

CHANGING THE ASSESSMENT STRATEGY FOR THE COMPUTER SCIENCE MODULE "SIMULATION FOR DECISION SUPPORT": A LONGITUDINAL STUDY

Peer-Olaf Siebers
The University of Nottingham
Nottingham
NG8 1BB
peer-olaf.siebers@nottingham.ac.uk

Please cite as: "Siebers PO (2014) Changing the Assessment Strategy for the Computer Science Module Simulation for Decision Support: A Longitudinal Study. Working Paper (v1.0)"

Abstract

This paper is a summary of my PGCHE coursework which looked at changing the assessment strategy of my Computer Science module "Simulation for Decision Support" (G54SIM). This is a module that I designed four years ago and have been teaching on an annual basis at Nottingham University as well as in form of a short course at several international institutions, e.g. Bayreuth Summer School.

The paper is divided into three parts. Part 1 provides a statement of my teaching philosophy. This is provided to support the understanding of the subsequent parts. Writing this teaching philosophy statement was an evolutionary process. Several discussions with colleagues and the study described in part 2 and 3 of this paper showed me that my initial philosophy could not be applied in practice. Therefore it was amended in a way that it still reflects my core philosophy on teaching but also that it can be applied in the real world. Part 2 and 3 provide a record of a longitudinal study. Part 2 relates to the previous assessment strategy for the module (coursework and exam). It contains a reflection on the previous assessment strategy and provides an action plan for changes. The proposed changes have since been implemented. Part 3 relates to the assessment strategy after the changes (coursework only). It contains a reflection on the consequences of the changes (in terms of student satisfaction, workload reduction, and problems that occurred) and proposes some improvements to cope with the problems that occurred. These will be applied in the next semester.

The paper uses different writing styles. This is due to the requirements for the PGCHE coursework. Part 1 is presented as a list of statements. Part 2 is presented as a scientific investigation. Part 3 is based on several discussions with colleagues and provides transcript summary of these discussions.

PART 1: MY TEACHING PHILOSOPHY

1.1 Introduction

The work described in part 1 is a section of my *Teaching Dialog* (TD) module coursework. The aim of this module is to encourage participants to reflect on their own views about teaching and learning and consider how these compare to those demonstrated in their Schools (Cook 2014a).

This part provides the final version of my personal Teaching Philosophy (TP) and delivers a reflection on the evolution of this statement. The TP statement version presented here is a revision of a draft that was put together in 2012 during a short course within my PGCHE TD module.

1.2 Final Version of my Teaching Philosophy Statement

Below is the final version of my TP statement:

Students need to be motivated to engage with the material being taught. This is a prerequisite for deep learning. Students can be motivated by lecturers that: show commitment and enthusiasm for the topic they teach, prepare teaching material in an interesting way, apply diverse methods of teaching suited to level and group size, and consider that different students have different needs.

What we teach the students need to be put into context. It is vital to find the right balance between teaching theoretical foundation knowledge and showing students how to apply this theoretical knowledge in the real world. The students need to understand why they are supposed to learn what we are teaching them and how it will be useful for their later studies and career. This will motivate them to engage with the material being taught.

Students need to be able to apply what they have learned. I believe the best mode of teaching is to have an even number lectures and lab classes so that students can apply under supervision what they have learned during their lectures. For the lab sessions it is important to find the right level of difficulty as students in Computer Science come with very different skills and therefore the labs need to cater for the needs of the diverse audience.

Students need to learn to think and work independently as well as in groups. These are key skills that employers are looking for when employing graduates. Throughout their studies the students need to become individual (critical) thinkers with some solid background knowledge but also learn how to interact with peers and how to take responsibility when working in groups.

Teaching should be student-centred and interactive. I acknowledge that this might be more difficult in large groups but I believe that it is possible for any class size. Techniques include engaging students during lectures in small group activities (e.g. discussing or solving simple problems with their neighbours) and interacting with students directly by asking them questions.

Students need to understand boundaries. It is important that students learn to respect boundaries. This includes amongst others understanding that cheating and plagiarism are unethical and that deadlines need to be met. Classes should be provided to prevent these things from happening.

The assessment needs to be meaningful, fair, and transparent. It is vital to consider the necessity of each assessment carefully to avoid that students and lecturers get overloaded with work. Care needs

to be taken to prevent unethical behaviour. Sufficient feedback needs to be provided so that students can see that they have been fairly treated.

Feedback and reflection are important aspects to teaching and learning. It is very important that students receive sufficient feedback. Besides providing direct feedback, peer observation and discussions are also useful ways for students to receive feedback. For me it is important to show the students that I am listening to their feedback and consider their suggestions. Reflection upon teaching and learning practices is another important aspect that should be done on a regular basis by both, lecturers and students.

1.3 Reflection on the Evolution of the Teaching Philosophy Statement

Before conducting my PGCHE studies I had never reflected formally and in a holistic way on my TP. It was a very useful exercise to put my TP down on paper and to receive formal and informal feedback on it from my colleagues. On the one hand their feedback provided me with the reassurance that my current TP is strong and convincing. On the other hand I received useful advice on how to make my TP even stronger and more coherent.

When I wrote the first draft in 2012 I was just at the beginning of my teaching career. Two years have passed since then and I have gained much more experience and have unknowingly changed my TP during this period. It was interesting to look back at the original draft TP statement and compare it to my current practice. The changes are reflected in the revised version where I have not only considered the advice given by my colleagues but also included my own experiences as a lecturer and what I learned during my PGCHE. In particular the literature review I conducted for my PGCHE Individual Pathway (IP) module was very helpful for reflecting on my original draft TP statement. I also used the opportunity to discuss my TP during the TD discussions with my colleagues.

1.4 Concluding Remarks for Part 1

Overall I find this reflection process very useful and want to continue to do it on a regular basis beyond the PGCHE studies. This is why I have now included it in my TP statement. The PGCHE has made me a reflective practitioner which is useful not only for my teaching but also for my research and professional development. I want to try and encourage my colleagues as well as my students to engage in this really useful practice which helps to improve the efficiency and efficacy of my teaching.

