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LEARNING AS A PERSPECTIVE OF REFLECTIVE PRACTICE IN COMPUTER SCIENCE

D.F.O.Onah^{1*}, J. E. Sinclair¹

¹ Department of Computer Science
The University of Warwick
Coventry, CV4 7AL
UNITED KINGDOM
{d.f.o.onah@warwick.ac.uk}, {j.e.sinclair@warwick.ac.uk}

Abstract

Reflective practice in teaching and learning in education has a more profound focus on the professional development of instructors in multidisciplinary education dimensions. This reflection has been applied in most professional teaching practices for a long period. The reflective practice by professionals in education has recognisable benefits to enhance the experience of students. However, there exists some unclear aspect of some of the ways in which the practice of reflection was done by professional base on their methods of teaching. The main goal of this research is to describe the various methods applied in teaching undergraduate seminars and lab demonstrations in a Computer Security module. So many modern and existing methods of teaching were applied in the delivery of the subject for undergraduate level of Computer Science discipline. Feedback was collected from the students after the classes. The feedback analysis was done using SPSS for statistical sciences for the data collection. The analysis reveals the level of acceptance of the various methods applied during teaching. The various opinions and critiques of the students were captured and analysed for further improvement in my future teaching plans. This research covers the following. Firstly, a brief review on reflective practice. Secondly, discussion of some of the methods applied by the researcher during teaching seminars and labs classes. Thirdly, analysis of the feedback forms collected from the students after the seminar and lab classes at the end of the term, and finally, a conclusion and further research directions.

Keywords: *reflective practice, SPSS, methods, feedback, analysis, and teaching*

Introduction

Learning according to (Marton & Booth, 1997, Gibbs & Habeshaw, 1992) is about how learners perceive and understand the concepts to make meaning of them. Fry et al., (2009) argued that learning is not all that single, it involves mastering so many concepts of teaching. Some of my major teaching values and believes is that teaching came across to me as crucial than lecturing. This means I will focus on making my lessons more student oriented with learner centred activities rather than giving a one-way lecture. This is important because it will give students an opportunity to respond to the activities in my lessons, thus enhancing their understanding of the content or topic I'm teaching.

At the same time, all my students can acquire new critical thinking ability in the class (Johnston, et al. 2011). All students taking the module I'm teaching can learn some new knowledge on how to communicate effectively and acquire new transferable skills in my lessons. This is important to me because no matter what level any student is at, whether average or advanced in the subject, I care about their improvement and am committed to assist them to reach their desired goals to do well. This will help me to plan according to their needs and how they progress weekly. The students' needs are more important thing in my teaching, this will enable me to concentrate on those that are slow to learn and support others without discrimination. I also believe all students should be treated equally and respect will be equally earned.

Reflection has been one of the focal points for professional development across multidisciplinary educational dimensions (Cornford, 2002, Loughran, 2002, Ottesen, 2007, Parson & Stephenson, 2005). Reflective practice is noted to be a vital goal amongst educators, though there is the argument that there exists "lack of clarity and agreement on what this means in practice and how best it is achieved" (Gadsby & Cronin, 2012).

Reflection on course delivery is significant in any teaching practice for the tutor to reflect on how to improve the teaching methods and to acquire full understanding on how to enhance students' learning experiences. According to Brookfield's argument in respect to teaching, he pointed out that "what we think are democratic, respectful ways of treating people can be experienced by them as oppressive and constraining" in his reflection on students thoughts during his teaching. Reflection in teaching comes along with some critical thinking and assumptions. Being conscious of ones assumptions, frames how we think and act "is one of the most intellectual challenges we face in our lives" (Brookfield, 1995).

I will be discussing several methods I applied while delivering Computer Security seminar course in term 1 of academic years 2013/2014 and 2014/2015. I conducted my teaching practice and reflection based on a case study in Computer Security as a seminar and lab tutor.

This paper comprises teaching methodologies and feedback received from students of Computer Security seminar group. The paper covers some reflective practice of over 10 weeks of seminar classes and over 10 weeks of lab sessions between academic years 2013/14 and 2014/15. But the feedback data analysed in this portfolio covered only one

semester of the 2014/2015 academic year. Teaching methods are applied in delivering the courses during the seminar and the students were requested at the end of the semester to give feedback on how useful the learning and teaching methods and supports were to their individual learning habits.

