirements

Complete the coursework: Choose topic and find sources

Note-taking: synthesis matrix

Use my example literature review to develop materials

Use notes to write assignment

Write proposal form

Tweak coursework requirements as necessary

Teach and guide students

Use what learned to improve for next year

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Medical applications

Robots

- What they're used for
- Inside, defect, intruders, building site, car industry
- Space, moving heavy things, disposing bombs, grain dosing & nurses, play games
- Control panel, person control
- Sensed, light, movement
- How they move
- What they're made of
- How they're made
- Leg, themselves, other things
- Energy, battery, solar panels

Electricity power

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Narrow down your Topic:

• What are some of the uses of robots in health care?
  – Robot-assisted surgery
  – Exoskeletons help disabled walk again
  – Robotic nurses or companions for the elderly
  – Carry people and equipment
  – Others

• Narrow down to a specific use or specific type of robotics:
  • Robotic exoskeleton
Some research questions:

- Robotic exoskeleton:
  - How is it used in health care? More than one application?
  - What are the benefits?
  - Are there any drawbacks?
Literature Review and Presentation

**Technology:**
Robotic exoskeletons for human use

**Literature Review:**
Topic: Medical Applications of robotic exoskeletons

**Presentation:**
Topic: HAL5 Exoskeleton
- How it works
- Evaluate its effectiveness
Note-taking: Synthesis Matrix

- Method I used
- Helps organise Literature Review by themes
- Made it compulsory for students
- Hand in and receive feedback
Identify themes

- Skim read your sources to identify common themes throughout
- List your main themes down the vertical column
- Look back at your brainstorm and research questions – what did you identify as your main focus?
Identify your main sources

• List the main sources that you intend to use along the top row of the matrix:

<table>
<thead>
<tr>
<th>Source 1</th>
<th>Source 2</th>
<th>Source 3</th>
<th>Source 4</th>
<th>Source 5</th>
</tr>
</thead>
</table>
As you read your article, highlight key information that is relevant to your literature review themes:

**Abstract**

An exoskeleton is a distinctive kind of robot to be worn as an overall, effectively supporting or, in some cases substituting for, the user’s own movements. The development of exoskeletons can lead to important changes in the rehabilitation of disabled people by introducing an alternative to wheelchairs. Exoskeletons can be an efficient tool in gait re-education and in the restoration of upper limb functions, and they can support therapists and caregivers in tasks that require major physical effort. The functionality of exoskeleton can easily be extended by a "disabled person integrated IT environment", described by authors. Exoskeletons can also be easily adapted to the needs of severely ill or aged people (Adv Clin Exp Med 2011, 20, 2, 227–233).

**Streszczenie**

Egzoszkielet jest szczególnym rodzajem robota, który można zbudować w formie kombinacji silecznej wspomagającego lub, w wybranych przypadkach, zastępującego jego ruch. Rozwój egzoszkieletów może doprowadzić do zmian w rehabilitacji osób niepełnosprawnych dzięki wprowadzeniu alternatyw dla wózków dla osób niepełnosprawnych, wykorzystywania egzoszkieletów jako skutecznych narzędzi do redukcji chorób i czynności kończyn górnych oraz jako wsparcia terapeutycznego i opiekunów osób niepełnosprawnych, ciężko chorych lub w podczynionym wobec przywodzenia czynności związanych ze znacznym wysiłkiem fizycznym. Funkcjonalność egzoszkieletu może zostać zwiększona dzięki włączeniu go w przestrzennie przedstawione przez autorów "zintegrowane środowisko teleinformacyjne osoby niepełnosprawnej". Przetwarzane zaszczytne mogą w łatwo sposób być przystosowane do potrzeb osób ciężko chorych lub w podczynionym wobec." (Adv Clin Exp Med 2011, 20, 2, 227–233).

