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The Co-teaching Trial of Professional Development for the Pre-service and In-service Mathematics Teachers in Macao - Open Class of “Heterogeneity in Teaching Methods for the Same Lesson”: Establishing a professional development platform for teachers

Do teachers teach better when they teach more? Do they improve continuously? This is the expectation of the school administration, the hope of parents and all levels of the society; it is also the ideal of a teacher. However, in reality, many teachers believe that it is natural that students need to learn, but teachers' concern about their own learning is too little. Many teachers in Macao believe that their workload is heavy; after having some pedagogic trainings and education in normal college, they should have the ability to cope with their teachings, so it seems that there is no urgency to take professional training. Nevertheless, in comparison to the heated teacher development (mainly within curriculum reform) in the “two shores, three places” in the Greater China region, including Mainland China, Hong Kong and Taiwan, Macao is still in the quiet exploration stage.

On Saturday, 19 November 2011, Mr. Hu Long Cheng - teacher trainee of the Faculty of Education, University of Macau, and Mr. Huang Qiao Jun - teacher of the Tong Nam Middle School separately carried out the teaching activity of “Heterogeneity in Teaching Methods for the Same Lesson” in a session on index and exponent computing. Miss Jiang Chun Lian and Miss Sun Yu-Hua - Assistant Professors of the Faculty of Education, University of Macau, led eighteen third year students major in Mathematics and Mr. Chang Rong, the Mathematics panel head of Macau Tong Nam Middle School led five mathematics teachers to watch the lesson together and discuss fervently. The discussion atmosphere was pushed to the climax. With the participation of teacher trainees and experienced teachers, the “Heterogeneity in Teaching Methods for the Same Lesson” brought about more thinking on professional development. Why could the “Heterogeneity in Teaching Methods for the Same Lesson” Open Class be turned into a tool for professional development? The writer believed the several aspects below are of critical importance:

1. Changing the platform of professional community organizations

An interesting fact is that the “Heterogeneity in Teaching Methods for the Same Lesson” Open Class changed the organization structure of teachers quickly. Due to the task mission and needs of the “Heterogeneity in Teaching Methods for the Same Lesson” Open class, the mathematics teachers of Tong Nam Middle School changed their community culture from working alone to working in group. The teachers had planned and watched the lesson together, they jointly reflected and discussed on the teaching, thus changing the teacher community culture from a community organization to a learning-based organization. Although many teachers in Macao are willing to plan and watch lesson together, as well as to reflect and discuss together, they are busy with their own work. Lacking a common mission, common topic, appropriate occasion and suitable organization, teachers are isolated. Learning-based organization community is something that can only be found by accident and not through seeking. The first function of open class is to change the culture of schools; teachers become the members of a learning-based organization community immediately.

2. Establishing a platform for professional development Teaching contrast between the teacher trainee and professional teacher highlighted professional teaching in an instant

In recent years, the “Heterogeneity in Teaching Methods for the Same Lesson” Open Class activity is a new kind of teaching mode for comparing

the teaching characteristic of teachers in different areas of Mainland China. Here in Macao, the “Heterogeneity of teaching methods for the Same Lesson” Open Class is the teaching contrast between teacher trainees and professional teachers. It not only reflects the cooperation between universities and schools, the link of theory and practice, the one-stop professional development for the pre-service and in-service teachers; more importantly, this contrast is easier to grasp the professional teaching in an instant highlighting where the professionalism of mathematics teaching is. Due to the lack of real students, real teaching materials and true background in the teaching pedagogy classes in the university, the professional knowledge is difficult to be deeply understood. This time, through the “Heterogeneity of teaching methods for the Same Lesson” Open Class, where the teacher trainees without any teaching experience and the well-experienced professional teachers teaching the same content at the same time with real students and real teaching material discussion, the teachers really focused on: selection of introductory questions, how to care about students' thinking? How to use teaching materials? How to cultivate the mathematics reading ability of students? How to develop knowledge structures? All these real existing contrasts highlighted the mathematics teaching professional learning in an instant. As for the training of teachers of the Faculty of Education, it built a professional learning platform based on a “real class” which is rare and commendable.