In this paper, I will be reflecting on my teaching practice and discussing my findings and experiences during the course. There are various methods used in classroom creativity, teaching and learning according to McIntosh & Waren, (2013). I implemented several methods of delivering the seminars and lab sessions; such as group discussions, individual presentations, chalk & board methods of teaching, PowerPoint slides teaching presentation and discussion of weekly assignments. The feedback received from the students was analysed using SPSS to evaluate the feedback results based on the preferences and usefulness of the various methods of delivering the seminars and labs sessions.

This paper is structured as follows: firstly, brief review on reflective practice, secondly the teaching methods applied during the seminars and lab sessions, thirdly analysis of the feedback forms and comments, and lastly discussions, personal reflection and further action plan.

Reflective practice

Reflecting on teaching practice and habit enables one to improve professional teaching methods suitable to the learners' aspirations. Vast knowledge and experience in teaching helps to improve good reflective practice during and after lectures. Schon, (1983) highlighted that this practice elevate the critics of confidence in teaching. According to Wolcott, in a situation where established knowledge and teaching behaviour proves insufficient, the professional tutor is faced with the difficulty of unprepared task to deliver (Wolcott, 1995). Schon argued that professionals must use the knowledge that is implicit for their teaching actions in order to apply their techniques and specialized teaching theory. Reflective practitioners look inward and examine their understandings of their practice from foundation (Dewey, 1997, Kinsella, 2010).

Seminars and discussions

Some authors claimed the only way meaningful learning can take place is to be able to reproduce a small group face-to-face discussion during classes (Rheingold, 2013, Breslow et al., 2013). A counter argument by Davidson pointed out that seminar discussion "have been reproduced successfully in web-based" learning experiences (Davidson, 2013). Horn, (2013) argued online learning quality might be lower due to ratio of students to teacher seminar discussion.

Critical reflection in experience teaching

Cranton & Carusetta, (2004) stated that teachers experience is very vital for teaching and discussions . McAlpine & Weston, (2002) and Wang, (2012) argued “turning experience into knowledge may depend on the ability to use reflection to recognised patterns in one’s experience” that experience alone is not sufficient to be skilful. Critical reflections, however has been noted to increase the chance of a better lecture in the class to have an effect on the students experience according to Kreber et al., (2007).

Teaching methods

I applied several methods and techniques in my teaching during the seminar classes. Some of these techniques are explained in this paper and the feedback received from the students were analysed based on these methods of teaching. There is no specific individual demographic targeted in my reflective practice.

Class group discussion

During the seminar classes, I divided the students into three groups. Two groups made up of four students and the last group made up of five students, I did these group discussions to bring out the interpersonal skills and understanding of my students (Bligh, 2000). During the group discussions, I engaged with the students and sat with each group and had a discussion with them. I listened to their discussions and assisted them in clarifying some of the issues and points raised. There I engaged with the students in the groups as they were answering some questions and they in turn asked me some questions for more clarification. The group discussion was selected based on a particular area for each group, they were all invited to come out in front of the class and present findings from their group discussion to the other groups one after the other.

Individual presentation

During the group presentation, each individual in the group presented separately on an area of interest, which they understood and agreed within themselves, also which is relevant to the group-selected discussion. Many of the students found this method of presenting very useful to increase their confidence and this gave them courage to present to large groups.

Teaching using chalk and board

I applied this method of teaching for solving mathematical security calculations and drawing framework architecture of the security concepts in the computing seminar. Many of the students found the idea of writing with chalk and board useful because it helps them to see solving of the mathematical solutions in the topic clearly.

Teaching using PowerPoint slides

The idea and method of teaching using slides was also very essential. I did combine this method together with chalk and board when explaining some concepts. It came across as very informative to the students, as I made use of graphical and object illustration as examples in the seminar presentation classes to explain some computing security issues. Hagood and Schoffner, stated that “teachers need to understand that students in a diverse population will benefit from educational programs that offer variety in content material and presentation style, and that they stay current with popular culture” and be aware of the latest educational technologies to apply in delivering presentations in class (Hagood, 2000, Shoffner, 2009, Falk-Ross, 2012).