**Key words**: neurologic diseases, rehabilitation, robotics, exoskeleton, hospital care, home care.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview information</td>
<td>Exoskeleton = distinctive kind of robot; worn as an overall; support or substitute for the user’s own movements. Lead to – import. changes for rehabilitation of disabled people; effective tool in gait re-education &amp; restoration of upper limb functions. Support therapists &amp; caregivers – tasks that require major physical effort.</td>
</tr>
</tbody>
</table>

Source: Mikolajewska & Mikolajewska, 2011
<table>
<thead>
<tr>
<th>Topic: Application of 3D printing in fashion industry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overview Information</strong></td>
</tr>
<tr>
<td>Three types: deposition, fusion, stacking up. Pp.20-21</td>
</tr>
<tr>
<td>Freedom of designing and creating</td>
</tr>
<tr>
<td>Revolution for manufacturing</td>
</tr>
<tr>
<td>Economic and environmental friendly</td>
</tr>
<tr>
<td>Evaluation and conclusion</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Overview of Current Bio-printing Technologies

**Lee VK & Dai G, 2015**

Bio-printing: also called organ printing - an advanced form of 3D printing.

- Inkjet-based: a noncontact technique - low cost, readily available, and has high print speeds.
- (Advantages) the lack of precise orientationality and size control of droplets and biomaterials etc.
- Microinjection (conf) convenient, simple to construct, affordable, (disadv) tends to kill the cells during the printing process.
- Laser-assisted: uses the energy of pulsed laser (adv) able to produce relatively higher resolution patterns, (disadv) lower cell viability in the printed hydrogel in comparison to other injectable mechanisms.

**Amer B. Dababneh & Ibrahim T. Ozobalt, 2014**

Bio-printing: an emerging technology for constructing and fabricating artificial tissue and organ constructs. It can be used to obtain tissue and organ constructs.

- In-situ Bio-printing: can enable the growth of thick tissues in critical deficits with the help of vascularization driven by nature in biodegradable polymers. First proposed by Weis using inkjet technology (evaluation) is still a challenge, and further systematic research is required to enable the technology to a robust state. It can sometimes increase the duration and cost of surgery. (Future Trend) It could be considered safe for humans.

**Ibrahim T. Ozobalt, 2015**

In vitro Bio-printing: living tissue constructs or cell-laden scaffold in vitro has been well studied.

- In situ Bi-Printing: can enable the growth of thick tissues in critical deficits with the help of vascularization driven by nature in biodegradable polymers. First proposed by Weis using inkjet technology (evaluation) is still a challenge, and further systematic research is required to enable the technology to a robust state. It can sometimes increase the duration and cost of surgery. (Future Trend) It could be considered safe for humans.

**Natalie D., 2014**

History: The University of Toyoama Professor Maho Nakamura has adapted the inkjet technology to create a bioprinter that produces bio-ink similar to a 3D printer. In 2008.

| Bio-printed Tissues and Organs | Bio-inks: two primary categories, (1) Curable Polymers, Forming mechanically robust and durable materials after solidification, providing structure and scaffolding to printed constructs. (2) Soft Materials. Generally with high water content, inside of which cells are capable of residing. (Bone) An anatomic shaped scaffold can be created to match the actual defect of patients based on the medical imaging data. (Skin) In skin injuries, autografting, allograft, wound dressing, and tissue-engineered substitutes are the current treatment choices. | Biomaterial: Bio-inks. Hydrogels with hydrogel-free Cell Aggregates, bioceramic bioprinters differ from each other, in that different biomaterials have different mechanical properties, gelation methods, and other biocompatibility characteristics. (Evaluation) It is important to be aware of these characteristics in order to implement the appropriate bioprinting technique. | Whole-organ bioprinting: has remained elusive due to several limitations associated with biology, bio-printing technology, bioreactor material, and the pre-bio-printing maturation process. | Process - Innovative and simple. Organs and other body parts have already been printed and transplanted into patients. E.g., a bio-printed heart saved the life of a child in February 2014. As the cells used to create that organ are disintegrated from the patient, the risk of the body rejecting the transplanted organ is very low. Bio-printers: have the capability to print organs or body parts which include bones, tissues, skin, cartilage, and stem cells. The machines are all different because each machine is designed for a specific organ or body part. E.g.: NovoGen MMX (presently in use) | Provide relief to the hundreds of thousands waiting for organ donations. It could revolutionize the scientific and surgical world. |
Next step: Writing

My chosen method:

• Use notes to write literature review:
  – 1 theme = 1 paragraph
  – Avoid 1 source = 1 paragraph

