CONCURRENT SESSION 1 (2.30 – 3.00 pm)

Incorporating Pbl using UbD framework in teaching the topic Electric Field

Yip Kim Wah, Jeffrey Toh, Chan Chee Meng, Anderson Junior College

Students preparing for the A-level examination often have difficulty understanding and applying the field theory concept. The field theory concept is taught in Gravitation, Electric field and Electromagnetism.

The workshop shares with participants on how Anderson JC Physics teachers incorporate Pbl using the UbD framework to teach the topic on Electric Field. The workshop will showcase some hands-on activities and a project based assignment to help students better understand and apply the concept, and also acquire 21st century skills.

Discovery Trails!

Li Sze Ying Emily, Esther Tay Wei Jing, Alvin Low Juay Kiang, Hwa Chong Institution

Have you ever felt apprehensive about your students’ answers to the planning questions? Have you wondered why they used apparatus which can only be found in the SLAC National Accelerator Laboratory or scratched your head over the illogical steps they wrote, even after you have reviewed so many questions with them previously? Fear not, you are not alone. To aid our students in managing the newly introduced planning questions, we came up with a series of discovery trails in which students were given the opportunity to play around with common apparatus in the school laboratory and to design experiments that make sense. Join us in our workshop, where we will share with you the exploratory worksheets and experiments we have crafted!

Workshop Physics

Wee Wee Chau, Nur Zuhailah Binte Hanafi, Catholic Junior College

Aim
To reinforce learning of Physics concepts through hand-on group activities.

Approach
The workshop physics tutorials enhance learning through group work on hands-on experiments with student-centred instructions. Students work in cooperative terms performing experiments, making observations, discussing the results and building for themselves the fundamental ideas or solving problems. The experiments and worksheets are constructed to illustrate particular Physics concepts step by step in a structured way.

Benefits
Students are reinforced in Physics concepts/principles in an interactive and cooperative environment and they are enthused through student-centred activities and enriched in self directed, communication and team work skills. They are given the opportunities to discover phenomena on their own and as the result, have a deeper understanding of the concepts being studied.
The Chinese Soup Spoon: Taking demonstrations a step further

Philip Hugh Thomas, Hwa Chong Institution

It is the presenter’s contention that many useful demonstrations are relegated unnecessarily to mere POE’s (predict, observe, and explain). Many demonstrations are chosen because they are visually appealing or fascinating in some way to students. They can therefore be often chosen more for their entertainment value rather than their ability to illustrate a concept or physical principal. The presenter believes that the appeal of the demonstration can be leveraged upon to engage students in a deeper analysis of what is occurring. To do this involves estimation or measurement of any physical quantities involved. The presenter will show how the simple demonstration of the water flow over a Chinese soup spoon which is often used to illustrate Newton’s Third Law, can be adapted to deepen and extend the students’ understanding of this important concept.

Blended Learning coupled with a Mastery Learning Approach

Chow Chiu Wai, Irene Tan, Dr Lim Jit Ning, Lau Soo Yen, Hwa Chong Institution

Blended learning is the approach whereby ICT and face-to-face interaction between teachers and students are integrated into one seamless pedagogy that is potentially more powerful than having only either ICT or face-to-face interaction. The key to a successful integration is to have the “right” ingredients, which is dependent on several factors, such as the content matter to be learnt, availability of relevant resources and teachers’ competencies in conducting the blended learning lessons.

We have explored the effectiveness of blended learning, using mastery learning as a key approach, with about 150 JC1 physics students from six Physics classes. They have embarked on the classroom-based blended learning programme for a period of one academic year, using various ICT applications and Moodle as the learning management system.

The academic achievement of the students was compared with other students using the traditional lecture and tutorial system. We will be sharing our learning experience, the results of our study, and what seem to be useful and not so useful for conducting blended learning lessons.
Sharing of StarLab activities in IJC
Ng E-Hian, Ang Tze Siong, Innova Junior College

Experiments form a critical aspect of physics learning for students. It is instrumental that students play an active role in collecting the data, processing the data observed and linking the observations with the concepts they learnt in theory.