Answering assignment questions

During the seminar classes, revision was done based on the previous week’s assignments. The solutions and corrections of the assignments were discussed and the students were able to understand fully what they were required to do in the next assignment. After the tutors had marked the assignments, we provided them with feedback based on their scores.

Verbal feedback

I gave verbal feedback to the students on how to answer their weekly assignment logically. I also explained during each seminar class, individual student errors found in the assignment. They were really pleased to have this feedback from me during the seminars.

Mixed match group discussion

In relation to this sub-group section, I requested all the students in each group to mix with the others. The concept was for no individual student to remain in his or her initial group and group members. They all joined other groups separately and shared ideas together on a new topic. After forming new groups and participating in the mix match group discussions, they all returned to their original groups and shared all they have learnt from the other groups. While they were in their new groups, I moderated and contributed to the discussions to enlighten some doubts. As soon as the students settled in their original groups, I then asked general questions through a whole class discussion about their experience with the mix match discussion, and they in turn gave their understanding of the topics from what they learnt from their other classmates in the newly formed group (Jacques & Salmon, 2007).

Feedback analysis on computer security seminar

This section addresses feedback analysis conducted on 13 students in the seminar class of which 12 students were present on the day of data collection. The only student left was off sick and sent an email to be absent from the class. The last class was towards the end

of the semester when all the feedback was collected. I will be analyzing each of the questions asked and the various responses received from the students.

Feedback section

Q1. The content was appropriate for my understanding

I observed that in this feedback response, 58.3% (7 students) agreed to the comment and 33.3% (4 students) strongly agreed as shown in figure 1. This revealed that majority of the students are in agreement that the delivery and presentation of the content was appropriate to their understanding and needs. An anonymous student said the content used, which I would like to quote, “*could have been close to the lecture material*”.

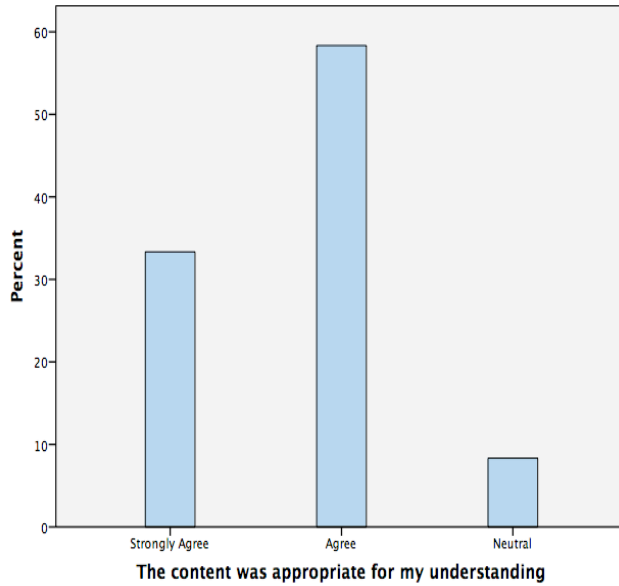


Figure 1. Shows Q1. The content was appropriate for my understanding

Q2. I found the seminars teaching methods appropriate

Based on the response from the feedback, it revealed that 83.3% of the students (about 10 students) are in agreement with the teaching methods. This revealed that greater number of students liked the entire teaching methods in the seminars and found it very useful, appropriate to their learning needs as seen in figure 2.