• Students encouraged to:
  – cite sources correctly
  – include evaluation & comment (voice)
Materials Developed: Example Literature Review

An overview and analysis of the main medical applications of robotic exoskeletons
Example materials: Students analyse my literature review

Example literature review

Task 1: Introduction

Read the introduction and identify the features from below:

<table>
<thead>
<tr>
<th>outline</th>
<th>thesis statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>reason for research/justification</td>
<td></td>
</tr>
</tbody>
</table>

2. For each paragraph identify:
   - The main claim(s)
   - Supporting evidence
   - Writer’s voice

3. What do you notice about the use of sources in a literature review? How should sources be used?

Task 2: Read the main body of the example Literature Review and answer the questions below:

1. Make brief notes on the main theme of each main body paragraph, the writer’s opinion and note which sources are referred to in each paragraph:

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Theme</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paragraph 1</td>
<td></td>
<td>E.g. National Stroke Association (2016)</td>
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<tr>
<td>Opinion:</td>
<td></td>
<td></td>
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<tr>
<td>Opinion:</td>
<td></td>
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<tr>
<td>Paragraph 2</td>
<td></td>
<td></td>
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<tr>
<td>Opinion:</td>
<td></td>
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<tr>
<td>Paragraph 3</td>
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The third application in the field of medicine and caregiving for exoskeletons is their use to enhance the strength and agility of physically fit wearers. This application falls into two categories: firstly, increase the strength of caregivers and, secondly, increase the mobility and strength of the able, but frail wearer. These applications were the original aims of the HAL5 exoskeleton. In regard to the first use, the HAL5 ‘helps double the weight someone can carry unaided’ (Pacific Prime’s Blog, 2011). A support therapist or caregiver wearing an exoskeleton would be able to lift and move a patient without the need of additional apparatus such as a lifting device. This application may be preferable for many patients rather than being lifted by a crane or a robot; it would be a more personal experience for the patient. Additionally, elderly, but able people may be able to wear exoskeletons to help support their frail spouses and reduce the risk of injury to themselves (Bowder, 2014). The second strength enhancing application has, perhaps, even more potential. With the percentage of over 65s worldwide due to surpass 35% by 2050 (Bogue, 2009, p424), it is essential to keep elderly people fit and healthy for as long as possible in order to reduce pressure on healthcare systems. Wearing an exoskeleton can increase both the mobility and dexterity of the world’s elderly population (Bogue, 2009; Mikolajewska and Mikolajewska, 2011). For example, the exoskeleton can help an elderly person to climb the stairs (Mikolajewska and Mikolajewska, 2011). One example is the ‘Walking Assist’ device currently being developed by Honda, which aims to help ‘people with weakened leg muscles who are capable of walking on their own and manoeuvring on their own but who would benefit from additional leg and body support while performing tasks such as climbing stairs’ (Bogue, 2009, p424). Another example is an exoskeleton which is being developed by the Tokyo University of Agriculture and Technology; it will ‘assist less-able farmers with physically demanding tasks such as uprooting crops, tiling soil, and planting trees’ (Bogue, 2009, 424). This usage could be particularly important in a country such as Japan where people aged 65 years or older comprise nearly half the number of agricultural workers (Bogue, 2009). It would appear that for countries with a growing proportion of elderly people, exoskeletons could keep a significant proportion of the population mobile and independent for longer. Indeed, according to Bowder (2014) Rich Walker from the Shadow Robot Company stated ‘exoskeletons have a really important role in keeping older people active and healthy for longer, whether at work or at home’. Exoskeletons could, therefore, be vital in aiding elderly people to maintain a more active lifestyle and thus retain more independence. Keeping elderly people active and living in their own homes for longer could potentially save money. For instance, in the UK in 2009 the NHS spent £4.23 billion of its annual budget on social care for the elderly (Hill, 2010). It appears that this usage is one that needs to be investigated further to determine the
Firstly, exoskeletons can be used as an aid in the rehabilitation of patients who need to learn to walk again, known as ‘gait’ training. Many patients who have suffered a stroke or had damage to their spinal cord spend many laborious and often painful hours undergoing physical therapy in order to re-train their muscles and brain how to walk. For example, ‘every year, more than 795,000 people suffer a stroke, a “brain attack” that occurs when blood flow to an area of the brain is stopped or severely reduced’ (National Stroke Association, 2016). Such injuries can result in impaired leg movement or even the loss of leg function. The exoskeleton can, therefore, aid in the rehabilitation of such patients.

