Assessing Engineering Project-based Assignments at The Chinese University of Hong Kong

'Social Media and Human Information Interaction' is an intermediate course in in information engineering, appropriate to 3rd or 4th year students in a 4-year curriculum. It is an elective course for students majoring or minoring in information engineering, or engineering students in the 'ELITE Stream', namely 'Engineering Leadership, Innovation, Technology and Entrepreneurship Stream' – an innovation in teaching and learning devised by the Faculty of Engineering since 2014/15 to strengthen students' holistic leadership for diverse development. The specialist content of the course recognizes social media as one of the main sources of big data, and examines the social and human dimensions of social media. The course consists of mainly in-class lectures and web-based learning, while the students carry out project works via experiential learning. The lectures cover foundations of social media, human cognition and information behavior, online communities and social interactions, as well as infographic and big data visualization. There is one course instructor/ coordinator, assisted by three tutors to facilitate the teaching and assessments of the course. As the ELITE status is offered to students with excellent academic performance, this course as one of the engineering courses for the ELITE stream is designed with additional subject contents and challenging coursework assessments.

Distinctive Features:
- ☑ Relating engineering professionalism with global citizenship for holistic leadership training;
- ☑ Integrating human information interaction with the analytics and visualization of big data;
- ☑ Specializing in user-application interfaces at the research-teaching nexus of data science

Designed Learning Outcomes (LO):

I. Gain conceptual knowledge and theoretical foundations in social media and human information interactions.

II. Ability to demonstrate the integration of acquired skills, capabilities and knowledge from university studies to a practical workplace project. Demonstrated knowledge of corporate employability acquired within a workplace and applied to university studies. Professional presentation of the application of theory into practice, and project and learning outcomes.

III. Capacity to perform project-based work assignments and provide a project précis to the workplace.

Source: …

Coursework Teaching & Learning Activities:

- ✎ Lecture [46 hours; Week 1-14]
- ✎ Web-based learning classes [4 hours; Week 7 & 8]
- ✎ Blogging
- ✎ Group works
- ✎ Exam

Assessment Approaches

	Name	Learning Activities	Weight	Aligned LO	Type	Generic Skills
A1	e-Portfolio	Each student makes a personal blog on WordPress.com as e-Portfolio, hosting 4 posts to reflect on their learning in the course (around 80 words in each post).	20%	I.	Formative/ Summative	Communication; Creativity; IT; Critical Thinking
A2	Online Learning Community Participation	Students need to give non-trivial comments, and/ or answer to comments given to their blog posts.	20%	I. III.	Formative	Communication; Critical Thinking; IT; Self-management

A3	Group Project One	A group of 4 students work on a project about human-information interaction and global citizenship.	10%	II.	Summative	Collaboration; Problem Solving; Critical Thinking
A4	Group Project Two	A group of 4 students work on a project about social media analytics and information visualization.	20%	I. II. III.	Summative	Collaboration; Problem Solving; IT
A5	Final Exam	An open lecture-notes exam is arranged.	30%	I. II. III.	Summative	Study Skills; IT

Assessment Type

A wide range of summative assessments are employed to assess students' grasps of knowledge. Formative assessment is adopted to encourage student participation in making active responses in the online learning community.

Assessment Focal Areas

Interdisciplinary Teamwork (Collaboration Skills):
Students are required to work in groups to work on an interdisciplinary project regarding the Sustainable Development Goals set out by the United Nations. This group project encourages engineering students to bring in knowledge from different disciplines, especially the ones that they are exposed to in their general education curriculum or minor program courses, e.g. social sciences and humanities. This research project is thus interdisciplinary in nature. The course instructors assess the output of this interdisciplinary teamwork research based on the relevance of recommended solutions to the identified problems (A3). The process of teamwork is assessed in another activity – online learning community participation (A2). Since each student has to create a blog and share some learning reflections (A1), the course coordinator encourages students' collation of ideas by giving some marks to active comments on blogs of peer students (A2). These score-bearing comments are used as incentives to teamwork. Although rubrics have not been very well developed for the blogging and blog commenting activities, students are informed about how this work is being evaluated.