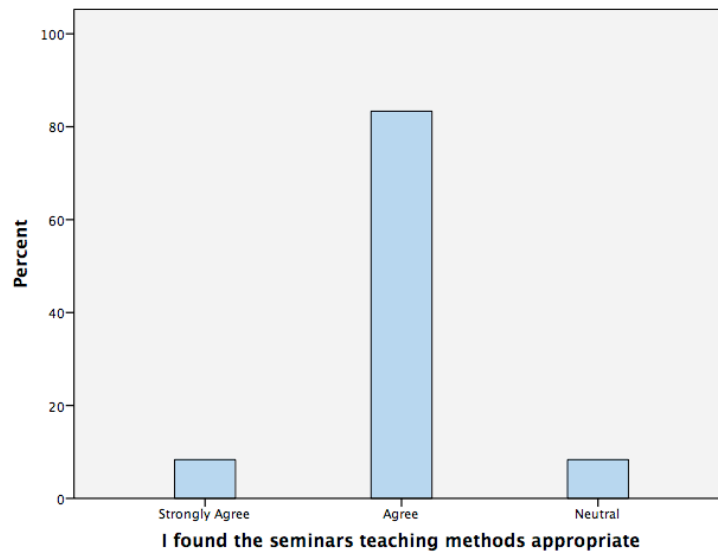


Figure 2. Shows Q2. I found the seminars teaching methods appropriate

Q3. The collaborative group learning exercise were beneficial to me

In this question, 25% of students (3 students) strongly agreed, 33.3% agreed and 33.3% remained neutral to the question as seen in figure 3. This reveals while some students preferred and enjoyed collaborative group learning exercises, others were not or might be new to this method of teaching and learning.

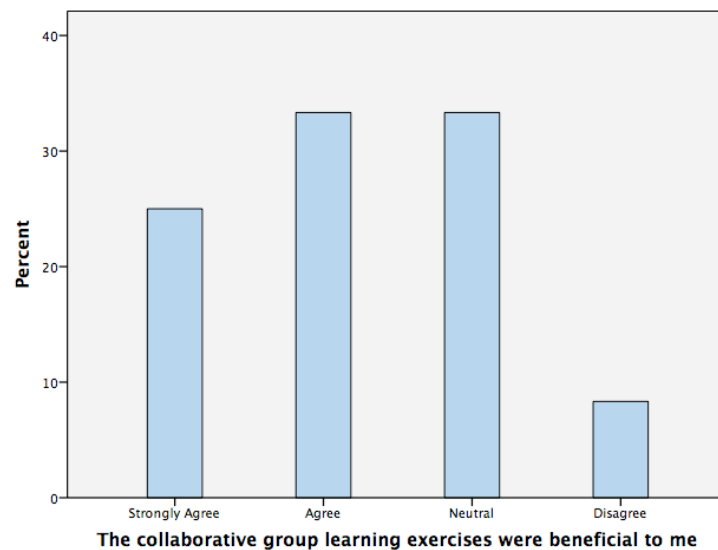


Figure 3. Shows Q3. The collaborative group learning exercises were beneficial to me

Q4. I found the group monitoring by the tutor very useful

This question reveals 25% (3 students) strongly agreed, 41.7% (about 5 students) agreed and 33.3% (about 4 students) were neutral (see figure 4). This revealed that greater percentage of students liked the tutor’s role of monitoring, contributing and supervising the group discussion and found it very informative.

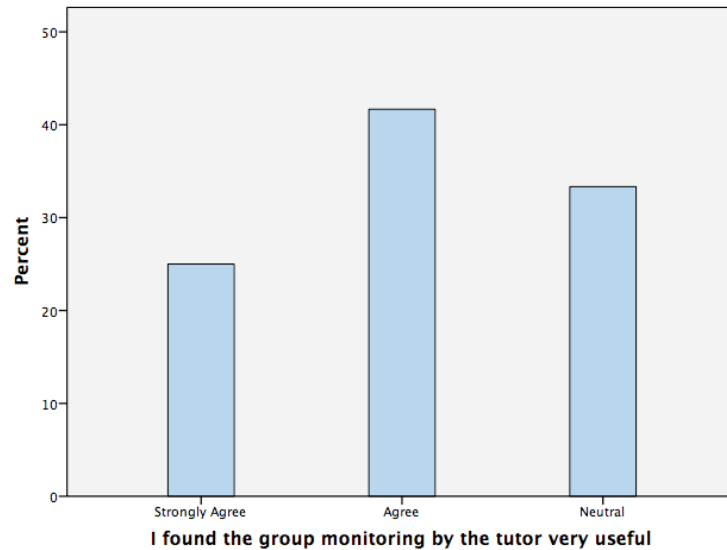


Figure 4. Shows Q4. I found the group monitoring by the tutor very useful

Q5. I found giving the group presentation very useful

Based on this question, it reveals that 33.3% (about 4 students) agreed they found the group presentation very useful. 50% were neutral in their responses and 8.3% (1 student each) disagreed and strongly disagreed (shown in figure 5). I assume this shows that during the group presentation, most people were new to this method of learning and thus they were neutral to respond. While others agreed because it boosted their confidence and presentation skills. An anonymous student commented and I quote “*I don’t normally like to present but this really helped me learn*”.