Peer lesson observation and brought about professional learning in an instant

First of all, the teachers switched from the ordinary role of teaching to the role of lesson observation from the research perspective, the continuous changes of different perspectives helped to consciously strengthen the sense of “learning” from the original role of “teaching” only. Furthermore, in comparison with the single round of teaching, the two reincarnation cycles increased the opportunities for continuously switching the roles of “teaching and learning”. In the instant of switching of “teaching and learning”, many teachers could not understand the difficulties of student from the learning perspective, which was the key problem for teaching. Only through the continuous connection process of “Teaching” and “Learning” that the teachers were able to understand deeper, further consolidate and improve faster, and truly enhance professional learning.

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Setting the reflection platform through post-open class meeting

Reflection is the key to teachers' professional development. Yet usually the time and space for teachers' reflection are very fragmented and limited. A "complete" time and space for reflection was set up in the post open class meeting, in particular for experienced teachers and professionals. The teaching discussion on the same lesson is actually a process of "teaching each other", as well as a process for teachers to learn among themselves. The feedback of teaching effectiveness is more diversified and deeper than that from one-time teaching and students' homework. It has opened and promoted teacher's thinking, helped reflecting the weakness and strength of teaching and further improve teaching.

The activity of "Heterogeneity in Teaching Methods for the Same Lesson" helped to achieve more comprehensive reflection from diverse angles

The "Heterogeneity in Teaching Methods for the Same Lesson" taught by teacher trainee and experienced teacher increased a "mirror" for observation, and a "Mirror" for the meeting. It strengthened the continuous and timely reflection from the viewpoints of students, teacher trainees, other teachers and professionals; so that the level of reflection can be more multi-angled and comprehensive. The experiences of this kind of activities are of critical importance to teacher trainees. All teachers who observed this lesson had their own appreciation from the experiences. Here let us pinpoint an area to show the whole picture. The attachment is an article of the feeling and experiences of the teacher trainee, Mr. Hu Long Cheng.

What the teacher trainee Mr. Hu Long-Cheng has learned Heterogeneity in Teaching Methods for the Same Lesson—the feeling on the Open Class in Tong Nam Middle School

I was a fourth year student of the Faculty of Education, University of Macau, majoring in mathematics. I had the honour to participate in the "Heterogeneity in Teaching Methods for the Same Lesson" Open Class jointly held by the Faculty of Education, University of Macau and Tong Nam Middle School on 19 November 2011. (This activity was highly regarded by the Education and Youth Affairs Bureau and representatives were sent to attend.)

As I was going to join the educational sector soon, no doubt it was a very good training opportunity for me. I had learnt a lot in this open class activity.

About teaching materials: The teaching content of the "Heterogeneity in Teaching Methods for the Same Lesson" Open Class was the first session of index function, the computing of index and exponent. Before entering into the first session of teaching materials, there were two examples: one was the growth of GDP of our country and the other was the relationship between biological decay and time. According to my understanding, these two examples were simply an introduction bringing an index from a whole number to a rational number; it helped students know how to write formula when they encountered application exercises at most. In the sharing session after the open class, Mr. Weng and the teacher from the Youth Affairs Bureau, Mr. Yu addressed that these two examples not only represented the transformation of index from whole number to fractions, it also showed that one of it was in an increasing trend and the other was in a decreasing trend. I had never thought of the last words; however the degree of understanding on this problem could often determine the depth of understanding of teachers about the teaching.

About teaching method: In the sharing session, teaching method was the first discussed issue (deduction and induction). The method that I applied was the most original of the book, whereby the conclusion was made in a definite mode and this conclusion was usually abstract. Then, practice exercises were given based on this conclusion. The teaching method of Mr. Huang was different from mine. First he did the practice exercises and then lectured. He gave some examples for students to do, and then students made the conclusion, this teaching method was