PART 2: PROPOSAL OF A NEW ASSESSMENT STRATEGY

2.1 Introduction

The work described in part 2 is a section of my *Individual Pathway* (IP) module coursework. The aim of this module is to provide participants with opportunities to develop their teaching practice through a process of workshop attendance, followed by a practical development of their own teaching (Cook 2014b).

For my coursework I decided to focus on the required changes in the assessment strategy of my module "Simulation for Decision Support" (G54SIM). While doing the workshops and coursework I learned a lot about teaching theory and module design but also about applying these theories and practices to develop a new module curriculum that conforms to my Teaching Philosophy (TP) as well as to the teaching quality standards of the school.

Please note that this segment was written in 2013, i.e. before the changes to the assessment were implemented. It is written from the perspective that changes "will be made" in the future. Also this segment is written based on my draft TP statement. Once I reflected on the implementation of the planned actions described in this segment I had to revise my TP statement as it was not practical to apply it in the way I envisioned. I have since added a statement that underlines that the assessment needs to be meaningful, fair, and transparent and did some fine tuning of the other statements. This is discussed in more detail in part 3 where I reflect on the implementation of the changes proposed in part 2 (this part).

2.2 Motivation

From previous teaching committee meetings I learned that some of the most important issues we currently face are over-assessment and non-effective provision of feedback. Therefore it is the goal of the school to reduce the amount of assessment and distribute the load over the semester which would be of benefit to students as well as to staff. We also want to improve the ways in which we provide feedback to the students – ensuring wherever possible that students can use the feedback to improve their learning. In this way feedback will turn into "feed-forward" which helps students to gain real understanding of what is being taught (Quinton and Smallbone 2010).

In response to the request I agreed to change the assessment strategy of my G54SIM module for the coming semester (Spring 2014). The module provides the students with an introduction to the principles of systems modelling and simulation and enables them to make a competent decision about which simulation method to use for their particular problem. In addition students gain practical experience with applying systems modelling and simulation. It is a praxis-oriented 10 credit module consisting of 10 lectures of two hours and 10 labs of two hours and has so far been assessed by a 40% coursework and a 60% exam.

The plan is to change the assessment from coursework/exam to coursework only. But of course it is not only the "assessment format" that is changing. We also want to consider the best possible way to provide feedback to the students. I found this to be a good topic for my IP project as I want to take a scientific approach supported by educational theories to come up with a new assessment strategy that supports the students in the most effective way whilst providing a reduced workload for the staff (that's me).

For the development of the new assessment strategy I used the concepts from Kolb's experiential learning cycle (Kolb 1984) which is a constructivist perspective on learning. The basic idea is that through reflecting, processing, thinking and furthering understanding there will be improvement when something is done again (Fry et al 2009). The steps of experiential learning include "teaching activity", "reflection", "interpretation" and "planning". The two steps in the middle require strong feedback from others. In this report I will focus on the latter three steps and will deal with them in the following sections.

In this part of the paper I draw heavily on the work of Morgan et al (2004) and Race (2007) whose contribution to my understanding of the problem (and besides to lecturing in general) and possible solutions has greatly influenced my actions.

2.3 Reflection

For the reflection I have utilised various sources of information. I have talked to students from the 2012/2013 cohort and considered their SEM/SET (Student Evaluation of Module; Student Evaluation of Teaching) comments. I have discussed the topic with several colleagues off- and online. Finally I have also used my own class experience in teaching the module in the past 3 years.

After the first year of teaching the module I started thinking about the usefulness writing an exam in this praxis-oriented module. When I originally designed the module I tried to follow what I thought was a "classic design" by having an individual coursework and an exam. Assessing the students with an exam gave me the feeling that I could reduce the risk of students getting good grades without deserving them. Back then I was not thinking about the appropriateness of the assessment in regards to the learning outcomes.

One advantage I thought students gain from examination is that in order to prepare the exam they have to go through the whole lecture material again and, as this time they have a **holistic view of the module content**, they might understand the topics from earlier lectures much better. I also observed that students tend to do revision in small groups which I think also helps their understanding. I think it is important to consider how to achieve a similar effect in a coursework-only assessment.

I have now changed the assessment method to "coursework only" and I am very happy with the decision as I think that the **required learning outcomes are better assessed by coursework** than by examination. Real world simulation modelling takes time and no decisions have to be made under immense time pressure as it is the case in an exam. Therefore in an exam we would not really test any skills that students need for being successful simulation modellers. But without the exam we have to be even more careful that we are assessing a student's work and not the work of someone else – i.e. we have to put measures into place to avoid plagiarism.

I always had the opinion that in this module the coursework could only be submitted at the end of the semester as I wanted to evaluate if students fully understood the material taught in the lectures. For the new assessment strategy I would like to consider how I can **distribute the workload and assessment over the semester** and still be able to ensure that students have gained the skills and knowledge described in the learning outcomes. This would also allow me to provide feedback in a timely manner.

Another problem in this context is the way students approach the coursework task. Even if the task description is handed out early students (in particular the weaker ones) would start working on the

coursework just before the submission deadline. It seems like **more control is required to ensure that students work consistently** on their assessment.

I have been reflecting about how much my students gain from the feedback I give them. Throughout the years I have put a lot of effort into providing detailed feedback to the students by explaining the marks they received in their coursework and exam but I realised that the **students are not engaging with the feedback** and consequently do not learn anything from it. The reason seems that it comes too late for them as most students are "strategic learners". They learn what they need to pass the module and after that they focus on other things. Perhaps they do not see any benefit in it as it does not change their grades. Correct **timing for feedback is very important** in relation to the impact it has.