Professional & Ethical Identity of Global Citizenship:
Through the Group Project One on interdisciplinary topic (A3), "somehow the students can get to recognize their professional identity as an engineer, and appreciate how important the role that they are going to play, or is currently playing, in solving some of the global challenges" (Teacher Interview, Jan 2018). Developing students' professionalism and professional ethics as future engineers is a special focus of this course. The awareness of global issues is being assessed in the Group Project One: Policy Report (A3).

Information Technology (IT) Skills: Students majoring in information engineering (or computer science) are expected to master a higher level of IT skills than the ones in other academic disciplines. The Group Project Two in this course assesses students in terms of how they use computer programing instructions to perform sentiment analysis, how they select computational tools to visualize data, and how they present analysis results (A4). The building of blogs for individual e-Portfolio (A1) also assess students' skills in information and communication technology (ICT). To conduct the research for Group Project One (A3), students need to access databases of United Nations Statistics Division and identify relevant datasets to generate infographics, which assess their information literacy skills.

Knowledge Application: The open lecture-notes format of the Final Exam (A5) avoids rote learning and ensures critical application of theories and concepts covered in the course. Group Project Two (A4) examines the technical knowledge prescribed by the course. Group Project One (A3) requires students to "apply the knowledge in this course and make professional recommendations on how ICTs can be applied to solve or mitigate the issue...identified" (Project Specification 2017). Students need to justify their recommendations with principles in Human-Information Information and/or the nature of Information, some of the core concepts covered in the course.

Reflection & Critical Thinking: The reflection of student learning is assessed in e-Portfolio (A1), where many students reflect on why human information interaction – the subject matter of this course – is important to engineering field. Using blogs to compile e-Portfolio ensures timely reflection of students on the topic they learn along the schedule of lecturers. As blogging is open to the general public, it also ensures students' understanding of newly

acquired knowledge when they need to process complex concepts into simple language. The incentivized commenting (A2) on the blogs sustain such reflection of concepts and theories of the course. In the Group Project One (A3), students reflect upon the roles of engineers and global citizenship, by contemplating solutions to global problems.

Assessment Standards/ Sample Rubrics

	Areas	Exemplary	Accomplished	Beginning	Fail
A3. Group Project One	Identification of Issue (20%)	Issue and multiple relevant SGDs and targets identified.	Issue and one relevant SGD identified.	Issue identified without mentioning the relevant SGDs.	No issue is identified.
	The Research (30%)	Relevant statistics obtained from the UNSD databases as well as other sources are presented to support the issue identification.	Relevant statistics obtained from the UNSD databases are presented to support the issue identification.	Relevant statistics obtained from other sources are presented to support the issue identification.	No statistics are included to support the issue identification.
	Policy Solution & Recommendation (30%)	Policy solution is well-developed and is supported by an excellent understanding of social media and/or HII principles; argument is logical and with the support of the statistics presented in Part Two. Recommendation on several relevant aspects is made; and is integrated into an innovative suggested solution.	Policy solution is tentatively asserted and is supported by a basic understanding of social media and/or HII principles; argument is sound and partially supported by the statistics presented in Part Two. Recommendation on several relevant independent aspects is made.	Policy solution is very basic and is not based in an understanding of social media and/or HII; argument is presented without the support of any statistics. Recommendation on one relevant aspect is made.	No recommendation is made.
	Policy Report Organization (20%)	A coherent and unifying theme is established and maintained throughout the entire policy report. Clear internal divisions (e.g., Part One, Part Two, and Part Three, and references) are created. Sections headings (and subheadings) are marked clearly. Relevant figures, tables, and references are given in the report.	Effort in establishing a coherent and unifying theme throughout the report is shown. Clear internal divisions (e.g., Part One, Part Two, and Part Three, and references) are created. Sections headings (and subheadings) are marked clearly. Some figures, tables and references are given in the report.	Report organization is somewhat mechanical. Essential elements of the report (e.g., Part One, Part Two, and Part Three, and references) are present but without a clear internal divisions. Sections headings (and subheadings) are present but do not enhance readability. Figures, tables, and references are barely included in the report.	Lack of organization. Some of the essential elements of the report are absent. Internal divisions are unclear. No figures, tables, and references are included in the report.

Source: ...