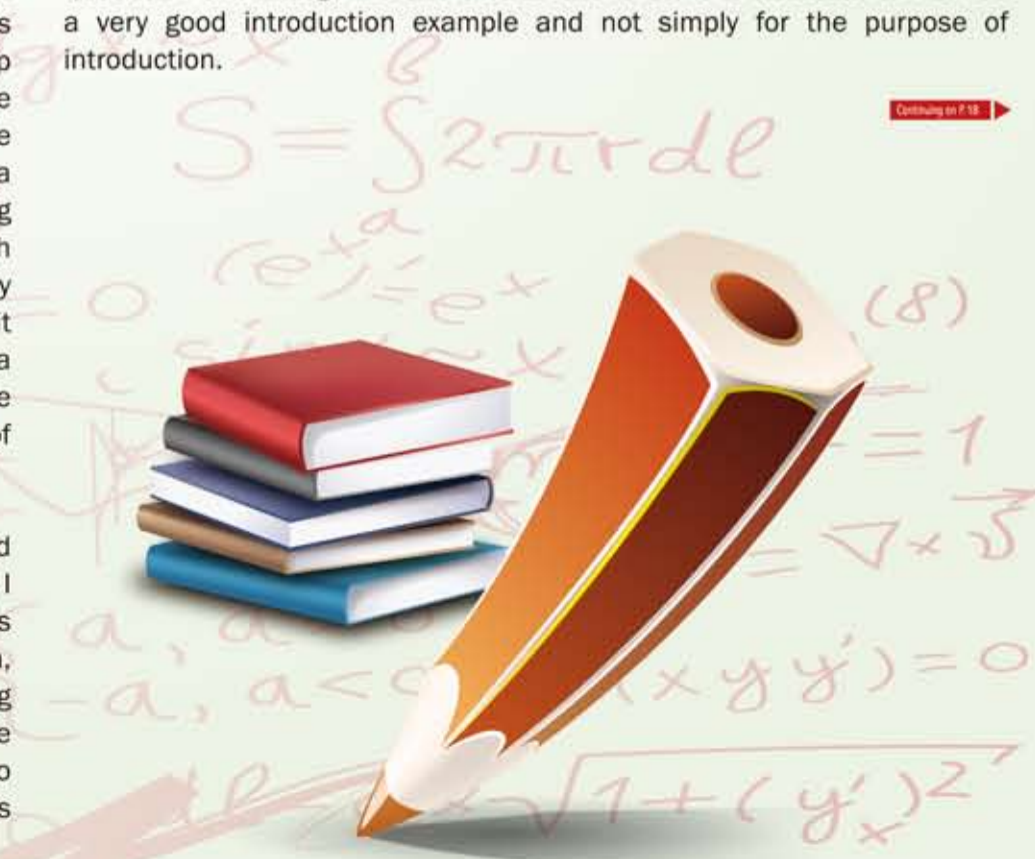
advocated in the new round of curriculum reform. It transferred from deduction to induction. The induction process not only was in line with the process of recognition, but also conformed to the process of mathematics discovery and was easier for students to accept. During my internship, I had used both the deductive and inductive methods, but I did not develop it into a system and understand it well. I thought that I should use the easiest way to teach, as long as students could accept. Through the opportunity of this open class, I deeply realised the tremendous impact of this two methods on students' learning.

In this "Heterogeneity in Teaching Methods for the Same Lesson" Open Class, the professional teachers also raised the problem of classroom management. Through the contrast, professional teachers suggested that teachers should often walk around students in the classroom. They said, "Class management and teaching design are of equal importance." Before that, I felt that teaching design determined the quality of the session. Professionals believed that it was just "teaching teaching materials" but not teaching students. If some of the students were asleep or in daze, no matter how good the lesson was, for these students, it was not taught to them. In the sharing session, I had to reflect: "Based on students, should students or teaching materials be taught?" Of course, if we raised this question separately, the answer was definitely affirmative; but how could we teach students in class rather than simply teaching materials? This issue was worth pondering.

In class, when I called on students to raise questions, I drew the number randomly and thought that it was very fair. However, according to the opinion of the professional teachers, it was all right to draw the number, but it was better to call the name of the student. In this way, we could shorten the distance with students. Maybe many teachers had the same awareness, but they might not use it as a teaching method. In requesting student to do exercise on the blackboard, I let students do it voluntarily. So the students who knew how to do the exercise could do it correctly; for those who didn't, they remained not knowing how to do the exercise. For this issue, Mr. Huang directly called on several students to do exercise on the blackboard. When watching the lesson, I did not agree. Through the sharing session, I understood that this method was very good, because some of the students could finish it and some could not. Those who could not finish the exercise revealed where the problem was. That was really what we wanted.

Through this "Heterogeneity in Teaching Methods for the Same Lesson" and the contrast, I found that the teaching method of Mr. Huang was really very good. He introduced with a question to arouse students' interest. This question went through the entire class until the end of the lesson. This was a very good introduction example and not simply for the purpose of introduction.

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Besides, the professional teachers also recommended reserving a little more time for students to learn by themselves in class. In my opinion, it was impossible for students to learn by themselves in class. But after listening to the opinion of the professional teachers, I felt that sometimes it might be a good method and was quite practical.