I realised that I double assess students on the same topic as some of the knowledge I was testing in the exam is also tested in the coursework (e.g. conceptual modelling accounts for 25% in the coursework and 50% in the exam). Looking back I think it was more an insurance for me to make sure that students have learned the core skills they were supposed to take away from the module – which is the capability to come up with a conceptual model of a system. I think there must be more efficient ways to ensure that students have gained the skills described in the learning outcome and **avoid double assessment of the same topic**.

One aspect I did not consider when agreeing to change the assessment format for the module is the hidden danger that a **coursework-only assessment might actually increase staff workload**. From an online discussion with colleagues I understood that if one is not careful additional feedback and the increased requirements for precaution against plagiarism in a coursework-only module can take up a lot more staff time than other assessment strategies (ResearchGate 2013). While this form of assessment seems to be the most valuable form for the students it might undercut the initial goal of reducing my workload. This is definitely a factor that I need to keep in mind when planning the new assessment strategy.

The reflection above has helped me to identify the needs for the new assessment strategy and also highlighted some concerns that need to be kept in mind if the new assessment strategy should be a success for both sides - the students and the staff. In the next section I will formally analyse my reflection which will help me with the development of an action plan.

2.4 Interpretation

The core to better understanding the problems from a scientific perspective and coming up with some solutions is to look at the different ways students learn which is directly linked to how we should assess them and how feedback is best provided to support and enhance student learning.

There are two different schools of thoughts about how learning happens. There is the behaviourist school (e.g. Skinner 1954; Biggs 1989) and the cognitive school (e.g. Lewin 1952; Kolb 1984). For the purpose of interpreting my reflections I will adopt the cognitive view which "focuses on perception, memory and concept formation, and on the development of people's ability to demonstrate their understanding of what they have learned by solving problems" (Race 2007).

Researchers make a distinction between different cognitive levels of engagement between learning tasks. Studies by Marton (1975) led to the classification of surface and deep approaches to learning. When practicing surface learning the student perceives that it is necessary to remember the body of knowledge. Students learn things sufficient for the exam day or the assessment week. Once it served

its purpose it's ditched. Strategic learning is a special form of surface learning and is seen as the worst approach in consideration of knowledge gain. Here the student practices deliberate surface learning, consciously engaged in at the expenses of deeper learning, i.e. "doing the minimum to get by" (Race 2007). Surface learning in general mostly involves the need to rote-learn and then recall the facts concerned which leads to a relatively low level of cognitive engagement with the task (Morgan et al 2004). Students treat the task as externally imposed. In exam dominated systems where strategy becomes more important than substance students only learn what they think they will be tested on during the exam and then forget about it after the exam - a phenomenon called "backwash" (Elton 1987; Frederiksen and Collins 1989). In a deep approach to a learning task, the student perceives that it is necessary to make meaning of the content concerned, to be able to appraise it critically and to be able to apply the knowledge to other contexts or knowledge domains (Morgan et al 2004). In deep learning a relatively high level of cognitive engagement with the task occurs. Students take ownership of the task. Deep learning is more appropriate to those students going to higher levels and is the kind of learning which leads to the most productive and inspired research. It helps students to develop real understanding. Research shows that strategic learners tend to be successful (Race 2010). Deep learners may deserve success but often focus too much on one part of the curriculum and leave other parts of the curriculum underdeveloped. As a consequence they might not get the overall credit they deserve. This should be taken into consideration when planning the assessment process for modules that aim to promote deep learning. It is very important to have a match between the teaching intentions (as manifested in the learning outcomes) and what we measure through the assessment of the students. For example, Race (2007) states that "deep learning may be the wrong approach to wean our students towards when our assessment might only be measuring something less than deep learning".

There are different forms of assessment that support the process of learning in different ways. In terms of purpose and timing a distinction is made between formative and summative assessment (Fry et al 2009). If there is an opportunity for the student to improve their performance on the same task then the assessment is formative. If the performance on an assessment task indicates the sum of performance on that task then it is summative performance. From the reflection section we know that our module is practical oriented and that we want to support deep learning (developing a real understanding) and the best way to achieve this is to use formative assessment in form of a coursework throughout the module (Trekles and Sims 2013).

Race et al (2005) propose a number of values and principles for assessment design. Many of these were also mentioned in our reflections and we need to make sure that we follow them when we design our new assessment. The most relevant are that "assessment should be valid" (we assess the learning outcomes); "assessment should be authentic" (we need to assess in ways that we can be sure that the achievement belongs to the student); "assessment should motivate students to learn" (it should help students to structure their learning continuously during their studies); "assessment should promote deep learning" (intended learning outcomes need to be assessed); "assessment should be formative and start as early as possible" (letting students know how they are doing and how they can improve); "assessment should be demanding" (assurance of quality is impossible if students are not stretched by assessment methods); and finally "assessment should be efficient and manageable" (the burden on students and staff should not be excessive). This summarises very well the key points we need to consider when doing the planning for action.

In order to be able to achieve all of this we cannot just focus on assessment design but have to take the whole module into account. We need to ensure that the module design follows the principles of constructive alignment (Biggs 2003; Biggs and Tang 2007). Constructive alignment is an outcome-based methodology for designing, promoting and assessing deep student learning in a way that students can construct their own learning through relevant learning activities and teachers can

create a learning environment that supports learning activities to achieve the outcomes. It emphasises the match of the aims of and the learning outcomes of the module; as well as the match of the learning outcomes and the assessment criteria, together serving for the whole programme specifications. In general, constructive alignment promotes independent learning, encourages engaging students in "deep" rather than "surface" learning (Biggs 1996).

The key insights taken from the above interpretation of the reflections are as follows. In order to support students in developing a real understanding we want to promote deep learning. The assessment method that best supports deep learning is formative assessment which means that students have the opportunity to improve their performance on the same task. Our newly designed assessment strategy needs to be evaluated against the values and principles for assessment design mentioned above and we need to ensure that we follow the principle of constructive alignment.