Two exoskeletons are currently being used for this purpose: the Lokomat (Mehrotra, 2013) and Hybrid Assistive Limb, known as HAL5 (Bogue, 2009; Kashyap, 2014; Nilsson et al., 2014). However, the HAL5 (developed by Japanese company, Cyberdyne) appears to be the most sophisticated on the market. The suit works by sensing the myoelectric signals that are sent from the wearer’s brain to the muscles (Bogue, 2009). The suit’s built-in sensors on the surface of the skin detect these, often weak, signals and interpret them as movement (Bogue, 2009; Kashyap, 2014; Eisinger, 2015). This appears to be a very effective method for patients who have lost their ability to walk as it can re-train the brain. The Walk Again Center website (n.d.) claims that ‘impulses from the leg muscles are sent...”
Overview some key aspects of writing

• Students brought writing to class

• Review:
  – Introduction and conclusion
  – Thesis statement
  – Paragraph organisation (claim, evidence, voice)
  – Paraphrasing and summarising

• Applied to own writing
Example

- Identify:
  - Focus
  - Stance
  - Direction

Notwithstanding the serious cost implications, the use of exoskeletons for medical purposes has significant potential for some of the most vulnerable people in society.

I now know the assignment is going to include information about this group of people.
Student evaluation of their writing:

are shown because of the unique capabilities of the smart contact lens, especially in medical applications. [Although] Despite that the products are still in testing phase, the use of smart contact lens for medical purposes can bring much more benefits to some people who need medical treatments. This article introduces some medical applications of smart contact lens, and a brief evaluation of this new technology is also
Review of process

• A method to guide students to analyse their own writing
• You can guide them to best practice (tell them your tips / techniques from experience)
• “Do what I do” – students follow too closely?
Student Feedback

“i just finished my synthesis matrix and it really helped in organising ideas from different articles! thank you for include it as part of our course!”

“At the beginning of my PhD life, it is essential to do the literature review of the research topic and manage the materials of papers. During the final year of my undergraduate, I attended the China Partnership Programme English Language modules which gave me lots of guidance towards my current PhD studying and improved the capacity of my academic English. I would like to express my gratitude to my teachers towards their professional teaching and kind help.”
Updated Planning and Writing process

Choose topic and identify sources → Topic specific reading in class → Note taking: Synthesis Matrix

Submit 1 paragraph for tutor feedback → Use notes to write LR → Submit Outline Plan

Feedback on paragraph → Use feedback to improve whole LR → Submit final Literature Review
## Civil and Building Engineering

Make notes on your matrix:

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<tr>
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<tbody>
<tr>
<td>'bona fides' = Latin term for good faith.</td>
<td>'Allowed judge discretion in cases where gaps in the law covering the issue under judgement.'</td>
<td>&quot;The political and social upheavals of the nineteenth and twentieth centuries have had an inevitable impact on the evolution of English contract law, leading to an emphasis on the promotion of trade, and hence commercial certainty in contracting.&quot; (p.39)</td>
<td>Good faith = v. difficult to define because of its versatile nature. Can be applied in different ways depending on scenario.</td>
<td>Good faith already included where required – e.g. insurance law</td>
<td>Industry – less likely to use courts if they include good faith as this would make the prediction of judgements more uncertain.</td>
<td>The inclusion and enforcement of express, good faith terms in contracts in industry – shows positive attitude to good faith being included in law.</td>
</tr>
<tr>
<td>USA, Australia &amp; much continental Europe – use concept of good faith – basis of legal system. Rely on it to close loopholes in the law.</td>
<td>Example – good faith terminology used in the European Directive of Unfair terms in Consumer Contracts</td>
<td></td>
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<tr>
<td>Page number for direct quotations</td>
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Put into own words as much as possible: summarise & paraphrase
Reflection

• Time consuming process
• Engage with the students
• More effective guidance
• “We are in it together”

What I learned (or remembered):
• Time needed to find sources and make notes