



北京大学
PEKING UNIVERSITY



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Next Generation Learning

Visions • Innovations • Possibilities

Learning Microbiology in Daily Life – How Can a Mobile Device Help?

Presented by: **Prof. Lilian L P VRIJMOED**
City University of Hong Kong, Hong Kong



Common issues of student learning

- ▶ Our students tend to recall factual knowledge without elaboration and “in-depth” analysis
 - Observed that they may be able to analyze information but only restrict to textbook content
- ▶ In general students are unable to connect what is learned in the classroom to daily life experience / activities

Discovery–enriched curriculum

- ▶ The Discovery–enriched Curriculum™ (DEC) has as its foundation the notion that every student will have the chance to make an original discovery while at City University.
 - ▶ Motivate and ignite a passion for knowledge and discovery in our students.
 - ▶ Prepare them to practise professionally at and beyond the level of international standards.
- 

Redesign the curriculum

- ▶ Incorporate DEC in the course ‘Introductory microbiology’
 - ▶ Encourage students, who will have acquired little knowledge of basic microbiological concepts, to relate these concepts to everyday life
 - ▶ The challenge is to redesign teaching and learning activities to engage student learning interactively, with or without planning
- 

Implications of DEC for student learning experience

Multiple opportunities for students to

- ▶ **explore**
- ▶ ask questions
- ▶ challenge assumptions
- ▶ connect to local and international communities
- ▶ **experience/working on real-world projects**
- ▶ reflect on personal and professional growth through their experiences
- ▶ **communicate with** professional communities and **wider society**

Marc Prensky – Innovate 2004

“Almost a million camera phones were sold last year, and in many places such phones are already accepted as the norm. Educationally – once students learn that privacy concerns are as important here as anywhere else – they are a gold mine. In class, **cell phones with cameras are tools for scientific data collection, documentation, and visual journalism, allowing students to gather evidence, collect and classify images, and follow progressions over time. Creative cell phone photos can inspire students’ creative writing via caption or story contests.** Phones can be placed in various (appropriate) places, and operated remotely, allowing observations that would be impossible in person. We can literally see what’s going on around the world, including, potentially, in “sister classrooms” in other countries”.



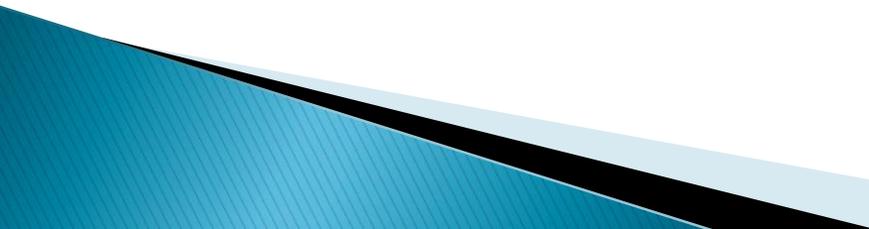
Extracted from “What Can You Learn From A Cell Phone? – Almost Anything!”

http://www.marcprensky.com/writing/Prensky-what_Can_You_Learn_From_a_Cell_Phone-FINAL.pdf

Smart phone as a learning tool?

- ▶ Most of the students have smart phones ?
 - ▶ Convenience
 - ▶ Instant capture and documentation
 - ▶ Support multi-media annotation of discovery
 - Voice record, video record
 - ▶ Log of student contributions enables tracking of student learning pattern
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Design of learning experience merging mobile technology with learning

- ▶ First-year Microbiology course
 - ▶ Students have little prior knowledge of subject matter
 - ▶ > 90% students without smart phones
 - ▶ Mobile learning project launched by University enabled students' loan of iPods to facilitate learning
 - ▶ A tailor-made teaching and learning activity was designed
- 

Ubiquitous learning experiences

- ▶ Facilitating students to develop an attitude of learning outside of the classroom
 - ▶ Building a habit of scientific mind of inquiry
 - ▶ Encouraging students to discover around daily life and creating 'plasticity of digital learning spaces' (Bomsdorf 2005)
 - ▶ Getting students to observe their own personal environments and relate learned knowledge to their lives
 - ▶ Building higher ordered thinking as they analyse and make annotation with the captured evidence (Sharples *et al.* 2009)
 - ▶ Enabling students to develop critical thinking as they make comments between one another (Hodgson and Wong 2011)
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Objectives of Assignment

1. To enhance the awareness of students on the impact of microbes in their daily life activities and their surroundings.
 2. To develop students' writing skills to communicate microbiology related information in simple and concise English.
 3. To cultivate students' attitude of discovery based on the microbiology knowledge they learn from the course.
- 

Assignment intended learning outcomes

1. Identify activities or observations from surroundings in their daily lives which are connected with microbiology.
 2. Describe the connection between the identified activities or observations with the activity of microbes in comprehensive English language.
 3. Evaluate the positive or negative effects of the activities or observations in relation to the microbes.
- 

Procedure

- ▶ Pre-activity benchmarking
 - ▶ Capture either as photo or video of their daily life encounter / activities
 - ▶ Describe connection between captured object and microorganism
 - ▶ Respond to peers' submission and description
 - ▶ 3 photos and 3 videos within 4-week period
 - ▶ Contributions are posted on a Blog
 - ▶ Assignment set 2 weeks after microbiology part commenced
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Assessment of Assignment