2.5 Planning for Action

As a reminder here is a summary of the main reasons for changing the assessment: required learning outcomes are better assessed through coursework; there is a need to better distribute workload and assessment over the semester; more control is required to ensure that students work consistently; we need to improve student engagement with the feedback; we need to avoid double assessment; we want to reduce staff workload. We have to make sure that we address all these points in our action plan.

Considering the key insight gained from the reflection and interpretation stage and the discussion with several colleagues and their recommendations left me with a choice of two coursework-only assessment strategies to be considered. The coursework could either be a single group project or a group project followed by an individual project. For the latter solution the group and the individual project could either be linked or independent from each other.

I have decided to go for the package of group and individual coursework where both are linked. This final decision is based on three informal interviews I conducted with colleagues who teach modules at the same level and with similar learning outcomes. The most important argument for going for this assessment strategy is that the goal of the coursework is to provide students with the experience of conducting a complete simulation study and to promote interaction and student engagement. In a real simulation study the modeller first works with other stakeholders (clients, representatives of the public, policy makers, architects, etc.) to come up with a conceptual model that is agreed by all stakeholders. After this group effort the modeller would then work as an individual on the model implementation, validation, and experimentation. At the end of the project the modeller would present the results to the stakeholders who are interested in the results. Using a single group project for the assessment would be better suited for subjects where teamwork dominates the activities (e.g. Software Engineering).

Figure 1 shows the new module content (Spring 2014). In order to accommodate the changes in the assessment process (including the type of assessment but also the way feedback is provided) I have changed the order of the lectures and have developed a completely new lab plan focusing much more on the formative learning process. In this new plan I have left the more technical aspects of simulation for self-study and after an introductory period the students are supposed to work on their projects. This gives me the opportunity to frequently check their progress and give them direct feedback on their work and performance.

Lecture 01: Introduction to Modelling and Simulation
 Lab 01: Discussion of Case Studies + Running Sample Models
 Lecture 02: Simulation Studies: An Overview
 Lab 02: Introduction to AnyLogic (and Java)
 Lecture 03: Conceptual Modelling
 Lab 03: Group Project - Task Release
 Lecture 04: Simulation Methods: Discrete Event Simulation
 Lab 04: Group Project – Conceptual Model Development
 Lecture 05: Simulation Methods: Agent-Based Simulation
 Lab 05: Group Project - Presentation + Reflection
 Lecture 06: Simulation Methods: System Dynamics Simulation
 Lab 06: Individual Project - Task Release
 Lecture 07: Input Modelling
 Lab 07: Individual Project - Model Development
 Lecture 08: Model Testing + Experiment Preparation (Part 1)
 Lab 08: Individual Project - Draft Model Check + Experiment Discussion
 Lecture 09: Experiment Preparation (Part 2) + Experimentation + Output Analysis
 Lab 09: Individual Project - Model Development
 Lecture 10: -
 Lab 10: -
 Lecture 11: Implementation + Simulation Project Analysis + Real World Applications
 Lab 11: Individual Project - Oral Assessment

Figure 1: New module content (Spring 2014)

Group project: Learning to interact with stakeholders; learning to abstract a system; understand conceptual modelling. Each group (4-5 students) has to build a conceptual model for different areas of London Heathrow Airport (shops; security; airline check in; help desk; gate; maintenance). Students in each group take on the roles of different stakeholders and come up with reasonable objectives and requirements for a project. Each student has to write a short progress report from the perspective of the stakeholder s/he presents and students have to write a joint report in which they agree to a conceptual model for the area under consideration. They will present the results to the other groups and finally provide some peer assessment. The group project part will account for 30% of the final mark.

Group project feedback: Feedback will be provided in form of "feed-forward" by discussing with the groups during the labs in which they are supposed to work on the group projects. They can then use this feedback to improve their marks which is a strong motivational factor for the students. In the end each group has to present their requirements and will get feedback from the other groups. This allows students to reflect on their own requirements and identify gaps (i.e. things they have not thought of). To finalise this part students will be asked to write a short individual report reflecting on their experience (1000 words; including peer assessment) and also to submit a group report (listing objectives + inputs + outputs and providing a component list) describing the conceptual model they came up with.

Individual project: For the individual projects students will use the conceptual model created during the group project as a basis. They will be allowed to individualise their conceptual model but only in limits and they will have to plan their experiments. Once both have been agreed with me students will have to implement their conceptual model in AnyLogic. Next they will do some experimental design, run the experiments, and analyse the results. In the end the students are asked to write a consultancy report (1500 word) similar to what would normally be handed over to the client. In this

report they will have to justify all their decisions. The individual project part will account for 70% of the final mark.

Individual project feedback: Several lab sessions are devoted to individual project work and informal "feed-forward" will be given to the students during these labs. There will also be a compulsory non assessed lab sessions where students have to show their progress (model and planned experiments). In lab 11 there will be a brief oral assessment of each individual student to ensure the students have done the work by themselves. They will then have until the end of that week to finalise and submit their individual project.

Self-study: Students are expected to run through some tutorials in their own time (after lecture 4-6). These tutorials will help them to get used to the AnyLogic development environment.

Self-study feedback: There is no need to check if students do this home study or not. If they do not do it they will struggle with the implementation of their conceptual models. If this is observed during the lab students will be reminded to do the tutorials. This part will not directly count for the mark.

As G54SIM is a 10 credit module and each single credit is notionally intended to represent 10 hours of student input (UoN Quality Manual 2014) the workload for students is expected to be in the range of 100 hours. Table 1 shows the breakdown of these hours.