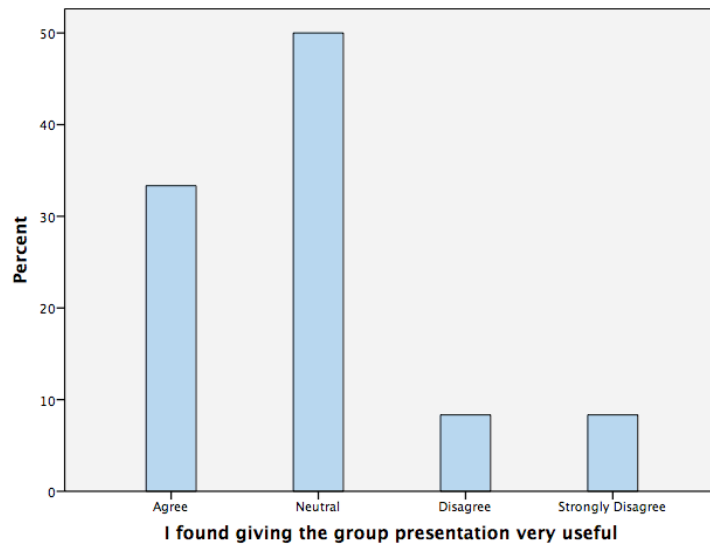


Figure 5. Shows Q5. I found giving the group presentation very useful

Q6. The examples and group discussions were very helpful

The feedback reveals that 58.3% (about 7 students) agreed to the comment and 25% (about 3 students) strongly agreed that all the examples used during the seminars and group discussions were very informative as seen in figure 6.

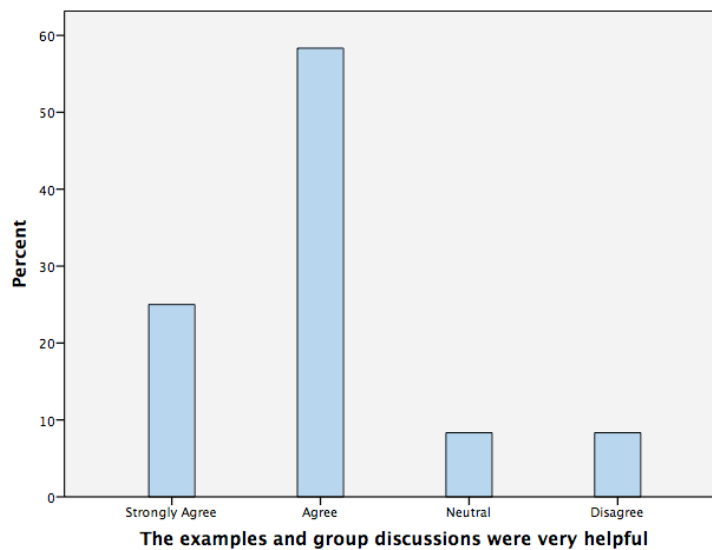


Figure 6. Shows Q6. The examples and group discussions were very helpful

Q7. I found the tutor engagement with the group discussion helpful to clarify doubts and issues

Based on the feedback responses collected, greater number of students were in support of the comment. 66.7% (about 8 students) agreed to the question that they found the tutor frequent and constant engagement during the group discussion very useful. This reveals that my engagement did enlighten and clarified doubts and was very helpful. 16.7% about 2 students strongly agreed to the question and 16.7% (2 students) were neutral as seen in figure 7.

