

## Modified program of Diploma Yi Jin in Basic Medical Knowledge for Easier Understanding in Hong Kong

Mary Ngan Bing Cheung <sup>1, 2, \*</sup>, Wings Tjing Yung Loo <sup>1, 2</sup> and Preston Corliss Loo <sup>1</sup>

<sup>1</sup> P and P Dental and Medical Sciences Ltd and Essence Medical Laboratory, Hong Kong.

<sup>2</sup> Hong Kong College of Technology.

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### Abstract

The situation of aging population is increasing in the world as well as in Hong Kong, many more in this population are more concerned with their health than in the past. A good healthcare system and its services are in high demand in Hong Kong currently and in the future. Hong Kong Government has given much effort to the increasing medical needs and it has also put more weight on education and training to improve the shortage of healthcare providers since year 2000.

In this training program we have modified teaching and assessment methods to promote students' interest and confidence in their study, they would develop and take a positive approach towards their studies and carrier in the future. The role of a teacher in the 21<sup>st</sup> century is to help students grow. He or she must be able to accept criticism and feedback from students so that he or she can also self-evaluate and adjust the teaching plan according to students' comments and needs. Having modified the teaching plan and assessment methods, we hope to better teach this course and this modification will be carried on for all other courses that we teach in the future.

**Keywords:** Basic Medical Knowledge; Healthcare; Anatomy; Physiology; Basic Biotechnology; Problem-Base-Learning

### 1. Introduction

As every other country around the world, the ratio of aging population is rising and has become a concern to the society. This demographic characteristic will continue to be more significant nowadays. When modernization of medical devices and the advanced development of drug would provide people with recovery from diseases so they live longer than in the past. The improved healthcare systems and health services need to serve a lot of people in this population (United Nations, 2013; WHO, 2011). The same situation of aging population is also increasing in Hong Kong and many are more concerned with their health than in the past. Hence, there is a higher demand on the healthcare system according to Food and Health Bureau reports (2010, 2018). The standard of healthcare services are the targets to develop in Hong Kong currently and in the future. The government is most concerned about training the front line healthcare providers and how their standard of care can be promoted (Food and Health Bureau, 2010, 2018; Hong Kong Year Book, 2018).

Hong Kong is no doubt a world class city and we are facing great changes within the healthcare system given that many new technologies and treatment options are introduced. Precision medicine has been highly promoted in the USA in recent years since it is tailor made to each person based on his/her medical conditions and genetic information. This would lead to a new direction in forming treatment plan, together with the clinical diagnosis, pathological examinations the clinicians will create a unique plan to each individual according to the results (Eugene Sefanov, January 30th, 2015; Lu, 2014; Mesko, 2017). This is especially useful in assisting the preparation of drug treatment to patients (Lu, 2014; Mesko, 2017). This new technique has been used in our healthcare system and it has attracted a lot of clients from China

\* Corresponding author: Mary Ngan Bing Cheung

so it has undoubtedly augmented the workload on the medical field. In order to satisfy the needs the manpower with the knowledge of health and medical biotechnology are to be recruited or maybe even newcomers from other background to get trained for our healthcare system (Food and Health Bureau, 2010; 2018).

Even though Hong Kong Government has given much effort to the increasing medical needs and it has also put more weight on education and training to improve the shortage of healthcare providers since year 2000 (Hong Kong Year Book, 2018), the problem still awaits to be solved. HK Government overlooked the quick growth of people requests in public health service in last decade causing a severe shortage in health care providers.

## 2. Methods and Discussion

Our school what school (Hong Kong College of Technology) has designed an elective cluster of courses in Diploma Yi Jin consisting 1) Introduction to Human Anatomy and Physiology, 2) Common Diseases and Basic Pathological Changes and 3) Application of Basic Biotechnology. They fulfilled quality framework of Hong Kong Government (QF) level 3. The first course provides basic knowledge of human anatomy and physiology to illustrate the structures of biological system in human body and it also demonstrates the functions of different parts of the body (physiology). The second course introduces some common diseases seen in Hong Kong with their causes and how they would be diagnosed and treated. In addition, there are some routine techniques taught and assessed making sure students could learn and apply in the future. The third course involves application of biotechnology to human diseases at a molecular (genetic) level. Each course contains a total of 15 units, a teaching unit consists of two lessons which are 2 hours each. Hopefully, the knowledge and techniques are delivered by means of a sequence of activities, showing understanding of relevant concepts in the program. The students are expected to be able to find, consolidate and value materials by themselves and they can judge the conditions to which they come across in practice after completing all clusters.