Activity	Description	Per Week	Hours
Lectures	-	2	22
Labs	-	2	22
Self Study	Revision of previous class	1	10
Self Study	Tutorials (3 x 2h)		6
Coursework Part 1 (30%)	Group Project: Conceptual modelling (supported by 2 labs)		10
Coursework Part 2 (70%)	Individual Project: Modelling + Analysis + Report (supported by 5 labs)		30
Total			100

Table 1: Module hour breakdown (Spring 2014)

2.6 Concluding Remarks for Part 2

In conclusion I can say that I am happy with the proposed action plan and look forward to putting it into practice. We have considered all the values and principles for our assessment design that we have listed in the "Interpretation" section. One thing I did not expect is that the entire module layout would change. It is interesting to see how deeply interwoven the assessment is within the planning of the teaching in order to achieve the promised learning outcome. I think the lesson I learned here helped me very much with future module design.

Now the important thing is that students are motivated and engage into the process. I hope that through the different feedback mechanisms I can encourage the students to work continuously on their coursework and in return achieve a good mark. Also I hope that through the realism of the process they go through during their coursework they will be better prepared to work on real world simulation studies. I hope the next SEM/SET will clearly indicate that the students value the new teaching arrangement and the new form of assessment.

My only concern at the moment is that with the new arrangements my workload might increase rather than decrease. So I will have to keep an eye on this. Hopefully I am wrong!

PART 3: REFLECTIONS AFTER IMPLEMENTATION

3.1 Introduction

The work described in part 3 is a section of my Teaching Dialog (TD) module coursework and is closely related to my Individual Pathway (IP) module coursework which has been summarised in part 2 of this paper. While the aim of the TD module is to encourage participants to reflect on their own views about teaching and learning and consider how these compare to those demonstrated in their Schools (Cook 2014a) the aim of the IP module is to provide participants with opportunities to develop their teaching practice through a process of workshop attendance, followed by a practical development of their own teaching (Cook 2014b).

Please note that this segment was written in 2014, i.e. after the changes to the assessment were implemented. While working on this part I revised and fine-tuned my draft Teaching Philosophy (TP) statement. The TP statement presented in part 1 of this paper is the result of this process.

3.2 Motivation

As explained in part 2 of this paper we were asked by the school in 2013 to reduce the amount of assessment and distribute the load over the semester which would be of benefit to students as well as to staff. In order to comply with this request I changed the assessment in my module "Simulation for Decision Support" (G54SIM) from coursework and exam to coursework only. I used the IP project to re-design the assessment strategy. The changes became effective in the Spring 2014 semester.

Now (after Spring 2014 semester) I have experienced the effect the changes had on student learning and satisfaction and I want to use my TD activities to reflect on them and to discuss and improve the application of two of my Teaching Philosophy (TP) statements listed in part 1 of the paper:

- Students need to understand boundaries
- The assessment needs to be meaningful, fair, and transparent

Through the SEM/SET (Student Evaluation of Module; Student Evaluation of Teaching) comments and from talking to individual students I realised that the application of these two principles needs to be improved. The improvements described in the action plan (section 3.5) will be implemented in the Spring 2015 semester.

3.3 Formalities

Name of colleague who observed you:

- Main discussion: Daniele Soria
- Additional discussion: Stefan Rennick Egglestone
- External discussion + other resources: ResearchGate + 3SAT TV

Nature of teaching activity observed/discussed:

- Reflection on changes introduced to G54SIM curriculum and assessment
- Sharing experience with others who deliver 100% coursework modules
- I have introduced a group activity (which is not marked) and an individual coursework (which is marked). How can you convince students about the usefulness of the first if it is not marked or tested in an exam?

Reason for focus on that activity:

- My goal is to increase the level of deep learning in my G54SIM module. I want to reinforce the motivation for deep learning through a meaningful, fair, and transparent assessment. The assessment should be fun (hence the group part) and should be possible to be done without many sleepless nights (task description needs some time management support for students) and it needs to have clearly defined collaboration boundaries (to avoid cheating and plagiarism). I want my assessments to be fair, and this needs to be understood/accepted by the students. This means that in an individual assessment the level of direct collaboration should be low. Attempts of task sharing and copying solutions in this part should be avoided rather than punished.
- I focus on this as a natural follow-up activity of my IP project where I worked out the new assessment strategy for G54SIM. Now I want to reflect on it and discuss some ideas for improvements

What were you trying to achieve with this activity?

- I want to make sure that I apply my TP consequently
- Look back at IP report and reflect on experience
 - What has worked as expected
 - What has not worked as expected
 - Problems not considered previously
- Reflect on comment from students (all elements should be marked – students don't want to work for free; the individual assessment is not fair as some students work in groups)
- Find solutions for plagiarism attempts (one of my biggest worries). I want a fair assessment!

3.4 Discussion Notes

3.4.1 Notes from the Discussion with Daniele Soria

Below is a summary of the points we discussed in our ***briefing and discussion meeting***. It is in no particular order. Although we originally had a specific focus for our discussion (impact of assessment changes for G54SIM) we used the opportunity to discuss also points loosely related to the topic of assessment.

- Dilemma
 - I believe that if people work in small groups they can gain more than working as individuals. But there is the danger that free-riders get good marks (in particular if there is no exam). Daniele agreed with this.
- Workload organisation:
 - We discussed why students plagiarise. One reason is that they are overloaded with assessments due to bad time management (on both sides). Students always leave it until the end before they work on the assessment and lecturers do not co-ordinate the deadlines. We said that we need a coursework database to see how our coursework fits in the overall coursework schedule and to estimate the workload for the student.
- Punishment:
 - The consideration of the consequences for students when being accused of plagiarism (including their emotional state) made me feel sad and in future I want to avoid this for my own sake. This might be due to the fact that I am still new in the lecturing business. It seems like colleagues who have been lecturer for longer do not have this problem and often do not report these kinds of cases. Perhaps I am too

serious with this - wasting my time and everyone else's as well!?! Daniele said that he feels exactly the same. We concluded that this is due to the fact that we are still new in the business.