In this session, I took the last five minutes to divide the class into two groups, a group of boys and a group of girls, who were requested to set questions. The boys set questions to be done by the girls and vice versa. Due to the limited time, it was given as homework. Students' reactions were positive and active. After class, some of the students asked me some problems which they did not understand. I found that Professor Sun also very much agreed to my approach and gave me a lot of encouragement.

Being an intern, I did not have a good understanding of a lot of the professional knowledge in mathematics. Through this "Heterogeneity in Teaching Methods for the Same Lesson" Open Class and the sharing session, I was enabled not only to understand how to teach, what kind of attitude to have and what kind of teaching methods to use; but also shared the viewpoint on curriculum reform, the purpose of curriculum reform and the suggestions of "Three enhancements" and "Three cultivations" from curriculum reform as well.

I really did learn a lot in this Open Class and the subsequent sharing session.

I believe that if this kind of activities is organised constantly, the teaching standard of the newly-graduated teachers in Macao will be improved in leaps and bounds.

"Teacher" development is the key to education development. Experiments showed that "Teacher" development was a long term and difficult mission. We could not improve our professional quality by just listening to lectures and participating in training courses. How schools gradually form a learning-based community culture of observing class, discussing and reflecting together on the basis of the original teaching and how teachers continuously reflect, improve and develop step by step on the basis of everyday teaching is the ideal "teacher" development that the whole world are looking for at present. Having stood long term test, the lesson study of Japan and the open class in Mainland are the more appropriate typical ways for Chinese culture. The open class of "Heterogeneity in Teaching Methods for the Same Lesson" is the integration of the two modes. The writer hoped that this mode would offer new opportunity for the professional development of teachers in Macao.

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Excerpted from: «Teachers' Magazine» 35th Issue, December 2011

03 2011年“持续进修发展计划”推行情况

随着社会不断向前发展，现今各类知识需要不断更新换代，要维持竞争力，必须持续进修，才能追上社会的发展。为支持居民终身学习，持续提升个人素养和技能，促进社会的可持续发展，特区政府于2011年7月推出了“持续进修发展计划”。该计划向每名年满15岁的澳门居民提供5,000元的资助，居民可利用此项资助参与持续进修。

上述计划自推行以来，得到居民及社会各界的积极参与及支持，至2011年底，已有八万五千多名居民经由网上及资讯亭查阅帐户。期间，已接获63所持续教育机构、9所高等教育机构、3个公共实体、78个社团、54个具培训及教育职能的实体，合共207所机构提交了近15,000项持续教育课程、高等教育课程及证照考试申请。经分析评审后，共有11,954个项目获得批准，可为澳门居民提供超过22万个学习名额。

在2011年共有44,639人次参与本地项目，使用资助金额80,968,812元，具体参与情况如下：

种类	持续教育	高等教育	证照考试	总数
发放金额	46,505,353	34,365,177	98,282	80,968,812
参与人次	37,503	6,880	256	44,639

居民参与本地持续教育课程情况如下：

	职业技能类	教育学术类	博雅艺术类	长者教育类	驾驶实习类
参与人次	14,423	938	11,397	1,536	9,209
参与比例	38.5%	2.5%	30.4%	4.1%	24.5%

外地项目方面，教青局共收到1,552份申请，其中以高等教育课程的申请最多，占86%，报读地点主要在内地及中国台湾。外地项目的申请、批准及资助情况如下：

	持续教育课程	高等教育课程	证照考试	总数
申请数	143个	1,346个	63个	1,552个
批准数	69个	1,331个	11个	1,411个
资助金额	214,628元	6,609,700元	19,754元	6,844,082元

至2011年12月31日为止，共有29,036名居民透过此计划持续进修，各年龄层的参与居民数如下：

年龄层	15-24岁	25-60岁	>60岁
参与居民数	13,433人	13,848人	1,755人

居民使用资助情况如下：

使用资助金额（元）	1-1,000	1,001-2,000	2,001-3,000	3,001-4,000	4,001-5,000
参与居民数	6,433人	5,394人	4,183人	1,437人	11,589人

如欲了解各项申请详情，请浏览教青局网页www.dsej.gov.mo，或如需要了解更详细的资料，可致电该计划查询热线2842 5199。

终身学习能够适应新时代的变迁，也是促进个人成长与社会持续发展的基石。特区政府将以更积极的态度推动持续教育的发展，并期望透过本计划的实施，进一步倡导终身学习理念，创设多元的学习机会，营造终身学习的社会。

摘自：《终身学习杂志》第二十期，2012年2月