A laboratory was reserved for special experimental setup where various experiments involving mechanics, waves and modern physics were readily available for students’ hands-on experiences. The college also prepared a set of learning worksheets to guide students through the experiments, ask students to explain experimental observations using relevant theories, and answer questions similar to those asked in the theory papers of the GCE A-Level Examinations. The intention was to help students better appreciate and understand the fundamental concepts behind the phenomena, create a deeper impression of the experimental setup in them, hoping that they can be better prepared to answer A-Level questions.

The presenters will share the conceptualization of the StarLab activities, the implementation, the observation by the tutors and the feedback from the students.

Physics applications in everyday life through professional sharing
Chin Fook Sing, Jurong Junior College

Students will find Physics more relevant and interesting if we are able to incorporate the applications of Physics to everyday life, more specifically on the topics that they will be learning for the A levels. In the presentation, we will share on how our department makes use of our weekly Professional Development (PD) meetings to discuss and share Physics applications for the A level topics, some of the real-life examples that we have discussed and how we try to incorporate these everyday applications into our lessons.
Learning of Physics through Flixlab Videos

Daniel Chong, Ting Hock Cheh, Chang Ching Chiew, Millennia Institute

Objectives
To test students’ ability to apply physics concepts in real-life phenomena which are recorded in videos. Each video is used as a tool to question why certain physical phenomenon is happening and facilitate inquiry-based learning among the students.

Approach
Use “Flixlab” iPhone App to get students to create videos in less than 5 minutes without the need for elaborated setting up of video camera. Videos can be posted on a common Facebook account immediately and students could use that account to comment on each other’s videos.

Outcomes
Self-directed learning (designing and creation of videos) and collaborated learning (discussions on posted videos) are two important outcomes from this teaching strategy.

Video-based Physics Teaching: Using authentic real-world scenarios to engage students

Samuel Ooi Junwei, National Junior College

How do we prepare meaningful resources that make learning authentic for our students? In this seminar, I will share my successful experiences and resources on how to engage students by using video-based teaching. Let me give an example of this teaching strategy.

In class, a student is filmed launching a ball in projectile motion. This is recorded in real-time using a handphone camera and in less than a minute, a video can be produced showing the velocity, acceleration, and force vectors superimposed on the actual video itself. We can even plot the actual displacement/velocity/acceleration graphs immediately.

This video can then be used to scaffold students on concepts involving Free Body Diagrams, Kinematics and Newton's Laws. Suddenly, Physics becomes immediately relevant (and hence interesting!) because students are no longer solving problems on paper, but rather, they are using Physics concepts to understand a real-world phenomena that just happened in front of them.

A free motion-tracking software is used to superimpose Physics Dynamics models on real world video clips. You can even use videos from Youtube instead of recording them yourself. This video-based approach helps students see the world in a different light by connecting abstract Physics concepts to actual real-world scenarios they can see and observe. After gaining such exposure, students will eventually learn how to use Physics concepts not only to score well in exams, but also to better appreciate and understand the world around them. And this is, of course, what learning Physics is all about.
Making teaching Physics with clickers click
Lauchor Yam, Darren Wong, National Institute of Education

We will demonstrate the effective use of classroom response systems (clickers) to promote active learning and formative assessment in our physics classrooms. Useful tips on how to make the teaching with clickers “click” will be shared, with examples and results from our own teaching.

Aerospace Summer Camp
Chee Wei Wei, Jurong Junior College

The Stanley Ho Astronautics Training Foundation organised the annual Aerospace Summer Camp, held from 18 to 23 July 2011 in Beijing, China. This was a 6-day educational trip where students had the opportunity to learn about astronautics and aerospace technology through engaging activities and visits to science centres. Besides Singapore, students from Hong Kong, Macau, Taiwan and Malaysia participated in the event.

The presenter was one of four chaperones for the camp, accompanying 39 JC1 students from the various JCs, and would be sharing her observations and learning from the trip.