- Student satisfaction
 - We discussed the student feedback. It is difficult to find out which is the better assessment solution (coursework + exam or coursework only) as no student tried both options.
 - SET is not with me anymore but most students were happy with coursework only assessment - but they wanted all activities to be marked (group activity as well as coursework). They don't want to do anything that does not contribute to their mark (strategic learners - in particular MSc students are like this). Some students did not come to lectures and expected slides to be more explicit - they don't understand that they are missing out on learning from the interactive elements during the lectures.
- Reflection on the first version of my TPS
 - Reflecting on my TPS I noticed that I wrote "I think it is important to apply a wide range of assessment methods to cater for everyone's abilities" (the idea was to make assessment fairer this way) but now I think this is too much in favour for the student - they should be able to cope with any kind of assessment (and coursework should put the least pressure on them). It is not my task to choose the assessment that is best for them. Daniele recommended that in the TD form (in the overall reflection section) I should point out that I wrote my TPS in 2012 but due to my gained experience and the suggestion from the internal assessor I recently changed my philosophy slightly to something more practical.
- Feedback
 - It is very important to give feedback to students and to listen to feedback from students. General feedback will only be taken on board by students who attend the lectures. In a coursework only module it is very important to decide when to give feedback. Currently I do this twice - one of which is for the conceptual model half way through the coursework and once at the end for justifying the mark. Daniele pointed out that the latter does not support the learning as it comes too late - there is no exam preparation needed where this feedback would be useful.
- Boundaries
 - In the end we agreed that it is difficult to set the boundaries for plagiarism and that it is also difficult to convey the seriousness of breaching the rules set out on plagiarism and cheating. We should be moderate with the judgement (to avoid wrong judgement) but in severe cases we need to follow it up.

In the **debrief meeting** we had a look at my revised TPS and found that the "importance" of the aspects we discussed in the TD is deep-seated and in line with my TP. We then discussed the suggestions I found from the various sources to improve the assessment fairness and the actions I am planning to introduce in this year's G54SIM module delivery. I also consider applying these steps to my other modules that contain coursework.

- We talked about some ideas for avoiding cheating and plagiarism that I got from a German TV show "Luegen und Betrug" (for more details see "Teachers Reflection" section).
 - They suggested asking students to "read" and "sign" a consent form at the same time when handing out the coursework. We found that it is important that students are physically present as this will have a different effect compared to just ticking a box that they followed all rules (if you only ask students to read the rules in the student handbook most of them will not do it). This measure will prevent at least

some more people from cheating - not all - but I think that is not possible anyway. In the end the students have to sign a form that they understood the rules, that they will follow them, and that they understand the consequences if they do not follow them. Daniele added that this will be a compulsory session. If you do not come to the lecture you cannot do the assessment. My experience as a personal tutor is that many students are not aware of the severity of the offense - or they have not understood the rules well.

- We then said that it is important that every lecturer does this exercise for each module as different kinds of coursework have different boundaries for the acceptable level of collaboration and also if students hear about this issue on several occasions they might in the end obey the rules.
- In the debrief meeting we also briefly discussed the meaning of "fairness" and what it means to students. While some students do all the work by themselves and run out of time others work in groups and in the end get better grades. To make an assessment fair, measures need to be in place to avoid such kind of unfair advantage. Fairness has also a very high rank in my TP. Therefore I made it the focus of my Teaching discussion.
- Finally we talked about feedback. One feedback I got from students last semester was that they were unhappy that the group activity is not marked. What they did not understand is that it is indirectly marked as the first question of the individual coursework. Perhaps I should better explain how the group leads to the answer of the first question in the individual coursework. I also need to clarify that the task for the student is to reflect on the group activity and it is not a summary of the group activity presentation and that reflections are individual. Perhaps I need to better explain the term "Reflection". This is linked to my TP by pointing out the boundaries.

3.4.2 Notes from Discussion on ResearchGate

I initiated a discussion on the topic of "plagiarism in coursework only modules" on ResearchGate on the 05/08/2014 (ResearchGate 2014). It seems like I am not the only one looking for a solution for this problem. Below is the question I was posting.

- I am running an MSc Computer Science module "Simulation for Decision Support" where I have changed the assessment from "exam + individual coursework" to "individual coursework only". This was done in order to promote deep learning. But most students are strategic learners and therefore try to minimise their effort while maximising their payback in terms of grades. They work together on the coursework: Often students were working on different sections of the coursework and were then sharing their solutions. How can I avoid (or reduce) this kind of plagiarism while still being able to assess the capabilities of individual students? Previously the exam was a kind of safety net for measuring individuals' performance but as I said above I would prefer to keep the module "coursework only" to promote deep learning. How can I make this assessment fairer for those who work on this coursework by themselves?

There were many interesting answers. Here is a summary of those who relate directly to the questions asked. They are in line with the results from the face-to-face discussions:

- Christina B. Class: In those cases (when plagiarism is detected) it is important to set clear examples and punish them. ... I think this will reduce the number of trials in the future as students will know that they take a risk. ... They have to learn that we can find plagiarism.

- Riccardo Poli: ... two ways to significantly reduce plagiarism: (1) do coursework in labs under examination conditions and tell the students that you will run plagiarism detection software on their submissions ... (2) use revision control software to track the progress of the student's coursework, instruct the students that they are expected to work on their assignment over a set period (e.g., 2-3 weeks) and that they need to do regular commits as this will count for a certain percentage of the final mark.
- Stefan Gruner: A written exam under controlled conditions in the exam room is, i.m.h.o., still the highest level of equal treatment which any student can get for the sake of fairness. Oral examinations (in the presence of witnesses and minute-writers) are also very good for the quick detection of knowledge gaps, and fairness can also be achieved in oral examinations. ... I recommend to let the students do their projects without awarding a lot of points to those projects themselves, because in the un-supervised home-work the students will most probably play their games with all the possible tricks. Finally, the students should be given a written exam (under controlled conditions in the exam-room) in which many of the questions posed will be closely related to the same problems with which the practical home-work project had to do.

3.4.3 Notes from Discussion with Stefan Rennick Egglestone

I also organised a discussion meeting with a colleague of mine who had found a solutions to tackle plagiarism in his module. Below is a summary of our discussion.

