USING PROBLEM-BASED LEARNING FOR A PHARMACEUTICAL CHEMISTRY PRACTICAL COURSE

“The power of the virtual client”

Professor Katja Strohfeldt (Teaching and Learning Dean)
WHAT IS PROBLEM-BASED LEARNING (PBL)?

• PBL is a student-centered pedagogy in which students learn about a subject through the experience of solving an open-ended problem.

• Students learn both thinking strategies and domain knowledge.

• PBL is a style of active learning.
BACKGROUND

- PBL initially was developed in medical schools
- a format for self-directed learning
- to acquire problem-solving skills
- It significantly differs from other learning approaches, where students are equipped with knowledge prior to the exercise
- limited examples of a PBL approach available being used to teach a large science classes.
THE ORIGINS OF PBL

McMasters Medical University, Canada

• Medic students
• Groups of 5-6 working through a range of case studies
• Initial case evaluation as team, then self-directed individual tasks.
• Academic member of staff as mentor for each group → staff intensive
• Assessment mainly oral → staff intensive
• Case studies as the only instrument of teaching = “real” PBL
TEACHING APPROACHES

Traditional:
- teacher-orientated
- teacher is a lecturer/giver of information
- student is a passive learner
- theory-based
- surface-learning

PBL:
- student-orientated
- teacher is a facilitator/coach
- student is an active learner
- collaborative learning
- practical application
- deep-thinking
MY ‘INITIATOR’

• Chemistry Practical
AIMS

• Design a novel medicinal chemistry-based practical class, using the following aims:
  • to introduce a new and creative approach to PBL used in a medicinal chemistry practical class.
  • to make it relevant to real-life.
  • to develop a design that addresses typical issues found in PBL approaches, such as high staffing needs and the time-consuming aspect of feedback.
  • to learn tips and tricks how to implement this pedagogic approach into large classes.
• “the power of the virtual client”
DESIGN

• Chemistry Practical (150 students)
• Integrated Approach
• Virtual Client
• Providing students with
  • Guidance
  • Forms
  • Laboratory space
  • Drop-in workshops

STRUCTURE

• Students work in teams of 4-5 and “found their own virtual company”.
• No lab manual is provided.
• Students are allocated a “dedicated” lab space and meeting times (aka timetabled sessions).
• Students receive a brief of their virtual client via video link.
• A mentor guides the students through this 20 week practical, there is no formal teaching as learning is self-directed.
• Students are guided through the process by a series of forms they have to fill in.
MARTIN NICHOLSON
TIMELINE

Weeks 1-5  |  Weeks 6-10  |  Weeks 11-15  |  Weeks 16-20

- Research API analysis
- API analysis & evaluation of results
- Research physical testing
- Physical testing of tablets
- Certificate of Conformity
LEARNING OBJECTIVES

• to research and understand the literature regarding relevant to quality assurance; engage with quality assurance protocols and regulations;
• to devise an experimental setup; undertake health and safety risk assessments;
• to perform chemical analysis to a high standard; practice scientific calculations;
• to develop and strengthen understanding of unit conversion and technical limitations;
• to evaluate results in relation to relevant standards;
• to present outcomes to virtual clients and respect professional standards.
## STUDENT FEEDBACK

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<th>I enjoy working in teams</th>
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LIMITLESS POTENTIAL | LIMITLESS OPPORTUNITIES | LIMITLESS IMPACT
TOP TIPS

• Always answer a question with a question!
• Do not be afraid and enjoy it!
• Work together with the student on the problem, you do not have to be an expert!
• Set strict rules, but not too many!
• You will be surprised how little help the students need!
CONCLUSION

• Successfully implemented PBL into our Chemistry laboratory class to allow students to engage in real-life scenarios.
• PBL approach encouraged students in self-directed learning and to actively approach a variety of learning outcomes.
• Independent learning process and feedback provision were successfully aligned.

Students enjoyed the practical and actively put their learning into practice enhancing their professional values.
QUO VADIS...
REFERENCES

• The "McMaster Philosophy": an approach to medical education, V.R. Neufeld, H.S. Barrows, Journal of Medical Education 1974; 49 (11), 1040-1050.
• The effectiveness of problem-based learning compared to traditional teaching in undergraduate psychiatry, M. McParland, L.M. Noble, G. Linigstone, Medical Education 2004; 38 (8), 859-867.
• The use of Problem-Based Learning in a chemistry practical class for students of Pharmacy: Engaging pharmacy students with feedback, Katja Strohfeldt, Olga Khutoryanskaya, American Journal of Pharmaceutical Education 2015, 79 (90), Article 141.
ANY QUESTIONS?

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