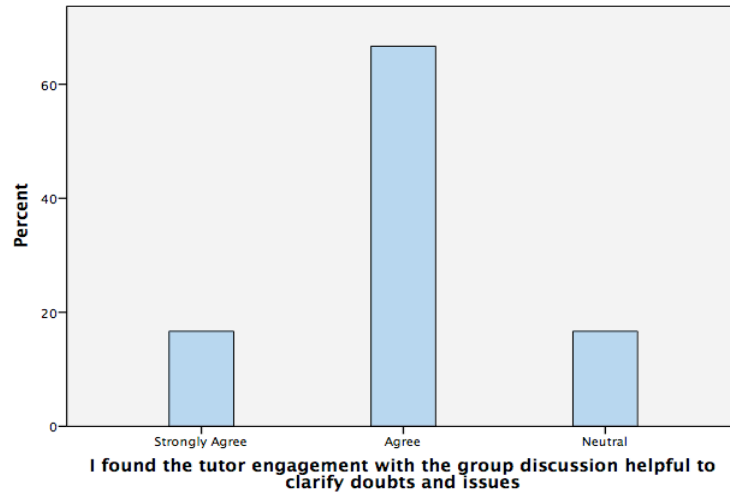


Figure 7. Shows Q7. I found the tutor engagement with the group discussion helpful to clarify doubts and issues

Q8. The seminars teaching were of high quality

This question reveals that majority of the students 66.7% (about 8 students) found the teaching methods and techniques applied during the classes to be of high quality and standard. 8.3% (1 student) strongly agreed and about 25% (3 students) were neutral (seen in figure 8). Overall, majority of the students showed they have high regards for the teaching concepts and patterns of seminar presentations. A quote from an anonymous student states, “ we did more group work, but when we were taught, it was useful”.

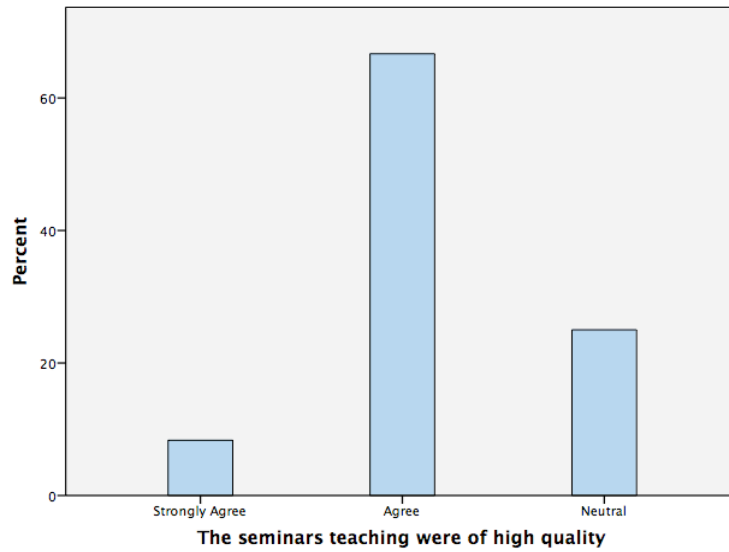


Figure 8. Shows Q8. The seminars teaching were of high quality

Q9. The PowerPoint slides were engaging and relevant to topic of the seminars

This feedback response reveals that greater percentage of students were satisfied with the PowerPoint slides designs and patterns of the seminar classes. It reveals 75% (about 9 students) agreed to the question. This revealed that the PowerPoint slides used encouraged more participation from the students during the classes and therefore students were highly engaged. An anonymous student commented thus; “they were relevant” and another said, “did just read from the PowerPoint” which sound to me like a critique that I will have to improve on.

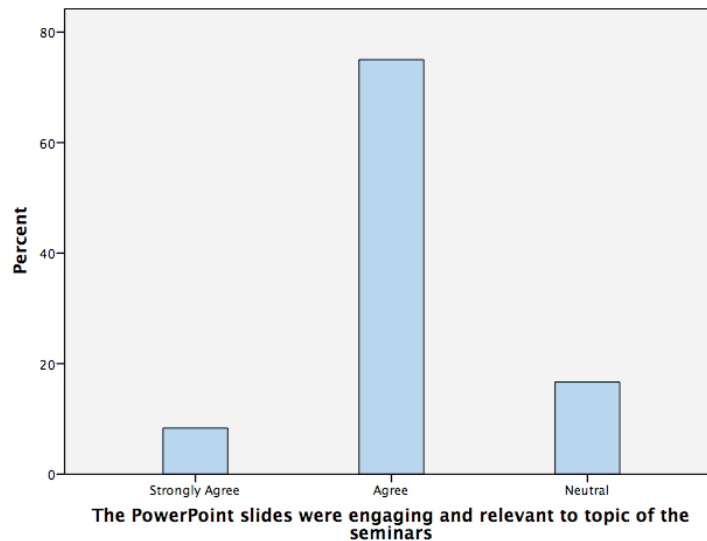


Figure 9. Shows Q9. The PowerPoint slides were engaging and relevant to topic of the seminars

Q10. I found the seminars and the various methods of delivery satisfactory

In this question, it revealed that many students about 66.7% (8 students) were fully satisfied with the way the seminars were delivered. This brings to my understanding that all the various methods introduce in the class during the seminars as discussed in section 3 were very beneficial and rewarding to the students as shown in figure 10.