- There is an issue about fairness if you assess students only by individual coursework. Most students will use strategies to reduce their workload (sharing problem solving and tasks and only do the writing up separately) - which is unfair for those who don't.
- One problem is that in my case it is very difficult to give the students truly individual coursework. It is also very difficult to set the boundaries between collaborative learning and plagiarism. During the lectures I encourage students to discuss problems in small groups. This is also encouraged during the group activities and allowed (within limits) during the individual coursework. But workload sharing during the individual project is not allowed.
- Raising plagiarism concerns for me is a difficult step - on the one hand the procedures to follow it up are very complex and on the other hand I have a moral problem (people make mistakes and penalties are very high). So the best is to find strategies to avoid plagiarism in the first place.
- Stefan (teaching New Media Design Y3+MSc) provides 40 topics from which students can choose their individual project. In the end every student ends up with a different topic so it stops students from copying directly from each other. The problem is that students might choose a topic because they know there is tons of information on the internet and they then copy from the internet. For the project work Adobe Illustrator is used which produces a record of each step done. This record also has to be submitted. In the event of any signs of plagiarism the file can be used as evidence but it also provides a morale boundary for students as they are made aware of the problems they might get into if they cheat. This worked out in one case this year. Another check is to compare delivered images with existing ones on the net using Google Image Search.
- This is a nice idea but unfortunately not feasible for my module as it would be too complex for me to produce (and mark) different individual projects and there is also no way to produce any workflow records.
- Problems with students: This is only a 10 credit optional module so many students take it easy. They do not come to the labs very frequently and they do the individual coursework last minute. This results then in practices that lead to plagiarism. The coursework could be

submitted in two parts but then I would have to provide feedback in-between which increases my workload. One of the original goals of restructuring the assessment in this module was to reduce my workload (as explained in the IP report).

- One of the advantages is that I mark all the coursework myself so I can spot similarities (e.g. students who directly copied their experimental results - we ask each student to run experiments with a random number seed related to their student ID so it is not possible that two students would get the same results if they are not copying the results directly from each other). The problem is more with the design of the software. Again, where are the boundaries of plagiarism? Groups of people make the same design mistakes or have very similar functions. Interviewing the students to find out if they have done the work themselves is very complex and would require a second opinion to avoid misjudgement (some students are struggling with the language or are not good in explaining things). Perhaps one solution is to schedule an oral assessment (say: if we have time we will do this) - not to do it but mainly to avoid plagiarism in the first place.
- Solution for me: Make coursework release session compulsory and before releasing the actual coursework take 15 minutes time to discuss issues with "Plagiarism" (serious issue; mention fairness; mention cases from previous years; clarify the boundaries; mention some of the strategies and that they can be easily detected (people work on different parts and then copy) and "Time Management". Errors will also be copied - which makes it easy to detect plagiarism. If I have a suspicion that they attempt plagiarism I will follow it up, etc.)
- In the end we agreed that prevention is the best and that it is the thing we should focus on. Raising people's awareness of the severity of the issues is one step. Supporting the students with their time management would be another step. Perhaps the school can introduce a coursework scheduling system that allows us lecturers to co-ordinate the coursework better so that students don't get desperate in the end of the semester. We should keep in mind that the coursework does not necessarily have to test the entire content of a module. This way of thinking could provide some flexibility with the coursework deadline planning. This is one of the things I am currently considering. But also releasing the coursework as early as possible might be useful. This is another thing I am currently considering.

3.5 Action Plan

During the TD period I have updated my TP statement several times. Mainly I have changed my view on the "amount of assessment" and the way feedback should be provided. It is now in line with school policies to reduce assessment for the benefits of staff and students. Instead I will focus more on making the assessment that is in place meaningful, fair and transparent. This applies to all the modules I am teaching and will impact on my future module development.

There will also be some practical changes to the next G54SIM module delivery in order to improve the level of fairness and transparency of the assessment process:

- Students need to better understand the learning outcome of the group exercise and why it is not directly marked - I have to make this more explicit. I have to clarify that in the individual coursework I want to see a reflection of the group work and not just a description of the presentation. I need to better explain how the group activity leads to the answer of the first question in the individual coursework. I also need to clarify that the task for the student is to reflect on the group activity and it is not a summary of the group activity presentation and that reflections are individual. Perhaps I need to better explain the term "Reflection". This is linked to my TP by pointing out the boundaries.

- I have to clarify what is seen as plagiarism (copying other people's work) and what the consequences are. The dilemma I have is that my general teaching philosophy is to promote teamwork while the assessment in this module requires individual work. The boundaries between allowed collaboration and cheating (job sharing) need to be clear and students need to be aware of these boundaries. I picked up some ideas about how to avoid plagiarism and cheating from a German TV show that seem to provide a good starting point (<http://www.zdf.de/ZDFmediathek#/beitrag/video/2241408>).
 - Just before the coursework is released provide a session focussing on cheating and plagiarism: defining the boundaries and illustrating the consequences.
 - At the end of this session ask students to sign a contract that they will not cheat or plagiarise. Doing this in the class room directly after the training will increase the impact.
 - On the form and during the session on plagiarism the consequences for students if they plagiarise will clearly pointed out. Students need to know what the consequences of their actions might be so that they can avoid these.
- All discussants agreed that in support of the above measures it would be good to conduct oral tests but that there is a problem with the practicality and the judgement is still subjective. Oral tests are time consuming and ideally you want to have two academics present at the oral test to avoid conflicts and wrong accusations. Therefore I am not planning to apply this at the moment but will still think about this as an option for the future.
- Workload for students need to be better distributed over the semester and progress needs to be more seriously checked (perhaps with penalties for not delivering anything during these checks). I should promote the idea amongst staff to have a general student workload schedule where staff members put the time for coursework and the expected workload. I have to keep in mind that I do not have to examine everything I have been teaching. The assessment does not have to reinforce everything the student learned. I could set up a coursework that does not require knowledge from the final lectures so I could give feedback to students in the last lecture. This is something I did not think about it before.

