# Use of Neuroscience Web-based Cases in Problem-Based Learning Groups

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## Introduction

The Michigan State University College of Human Medicine has a problem-based learning (PBL) curriculum for second-year students.  Student groups meet three times per week.  At each group meeting, one case is finished and a new case is started.  The cases were developed as  paper-based cases, and are sometimes used in an electronic non-interactive format with the availability of images.  During the neuro-musculoskeletal course in February 2002, we implemented  an interactive case simulation (DxR case Mary Gathing – aseptic meningitis) in the PBL group format.  The goal was to provide case data only as requested and promote student problem-solving at each step of the case. Reactions from both faculty preceptors and students were obtained following the PBL session.

## Methods

In the Neuroscience course, one Diagnostic Reasoning (DxR) interactive case simulation was used as a PBL case.  Preceptors were  trained in case navigation prior to the beginning of the course, and a case was demonstrated during a lecture session to make students aware of the navigation techniques.

Evaluation was conducted to determine the effectiveness of Web-based interactive simulations in the PBL format and and possible future use.  The evaluation consisted of a series of statements for student response on a 5-point Likert scale (SD=strongly disagree, D=disagree, N=neutral, A=agree, SA=strongly agree), and a request for narrative comments.  Out of 105 students in the class, 93 returned the survey.  The question "this type of simulation case would be effective if changes were made" was included because we wanted the case (Mary Gathing: viral meningitis) to be a more classic presentation; since the changes could not be made, there was some confusion in some groups.

# Results -- student response

| Responses - % | SD | D | N | A | SA |
|---|---|---|---|---|---|
| I liked using the DxR case in my PBL small group | 3 | 6 | 19 | 55 | 16 |
| This would be effective if changes were made | 1 | 3 | 15 | 62 | 19 |
| I would like to have cases in other domains | 2 | 9 | 11 | 60 | 18 |
| I would like to have cases for individual practice | 0 | 2 | 15 | 53 | 30 |
| I would like to have cases available during clerkships | 0 | 3 | 24 | 49 | 24 |

| Responses - %(for students with opinion) | % D/SD | % A/SA | mean |
|---|---|---|---|
| I liked using the DxR case in my PBL small group | 12 | 88 | 3.7 |
| This type of simulation case would be effective if changes were made | 5 | 95 | 3.9 |
| I would like to have computer-based cases in other domains | 11 | 89 | 3.8 |
| I would like to have cases for individual practice | 3 | 97 | 4.1 |
| I would like to have cases available during clerkships | 4 | 96 | 3.9 |

## Results - comments

**Sample comments are listed below**:
•I enjoyed the experience, but think it should be used in moderation
•Much better for individual use than for groups
•I really enjoyed using the computer based case.  However in learning the material initially, I like the hard copy cases.
•I liked the DxR simulation.  It was a fresh and effective new approach.
•The model was helpful but took up a lot of PBL time.
•Great software. I wish all cases could be based in this format.
•Too long but fun.
•The idea of learning what test to use when looking at a case is a good learning experience and preparation for year 3.  It is harder to use a computer in a group and at times slowed things down waiting for people to type and navigate the computer.

## Conclusions

1. Using DxR cases or other types of computer simulations as PBL cases is an effective approach, but  the issues of group time and student level of knowledge need to be considered.

2. In general preceptors were very positive about the interactive case format. There was variation in comfort level of both preceptors and students in case navigation. Training is an important issue.

3. Students were enthusiastic about having computer simulation cases available for individual practice both in the pre-clinical and the clinical curriculum.

4. Cases specifically targeted toward the goals of a curricular segment may be necessary.

## Plans

We plan to author additional DxR cases for implementation into the second-year curriculum, either for individual use, use as PBL cases, or use in performance-based assessments.