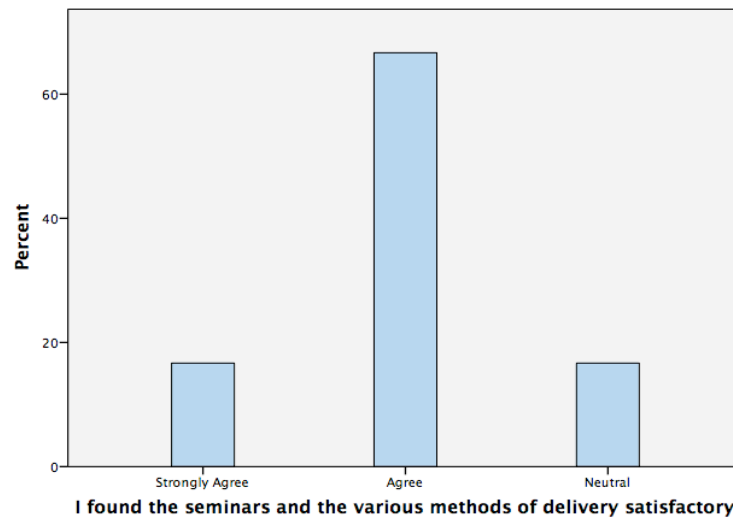


Figure 10. Shows Q10. I found the seminars and the various methods of delivery satisfactory

Q11: In general the quality of teaching and methods used during the seminar were good

Based on this response, it was revealed that majority of the students are in agreement. 58.3% agreed (about 7 students) and 16.7% (2 students) strongly agreed as seen in figure 11.

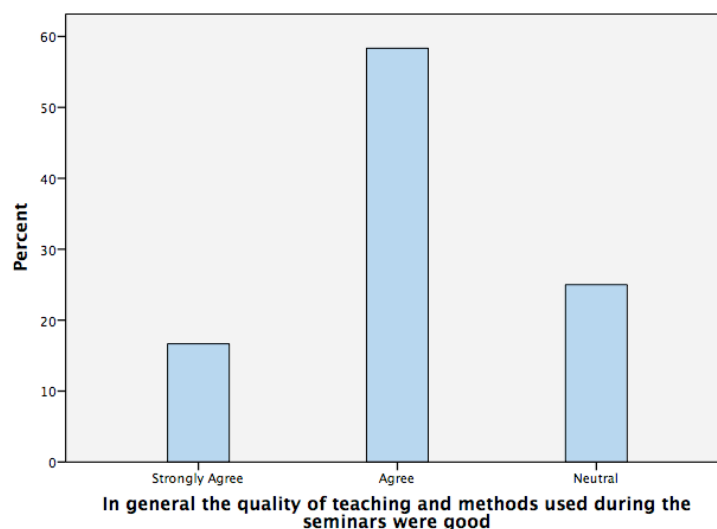


Figure 11. Shows Q11. In general the quality of teaching and methods used during the seminars were good

Average positive responses

Combining the average sum of the two positive responses of strongly agreed and agreed shown in the tables and figures analyses, these reveals that about 75.02% of students (in these positive categories) found the overall teaching concepts, quality of the teaching, and the methods applied in the entire seminar periods satisfactory.

Discussions and reflections

In summary, I have some reflection on the feedback received from my students. This revealed that majority of the students are in agreement that the delivery and presentation of the content was appropriate to their understanding and needs. The feedback showed the students were fully satisfied with the way the seminars were delivered. This brings to my understanding that all the various methods introduced in the class during the seminars as discussed in my teaching methods were very beneficial and rewarding to my students.