3.6 Concluding Remarks for Part 3

I have found that the TD is a very productive working model and a good way of exchanging tips and experiences about teaching practice. Spending time to reflect on changes made to the G54SIM module and getting direct feedback on these reflections was very useful. It also encouraged me to extend the discussion to a wider audience and post it as a question on "ResearchGate". I will try to organise the kind of TDs more often in the future. I have always motivated my PhD students and MSc dissertation students to engage in this kind of discussion rounds. The TD reminded me that this is also good practice for academics. Writing up the discussion was very useful as a final reflection on the measures I want to put in place.

Although I thought beforehand that the debriefing might not be that useful it turned out to be very useful to reflect with a colleague on what I wrote and it allowed me to confirm the links between TP and planned actions and to see that all my actions are in line with my TP. This encourages me even more to continue with these kinds of reflections and discussions as a means to "quality control" of my teaching.

Overall Conclusions

For me the PGCHE has been a very useful experience. Due to linking the TD coursework to the IP coursework I could apply the theoretical and practical knowledge I gained from the IP module and coursework directly to my TD coursework. Also it was a very meaningful exercise that benefits my own development but also benefits the students. I am sure they value my attempts to make their assessment meaningful, fair, and transparent - even if they would never publicly admit it ;-).

After the first round of teaching the G54SIM module as a "coursework only" module I believe that changing the module assessment was a good step and has a positive effect on what students take away from the module. It also reduces their and my workload. However – some fine tuning still needs to be done. I am looking forward to seeing the effect of applying the improvements proposed in section 3.5.

I hope that this paper will inspire people who are in a similar situation to me at the beginning of my PGCHE course with regards to the challenges of changing the assessment strategy of their module as well as with regards to coping with the problems typical for a "coursework only" module, as for example the issue of plagiarism. It would be great if people could continue to share their experiences with these issues on ResearchGate (ResearchGate 2014)

Acknowledgement

I am very grateful to the many people who helped me directly and indirectly to pass my PGCHE and to put this working paper together. I would like to thank my PGCHE co-ordinators Nuala Byrne and Mike Cook for their valuable support throughout the PGCHE. Major support for part 1 came from Ali Cheshmehzangi and Edwin Mok (Nottingham University – Ningbo Campus). Major support for part 2 came from Andrew French, Gail Hopkins, Julie Greensmith, and Michel Valstar (Nottingham University – UK Campus). Major support for part 3 came from Daniele Soria and Stefan Rennick Egglestone (Nottingham University – UK Campus) and the people from ResearchGate. Many thanks!

References

- Biggs JB (1989). Approaches to the enhancement of tertiary teaching. Higher Education Research and Development, 8(1): 7-25.
- Biggs JB (1996). Enhancing teaching through constructive alignment. Higher Education, 32: 1-18.
- Biggs JB (2003). Teaching for Quality Learning at University. 2e. Berkshire, UK: Open University Press.
- Biggs JB and Tang C (2007). Teaching for Quality Learning at University: What the Student Does. 3e. Berkshire, UK: Open University Press.
- Cook M (2014a). <http://workspace.nottingham.ac.uk/display/PGCHE/Teaching+Dialogue>
- Cook M (2014b). <http://workspace.nottingham.ac.uk/display/PGCHE/Individual+Pathway>
- Elton L (1987). Teaching in Higher Education: Appraisal and Training. London, UK: Kogan Page.
- Frederiksen JR and Collins A (1989). A systems approach to educational testing. Educational Researcher, 18(9), 27-32.
- Fry H, Ketteridge S, and Marshall S (2009). A Handbook for Teaching and Learning in Higher Education - Enhancing Academic Practice. 3e. New York, NY: Routledge.
- Kolb D (1984). Experiential Learning. Englewood Cliffs, NJ: Prentice Hall.

- Lewin K (1952). Field theory in social science. In: D Cartwright (ed.), Selected Theoretical Papers. London, UK: Tavistock.
- Marton F (1975). On non-verbatim learning – 1: Level of processing and level of outcome. Scandinavian Journal of Psychology, 16: 273–279.
- Morgan C, Dunn L, Parry S, and O’Reilly M (2004). The Student Assessment Handbook - New Directions in Traditional and Online Assessment. New York, NY: Routledge.
- Quinton S and Smallbone T (2010). Feeding forward: Using feedback to promote student reflection and learning - A teaching model. Innovations in Education and Teaching International, 47(1), 125-135.
- Race P (2007). The Lecturer’s Toolkit - A Practical Guide to Assessment, Learning and Teaching. 3e. New York, NY: Routledge.
- Race P (2010). Making Learning Happen: A Guide for Post-Compulsory Education. 2e. Thousand Oakes, CA: SAGE Publications Inc.
- Race P, Brown S, and Smith B (2005). 500 Tips on Assessment. 2e. London, UK: Routledge.
- ResearchGate (2013).
[https://www.researchgate.net/post/Can you share your experience of coursework only assessment.](https://www.researchgate.net/post/Can_you_share_your_experience_of_coursework_only_assessment)
- ResearchGate (2014).
[https://www.researchgate.net/post/How can one avoid plagiarism in coursework only modules](https://www.researchgate.net/post/How_can_one_avoid_plagiarism_in_coursework_only_modules)
- Skinner BF (1954). The science of learning and the art of teaching. Harvard Educational Review, 24(2): 88–97.
- Trekles AM and Sims R (2013). Designing instruction for speed: Qualitative insights into instructional design for accelerated online graduate coursework. Online Journal of Distance Learning Administration, 16(4).
- UoN Quality Manual (2014). UoN Quality Manual - Module Specification Guidance.
<http://www.nottingham.ac.uk/academicervices/qualitymanual/programmedesignandapproval/modulespecificationguidance.aspx>.