Other assessment approaches in this course do not have well-developed rubrics, but specific scoring methods are set out. For instance, for Online Learning Community Participation (A2), 1 score is given for each comment while up to 16 'non-trivial comments' would be assessed; additionally, there are up to 4 scores for the overall quality of the comments. Non-trivial comments refer to comments that are not as rudimentary as 'yes, I agree with you!' and should be constituted of readers' reflections on the blog post. If the students want to receive scores for their comments, they should give comments according to a pre-defined schedule, which cultivates the time management skill of the students. For Group Project Two (A4), scores are given based on the accuracy of technical components of the report.

Teacher's Stories
Prof. Chan Yuen-Yan, Rosanna, Adjunct Assistant Professor, Department of Information Engineering, The Chinese University of Hong Kong

Professional Engagements
Rosanna Chan received her BEng, MPhil, MEd and PhD degrees from the Chinese University of Hong Kong. She served as an assistant professor in the Department of Information Engineering, CUHK in 2006 – 2007, and as a postdoctoral fellow in Strategic Research Theme in Sciences of Learning, HKU in 2008 – 2011. Chan possesses a multidisciplinary background in engineering, education, and learning sciences. Her research interests include engineering education, human factors in online social networks, and learning sciences. Chan founded the IEEE Education Society Hong Kong Chapter and is the Founding Chair. She is an Adjunct Assistant Professor of the Department of Information Engineering at CUHK.

Motivation
The consciousness and empathy of global issues might be one of the motives behind the unique coursework design. Chan wants her engineering students to rethink their professional identity and global responsibilities. As Chan stated, *"I ask the students to study the United Nations' Sustainable Development Goals, and to think about how engineering knowledge and skills can be applied to those goals; I force my students to think out of the box, to work in groups, and try to exercise what they have learnt outside of my own course; …I encourage them to bring in the additional knowledge that they (may have been) exposed to… for example, some students may take courses from Psychology Department… So I ask them to try to propose some engineering solutions to at least approach those goals, to make people's lives easier."* (Teacher Interview, Jan 2018)

Challenges
No particular challenge has been identified.

Students' Side of Stories
- ☑ *"Whenever we search or download something, our actions will be stored as information, as data. These data can be analyzed into some other useful materials. As engineering students, these materials can help us to understand the preference of users. As a result, other than suggesting some products to the users, we can design new products those are more to their liking. If we can prepare and provide service before the user makes a request, services will be facilitated and time will be saved. Convenience is all we, the engineers aim to achieve."* (Student A, e-Portfolio, January 2017)

- ☑ *"As human information is getting more important nowadays, we should know more about it and learn how to process such data for using it in engineering field."* (Student B, e-Portfolio, January 2017)

- ☑ *"As an engineering student, we having been learning how to design program and circuit. However, it is not enough for us to become a good engineer. To make a program user friendly, we need to listen to the opinion and feedback from users. Then, we need to know how to obtain useful information from these feedbacks. Therefore, learning how to design program or circuit these kinds of hard skill is not enough. We should also learn how utilize*

the information we can get in this world." (Student C, e-Portfolio, September 2017)

☑ *"To us, Engineering student, information is a tool for us to change the world. We find a way to identify the useful information from this world, give out responds and transmit it to others so that we can change the actions of others towards our desire. This is the ultimate goal as an Engineer."* (Student D, e-Portfolio, September 2017)

☑ *"In my AI module ... the topic has hooked me up and now I am wanting to relate my further career to it. However, I realised I have very little understanding of fundamental concepts*

used on the background of any AI system – information, which motivated me to take up IERG3220. Just after a few classes I am able to structure my knowledge in regards to some topics that I could only understand intuitively before. Starting from the concept of context ..., ending up with topics on human cognition ... and how these affect the way we understand the input of data ..." (Student E, e-Portfolio, September 2017)

Featured Photos

The e-Portfolios of previous students in the course:

What is Digital Cognition and how can we implement it though Machine Learning?

Information can be classified into three types: physical, semantic and digital. To let computer to process the information, we need to convert the physical or semantic information to digital information though cognition. Due to the rapidly development of information technologies, computers are able to have the digital cognition itself through machine learning.

Continue reading →

Is Semantic Information meaningful data?

Nowadays, we can easily receive a lots of information in our daily life through Internet which can be expressed in many ways such as words, images, voices etc. To know the message behind the information, we need to understand the meaning of the information which is the semantic information.