- ▶ Completion of numbers of capture and comments (self and peers)
- ▶ Quality of submission – connection, discovery based on Bloom’s Taxonomy
- ▶ **Impact on Learning**
 - Objectives
 - Intended Learning Outcomes

Results

Pre-assignment contributions

- ▶ Food items encountered in daily life
 - Mushrooms, cheese
- ▶ Home environments
 - e.g. mouldy walls, contaminated food (mouldy bread, neglected food and drinks)

Contributions for Assignment

Items which do not exhibit obvious connections with micro-organisms

- ▶ Food items not encountered daily life
 - E.g. caterpillar fungus, Japanese beans
- ▶ Home environment
 - E.g. denture cleaner, bathroom furniture (chair and door), tooth brush holder
- ▶ Beyond home environment
 - E.g. restaurant menu, carpets in lecture theatres, alcohol cleansing gel



Impact on Learning

Pre-assignment Contribution

- ▶ when a cup of water has been stayed behind for a long period of time, a slippery layer will be formed inside the cup.
 - some microorganisms such as bacteria accumulate and multiply inside the layer of the cup, and they secrete slippery fluid.

Impact on Learning

Assignment

- ▶ Fungi growing on the table
 - Some dirt which is soy sauce has remained on the table for several days as I forgot to clean it.
 - I found out that the dirt is moldy.
 - There are different kinds of nutrients like fat, sugar and protein in soy bean, therefore the fungi can grow well.

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Enrich in content (by comparison)

In addition, attempt to use verbal narration to explain the connection which is NOT a requirement – a reflection of **enhancement of learning attitude !!**

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Impact on Learning

Pre-assignment contribution

- ▶ Bread mould
 - The fungus absorb nutrients from the bread and grow well on it.

Assignment

- ▶ Mouldy bread and humid weather
 - The humidity of the days recently were very high. That with warm weather, the conditions favored the growth and reproduction of fungi.
 - On the video, a piece of "wet" bread was originally contaminated with just very few fungi. After discovered the contamination, i transferred the bread in to a plastic bag. After 4days, the fungi had covered half piece of the bread. The reproductive rate of fungi is really awesome! To avoid spoil of food due to fungal contamination, we should keep our food under a cool and dry environment.

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Simple description

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More elaborative demonstrating reflective learning

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Direction for Future Research

Additional analysis

- ▶ Students' progression in cognitive development during the duration of the exercise
 - ▶ Correlation between engagement in this exercise and other assessment tasks
- 

References

- ▶ Bomsdorf, B. (2005). Adaptation of learning spaces: Supporting ubiquitous learning in higher distance education. *Mobile Computing and Ambient Intelligence: The Challenge of Multimedia*. Retrieved from <http://drops.dagstuhl.de/opus/volltexte/2005/371/>
- ▶ Hodgson, P. and Wong, D. (2011) Developing professional skills in journalism through blogs. *Assessment and Evaluation in Higher Education*. 36 (2), pp. 197–211, First published on: 03 November 2009 (iFirst).
- ▶ Sharples, M., Arnedillo-Sánchez, I., Milrad, M., & Vavoula, G. (2009). Mobile learning: Small devices, big issues. *Technology-Enhanced Learning*, 233–249.



End

Thank you!

Daily life example

Ad hoc recognition of microbes' presence in the surrounding environment in daily life

- Smelly bean curd – 湖南长沙 “火宫殿臭豆腐”
- Blue chesse – Roquefort



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Chopping board

Posted by Eda Chi Hei YAU at Friday, March 9, 2012 12:11:23 PM HKT

This is the chopping board that my mom usually used to cut meat or vegetable. You can see there are fungi colonies on the slits. the slits are cut by the chopper which is very sharp. The fungi itself or the spores will contaminate the food. So the food have to be cooked thoroughly before being consumed. I will tell my mom to stop using this chopping board and replace it with a new one as soon as possible!

Attached Files: [IMG_0104.MOV \(19215.5kb\)](#)

✕ [Comments: 2](#)

Comment

Black mushroom (*Lentinula edodes*)

Posted by Eda Chi Hei YAU at Friday, March 9, 2012 11:04:34 AM HKT

This pack of black mushroom indeed is one of the presents received during the Chinese New Year. Black mushroom is an edible fungi native to East Asia and is cultivated and consumed in many Asian countries such as China, Japan and Korea. Therefore we hardly found black mushroom in western cuisines. I think black mushroom grown native to East Asia but not western countries is because of the difference in weather and soil. Besides, usually black mushroom is dried so that they can be stored for a long period of time.

Attached Files: [IMG_0099.MOV \(19156.4kb\)](#)

✕ [Comments: 0](#)

Comment

Molds in bathroom

Posted by Eda Chi Hei YAU at Friday, March 9, 2012 10:51:07 AM HKT

I found that other than the shower curtain, actually there is also many fungi colonies on the wall of the bathroom, especially the wall next to the bathtub. It is interesting to discover that the fungi colonies rarely grow on the surface of the tiles but on the slits between the tiles, in which glue is present to stick the tiles together. I guess it is because the glue surface is much more rough when compare to the tile surface so that more dust, dead skins, soap residues are more likely to be trapped and acted as nutrients for fungal growth.

Attached Files: [IMG_0100.MOV \(31673.0kb\)](#)

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transcription:

Some days ago I forgot to clean the table like this, and then the result is, the fungi growth on the table because the dirt which is the source provide the nutrition for the fungi to grow.

Now you see that there are some fungi colonies on the table. Therefore I have to clean them as soon as possible



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