This paper on teaching reflective practice has enabled me to fully understand the various methods of teaching and impacting knowledge to students by listening and reading their aspirations and desires. However, there exists some criticism within some of the concepts I applied in teaching, as not all the students quite agreed to some of the methods. There are a handful of those who never liked some strategies and methods I applied in the teaching. I understand we have a variety of students with different learning styles from the research carried out. Therefore, in my future teaching, I will ensure I apply all the aspects mentioned so that some of those students will feel comfortable in the class. For example, several views did arise from the teaching methods applied in the feedback form,

some students will strongly agree in a method, while others will disagree on the same teaching method and so on. My analyses show that greater majority of the students were in agreement with most of the teaching methods applied. My lesson plans for the future is to apply the criticism in a more useful way to address lots of students' issues and learning habits. These methods I applied during my seminar classes were very interesting as it has lots of techniques applied in the past for teaching and some others were new to the students. Those that were new have some drawbacks in response from the students. The group discussions to some students did not come across well, therefore some students were not comfortable with the idea of group discussion and presentation. I intended to re-adjust my technique to teach the class in the pace of every student in the class so that no one is left behind and uncomfortable. I was able towards the end of the seminar to understand some of my students' needs and most preferred way of learning during my teaching.

The following explain my reflective understanding of the learning habit or desires of the students, and ways I can improve upon the methods I used in teaching during the seminars.

Personal reflection

Some authors reflect on the old and new paradigms of teaching and learning (Huba & Freed, 2000), I have applied some of the various methods as discussed earlier in the seminar classes. This report provides elaborate overview of the feedbacks from the students at the end of the semester. The feedback contains some constructive and helpful criticisms, which I will adhere to and incorporate in my next plans for teaching. Having said that, however, there were so many motivational comments in regards to the methods applied during the seminar classes. Overwhelmingly, the greater majority were in favour of the teaching methods, though there is room for further improvement on the critiques and the desires of which the students wish to be included.

Personal improvement & skills acquired

I have improved in my interactive skills, communication skills, presentation skills, observation skills and teaching skills. During this seminar, I learned so many ways of communicating with students be it in large or smaller groups. I developed the ability to interact with each individual student and support him or her in his or her doubts. I also arranged a one-on-one meeting in my office with some students (especially two male students) in my seminar class for support to clarify about their assignments and provided guidance towards improving their learning. During the class interactions, I built up more confidence as I observed the students needed more discussion from me and they were keen with the real life examples on security issues and challenges I demonstrated.

Things I should have done better

After reflecting on my experience of teaching this group of students, I realized I should have been able to spot weak or shy students more carefully and create a one-on-one

appointment with them to motivate learning (Race, 2014). This would allow them to ease their fears in group discussions and presentations. I should have given my students a few minutes to work in pairs of two students during the seminar time slots each week to engage in class discussion. In my future lessons, I plan to divide my students in smaller pairs of two and then groups of three or four. This strategy would give my students the opportunity to be familiar with everyone in the seminar class and that should increase or boost their confidence in a larger group because they must have had time to discuss with everyone in their respective pairs and groups. I should have included much more real life scenarios to support my teaching (Fry et al., 2009) such as several security threats and how to overcome them. I created after seminar hours for anyone who will want to chat about his or her studies. Although not many turn-up, others did ask me questions they found difficult in class via emails. I should have encouraged them more at each lesson to book an appointment to discuss any doubts after the seminar at their convenience.

Future teaching consideration plans

I have explained some steps above which include strategies I would adopt in my future lessons. These are changes, which I will try to include in my future teaching based on things I should have done better in the seminar classes. I will observe carefully and structurally plan my teaching conscientiously to support students in their learning and equip them with efficient learning skills to shape their learning habits. I will also communicate regularly with my students to see how they are coping in the class. This will enable me to know what is interesting to them and this information will help me to plan by selecting methods my students prefer most. This will also help me to focus on my students learning styles and their immediate needs in relation to the module which I am going to teach. Furthermore, it would enhance their learning to become competent learners.

Ethical consideration

With diligent consideration with the permission of the programme and module leader, I carefully considered and decided to tag anonymously all the feedback analysis with no subject to any one single individual student in my seminar class. I understand the ethical implications involved in reviewing confidential feedback for public information (Ghaye, 2007). I do have full responsibility for all information contained here.

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