However, the subject anatomy, physiology and pathology are the traditional courses taught in medical schools and they were mainly used taught with a didactic lecture format (teacher-centered) (Butler, 2009). By using this method, we could easily control the teaching pace of the class and deliver what we plan for the students (CIRTL Network, 2014; TeachingResourcesGuide.com., 2015). From this point of view, the teaching method that we used is a one-way communication, lacking the feedback from students causing them to loss attention as they are standing in a passive viewpoint by only listening (CIRTL Network, 2014; Edwin Slosson, 2013).

A better approach should involve a mixture of teaching from vertical and horizontal aspects. The vertical direction should show steadiness and succession from simple to multifaceted level of organizations (Yeung *et al.*, 2012; Oliva, 2009). For instance, the second course starts from introduction of a cell (epithelial cell), to tissue, then form an organ (liver), at the end, organ to organs would build the human system (Marieb & Katja, 2014). In horizontal aspect, students would realize one system may affect the other when its functions are impaired, for example, if there is an ulcer at the digestive tract it would cause indigestion thereby causing malnutrition (John, 2010).

We will also made use of Problem-base-learning, concepts to provide a disease case (hypertension) to arouse students to use the knowledge learnt to excavate related theories to discuss among the group members as to understand the disease diagnosis and treatment pathway (Duch & Allen, 2001). Students work as self-directed, active investigators or problem-solvers. They can explore a real and complicated medical problem, engage in a task with deep and constant attention. Teachers act as facilitators to guide the learning process and promote an environment of making inquiries (Schmidt, Rotgans & Yew, 2011, David, 2014). During the course of learning, the students' learning outcome has been assessed by means of class participation of 4 practicals, a project of a specific topic to be presented orally by powerpoint, mid-term test and final examination (Table 1, Figure 1).

**Table 1** The original assessment of the course

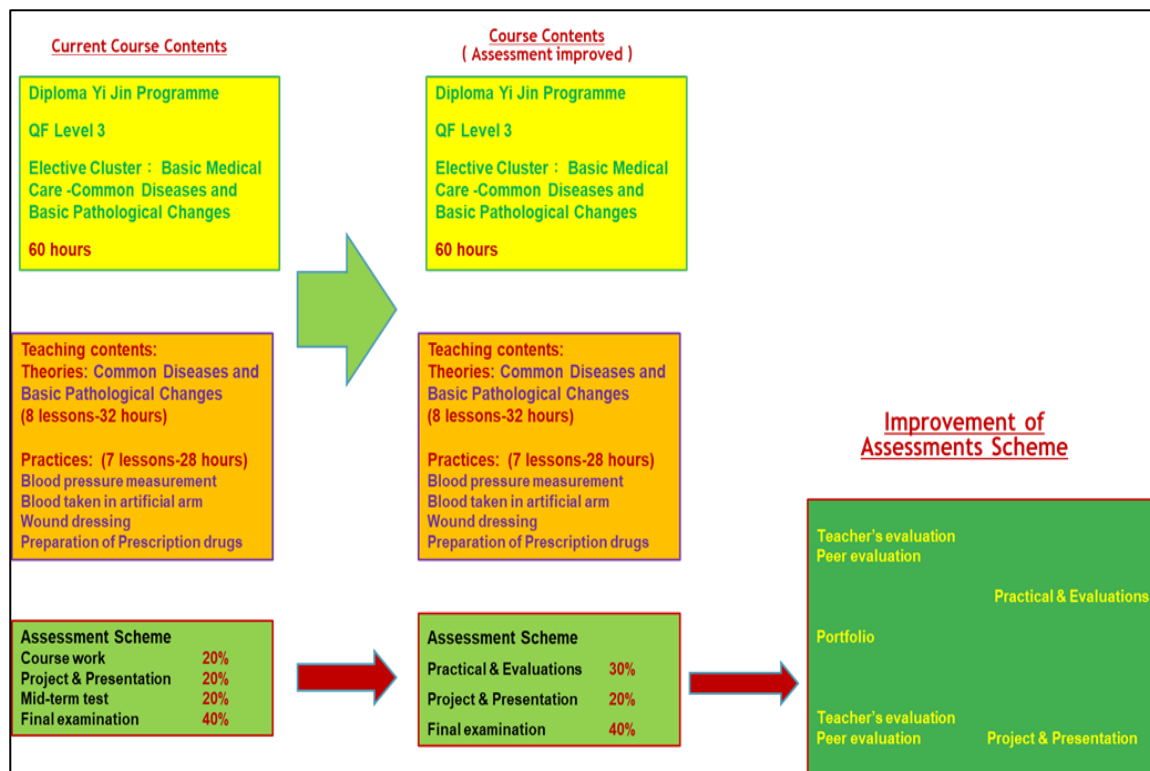
| Format of assessment                              | Distribution of mark (100%) |
|---------------------------------------------------|-----------------------------|
| Class participant & practical practice            | 20%                         |
| Selected project by power point oral presentation | 20%                         |
| Mid-term test                                     | 20%                         |
| Final Examination                                 | 40%                         |