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What is Context Computing and why it is essential?

Context computing is an attractive technology which can anticipate information to users by taking into account the things around the device. Imagine that you are walking on the street and suddenly you hear a screaming, your brain will analysis with your experience to figure out what is happening and what to do.

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What is Human Information Interaction and why is it important to me?

Clarifying Signifier and Signified

In the lecture, Professor Rosanna mentioned a lot of example about semiotics or sign. However, can we clearly distinguish it?

We can treat semiotics as a subject or research area, but sign likes a virtual object under this subject. Sign was composed of two concepts. One is signifier and another one is signified; however, what do both concepts mean? According to the definition, a signifier is the form the fact that the sign takes; nonetheless, signified is the meaning signifier represented. For instance, when you are going to shopping, you may want to urinate. So, you may want a toilet. However, how can you find it? If you are a boy and talk this thing to the girl, it is quite embarrassing. But how can we describe it or talk your need to the others? Hence, there are some toilet signage (signifier) for reference. If you find the signage below and related arrow, that mean there is a toilet in that direction (signified). In this example, the signage is signifier, and the meaning of the signage is signified.

Let me introduce one more instance. Flag semaphore is a communication tool for military in many years ago, especially navy. When a soldier found there was an enemy, the soldier will shake the flag to another who is on another ship. This was because of the lack of communication in many years ago, they would use two big flags to communicate with others. Their action is signifier but the content or meaning of the action is signified. Therefore, sign is very import to us for expressing related meaning. I hope this blog post can let you clarify what do signifier and signified mean. Enjoy! 😊

Let become a smart global citizen!

In this technology century, many people would surf the internet and/ or communicate with each other via social media, such as Facebook, Whatsapp and Twitter.

However, *in some developing countries, basic needs for life was a problem when comparing with the growth of technology.* As a global citizen, like developed countries, we can help to establish the network with each other and spread it until the whole world.

When developed countries can connect the developing countries, they can improve their daily life by Internet. For instance, if a friend A want to order a set of Japanese noodles, they can send a request to Japanese company. After several years, when the technology has become mature and complete, they can start to focus on entertainment for improving metal heath; for example, they can play online games or watch video streaming etc.

Therefore, as a part of world, we cannot ignore the others' needs, especially engineers since that developing basic physical infrastructure or IT infrastructure is an engineers' responsibility. Hope everyone has an equal chance to connect each other!

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What is Information and what does it mean to me (as an Engineering/CS student)?

What is the relationship among Environments, Elements, and Information?

In the last blog post, I mentioned what information is and what it means to me (IE student). In this blog post, I would like to extend that topic to *Environments*, *Elements* and *Information*.

For environment, its meaning is same what we see from our eyes. During the lecture, Rosanna showed us a beautiful landscape picture. Yes! It definitely refers a physical environment. There are tree, grass, wood and rock layer, etc. Those stuffs can compose our living environment.

However, what its meaning to us? Surely, we can be one of elements in this context. Elements are composed of (1) circumstances, (2) agent, (3) subject and (4) understanding.

Let me use crossing road as an example. Circumstances means the setting that surround the subject, like tree, cars, pedestrian. An agent means an entity (e.g. pedestrian), who is trying to understand what subject means. A subject (traffic light) likes a sender that it is trying to give meaningful information to agent, and those meaningful information is understanding. For example, pedestrian looks onto the traffic light to know whether he can across the road via light signals. The red light carries out a meaning of "Stopping", but green light carries out a meaning of "Going". Hence, agent can gain useful and meaningful information from subject's understanding under these circumstances. In short, *Environment*, *Element* and *Information* cannot be separated, and our environment can be full of information that we may interact with it.

Let me put my personal experience as an instance again. During examination, I always staying in University Library, there are many books, students and computers (circumstances). When I (agent) would like to review my IERG3320 lecture notes (subject), it may carry out a lot of useful knowledge (understanding) to

References

IERG3320/ESTR3306 Social Media and Human Information Interaction - Course Outline (2017-18 Term 1)

IERG3320 Social Media and Human Information Interaction Projects Specification – Project One: Social Media and Human Information Interactions from a Global Citizenship Perspective

IERG3320/ESTR3306 Social Media and Human Information Interaction Project Specification – Project Two: Sentiment Analysis