The format of course evaluation for students belong to summative assessment. This kind of assessment aims to evaluate student learning at the end of a course by marking in a paper-pencil test or exam, a final project or other means (Hanna & Dettmer, 2004; Lo, 2008). The main purpose is to check what grades or marks students can achieve in the assessment. Students will be marked as pass/fail according to the results of the assessment (Hanna & Dettmer, 2004; Lo, 2008).

The disadvantages of summative assessment measures for learners at the final stage is like a product when the procedures come to an end there is no more revision to be done (Hanna & Dettmer, 2004; Lo, 2008). We could say the exam is one's fate. At the end of the course, the assessment of learning in class participation and practicals is made, the results may not literally demonstrate students' ability in practical sessions. We would meet the students twice for the oral presentation, the first time would be about the assignment to group and the second time would discuss with them one week before presentation. Students would not be given much feedback because we mainly discussed what information they found, they took a passive role.

The Yi Jin students are those who failed in Hong Kong Diploma of Secondary Education Examination so the summative assessment may not fit them. They come from all sorts of background, some students did not even study science in secondary school. They may find the theories difficult although we tried to use case studies and questions to provoke them to think about the knowledge behind.

Our courses have trained many students to serve in hospitals and private clinics, there are four skills which could be applied to patients but we will focus on the course Common Diseases and Basic Pathological Changes rather than the other two because this course emphasizes on application of knowledge and practice on patients. As we mentioned above, the course is run mainly by the format of summative assessment and the final results of students were fair in the past. We assumed all students in the course should have received proper knowledge and skills, but the results and reviews from them revealed dissatisfaction in the content of teaching. Many of them lack the scientific background, even though the courses are completed, they still have queries on certain topics. Therefore, the teaching format and assessments in selected course need to be modified (Figure 1)



**Figure 1** Summary of modification of assessments in Common Diseases and Basic Pathological

Reviewing the 10 principles of assessment for learning in our courses, we involved a few principles to modify the assessments to focus on how students learnt, let students receive constructive guidance and suggest them how to improve and develop the capacity (Lo, 2008; Hui, 2019, class 3). After modification it would help students to develop their ability to self-assess and peer assess so that they would become thoughtful and self-managing.

There is a minor adjustment to the lesson plan, a question central to the topic of each lesson will be raised prior to beginning of the class in order to soften the atmosphere as promoting discussion among students. This allows students to evoke and recognize authentic information, use principles and theories in new circumstances and ultimately the students will be able to confirm a comprehension of the information by breaking the concept into portions. The rest of the lesson will then be teaching the topic of the day. This modification is opposed to only teaching in the previous plan which students might find boring or unable to get involved. Towards the end of each lesson the students are asked to evaluate themselves by a set of questions. We give ensuring they understand what the important take home message would be for each topic. These pre- and post-lecture evaluations are assessment as learning. Co-operative learning, heterogenous grouping (Johnson & Johnson, 1999; 2009) and Problem-based learning (Duch, Groh & Allen, 2001 David, 2014) are suggested by many scholars. Teacher often neglects how to organize students into groups in order to attain the best results (Johnson & Johnson, 1999, 2009; Zamani, 2016). When students are to be put into groups teachers should get to know their characters to properly arrange them into groups so that they can help each other out. If student from different levels are mixed into groups ie. heterogeneous grouping of students this would help the more passive and self-contained students (Johnson & Johnson, 1999, 2009; Zamani, 2016).

To combine class participation, practicals and evaluation but to remove the mid-term test. The others remain unchanged and the distribution of mark scheme has been rearranged (Table 2).

**Table 2** The modified assessment of the course

| <b>Format of assessment</b>                        | <b>Distribution of mark (100%)</b> |
|----------------------------------------------------|------------------------------------|
| Class participant, practical practice & Evaluation | 40%                                |
| Selected project by power point oral presentation  | 20%                                |
| Final Examination                                  | 40%                                |

The formative assessment are used to class participation, practicals and evaluation, formative assessment monitor how well students are learning during a unit or course, their strengths and weaknesses and their ability in identifying problem (Biggs, 1996; Lo, 2008; Hui, 2019, class 2). During the process of teaching there is evidence to recognize where students are struggling and address problems immediately.

The arrangement of practicals will be focused on peer review and guidance from teacher, the practicals will be repeated 3 times, once a week. The students would perform each task on their own being self-evaluators as well as with their peers being peer reviews. These changes apply to the four practicals namely Blood taking with artificial arm, Blood pressure measurement, Wound dressing and Preparation of Prescription Medications. During peer evaluation they would learn how to form a group and develop ideas, how the scoring works for evaluating other's work. They also learn how to conduct meeting as a team, solve problems and summarize results. Teacher will introduce a discussion on how to create an acceptable presentation and improve. Students will be taught to appreciate and criticize their peer's work based on certain criteria and standards, accepting responsibility to judge classmate's work (Lo, 2008; Hui, 2019, Class 8). These will be recorded in a portfolio for each student for their own use or revision. After three rounds of practice, students will be assessed by teacher and feedback will be given. The feedback should identify clearly the strengths and weaknesses, the information given to the students should be clear and direct, pointing out the good and bad points (Lo, 2008; Hui, 2019, class 9). The intervals between assessment and feedback giving should not be too long so hopefully the ideas will still be fresh in the students' mind (Lo, 2008; Hui, 2019, class 9).

The topics of the oral presentation will be assigned to groups. They will be guided on what to research and during the course of preparation of the powerpoints they are free to discuss among their group on the chosen topic. The oral presentation project aims to gather students to work as a team and train students to think in professional way. The project would lead students to learn autonomously motivating them to plan, implement and evaluate their learning. When they do the oral presentation for group assessment, the task is an excellent tool for developing students' knowledge of how teams function and their skills in working effectively with others so that the inter-personal skills are trained (Lo, 2008; Hui, 2019, Class 8).

We will meet the groups separately in two visits to keep track of their pace and see if they are clear what to look for. These are also valuable times to answer any questions students might raise and guide them to the right direction. The oral presentation will be assessed by the teacher and their peers for an average. The grades (A to D) will be changed to (5-2) for easier grading.

We set a table for the portfolio assessment for peer evaluation, practicals and oral presentation. A portfolio is established to records students' progress, the steps are the setting of outcomes, design learning experience, setting up work or learning items for students (Lo, 2008; Hui, 2019, Class 6). Work or learning items function as "building blocks" and provide the necessary learning experience to let students gradually add one on top of the other. The key focus is what experience do students need to have in order to reach the outcomes. Those work or learning items are also assessment tasks which need precise rubrics, and students' self- and peer-assessment could be incorporated (Lo, 2008; Hui, 2019, Class 6). Feedback could be given for improvement throughout the process. Portfolio assessment has a long history, it summarizes the progress of the students' performance and evaluates a student's learning for a certain course (Lo, 2008; Hui, 2019, Class 6). A portfolio indicates the actual abilities of the students instead of assessing the students based on the performance of a particular test or exam (Lo, 2008; Hui, 2019, Class 6).

### 3. Conclusions

The focus of education, as we all believe, is how to bring the learning experience of a student to its full. This can be seen as the application of the knowledge learnt to promote self development and to take a positive approach towards their future. As a teacher in the 21<sup>st</sup> century, we have to shift our thinking from being a lecturer to a facilitator (Lo, 2008; Hui, 2019, Class 4). The role of a teacher is to help students grow. He or she must be able to accept criticism and feedback from students so that he or she can also self-evaluate and adjust the teaching plan according to students' comments (Lo, 2008; Hui, 2019, Class 4). Having modified the teaching plan and assessment methods, we hope to better teach this course as a start and this modification will be carried on for all other courses we are to teach in the future.

### Compliance with ethical standards

#### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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