ISSN 1753-044X

Volume 4 Issue 1
January 2010

INTERNATIONAL JOURNAL OF CLINICAL SKILLS

A Peer Reviewed International Journal for the Advancement of Clinical Skills

- 'docendo ac discendo' - 'by teaching and learning'

In this issue:

Executive Board

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Published by SkillsClinic Ltd.

Acknowledgements

We would like to take this opportunity to show appreciation to all those involved with the production of the International Journal of Clinical Skills (IJOCS). Many thanks to all members of the Editorial and Executive Boards.

A special thank you to Dr Mayoor Agarwal for his rich enthusiasm and kind support.

The International Journal of Clinical Skills looks forward to contributing positively towards the training of all members of the healthcare profession.

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Foreword

As we head into the New Year of 2010, the International Journal of Clinical Skills (IJOCS) can feel justifiable pride that it has fulfilled its ambition to provide the international healthcare community with an arena for clinical skills education and research. For almost all the healthcare professions, clinical skills form the basic foundations and therefore a combined approach is absolutely what is needed for the future provision of a high quality health service.

The role of the ePortfolio in both education and continuing professional development of healthcare professionals continues to evolve as training and revalidation become increasingly important. Clinical skills are an essential element of this process and in 2010 the IJOCS will be proud to publish abstracts and papers from the 8th international ePortfolio conference hosted by ElfEL London Learning Forum 2010. Further information can be found at www.ijocs.org/eportfolio

This year will also see the launch of the new and exciting 'CliniTube' website – a free resource providing a single portal for accessing and sharing an array of information. It should be a valuable resource for students and should give teachers of numerous disciplines the opportunity to share educational materials. I'm certainly looking forward to seeing the 'Clinical Skills Lab' which should become an integral component of CliniTube and will comprise information on a variety of clinical skills.

The International Journal of Clinical Skills is a unique publication in its devotion to clinical skills. I encourage professionals all over the world to continue contributing to its on-going success. After all, our patients deserve nothing less than the best.

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myPaediatrics: a website for learning paediatric clinical skills

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Keywords:
Physical examination
Curriculum
Website
Demonstration
Reasoning
Paediatrics

Abstract

Increased student numbers across five teaching sites, without a significant increase in teaching resources, motivated us to develop a website for our undergraduate paediatric curriculum that supports the development of physical examination and clinical reasoning skills.

The website reflects our department's philosophy that in order to be clinically competent our students must also be culturally competent. The website concentrates on providing learning opportunities not readily available elsewhere and helps students focus their learning by providing clear goals for study and direction to resources. As our students rotate through paediatrics they provide feedback using a questionnaire on the website which automatically summarises data as it is entered. This ensures that the website is responsive to student learning needs. The students find the website easy to access and negotiate and it helps to focus their study.

The students value the videos demonstrating the physical examination of children because such visual medium complements the learning of these skills in their small group bedside teaching sessions. The 'presenting complaints' format encourages our students to store their knowledge in the same form that they will retrieve it when they encounter clinical problems. Practising with the presentations and case examples gets them used to using their knowledge as they acquire it. This is likely to assist them in developing the skills of clinical reasoning.

The design of our website could be used as a framework to develop websites for other undergraduate clinical courses.

Introduction

Changes to the learning environment of our medical students encouraged us to review how we designed and presented our undergraduate paediatric curriculum. At the Faculty of Medical and Health Sciences, The University of Auckland, students are taught paediatrics in two six week rotations in the last two years of their training. We have to manage an increased number of students across multiple sites in which the opportunity for patient contact is compromised by shorter duration of inpatient admissions, increased patient acuity and a decrease in inpatient numbers as increased use is made of ambulatory facilities. Teaching competes with clinical service as our clinical teachers are required to increase patient outputs.

We have previously described how we developed the framework of our curriculum which is based on 25 common clinical presentations [1]. We use the concept of 'key features' (the critical learning required to manage each presentation) to

define the knowledge, skills and attitudes students must acquire [2]. Previously, students received these and other teaching guidelines in a printed handbook.

The website emphasises the importance of clinical skills and that it is not possible to be clinically competent without also being culturally competent [3, 4].

Aim

Our aim was to develop a website that would:

- Be easy to negotiate and accessible from a number of sites
- Guide and focus students' learning
- Provide access to resources not readily available elsewhere
- Integrate the learning of cultural competence with the learning of clinical skills
- Enable all students to observe selected, important physical examinations of young children

Methods

Using informal discussions the learning designer and senior clinician worked to establish the learning needs of students on the paediatrics teaching rotation and sought to address problems faced by students and teaching staff. Both students and teachers wanted a well-defined curriculum with clear objectives and directions to relevant resources.

The website was never intended to provide a complete 'one-stop-shop' for students but rather to complement other learning activities. Interaction with staff and other students occurs in the work settings where students are placed for the rotation, in the eight small group bedside teaching sessions and also in face-to-face tutorials which are held during the 6 week paediatric rotation. Assessment includes case-based assignments, in service assessments by teachers, mini-CEXs (mini clinical evaluation exercises) and a written examination [5]. The website serves to integrate these other learning activities and make transparent the learning required for assessment.

All the students were able to access the website from outside their teaching institutions.

Design

The critical knowledge, skills and attitudes required to assess and manage each clinical presentation had been identified by surveying senior clinicians [1]. For each of the 25 presentations we present the key features under the heading of *'Study focus'*. Under the heading *'Readings'* students are referred to chapters in our preferred textbook so that the text on the webpage is kept to a minimum. Images and video clips related to each presentation are listed within a *'Viewing'* element and particularly important aspects of each presentation are highlighted as *'Critical practice points'*. A section called 'New Zealand Practice Points' highlights problems common in New Zealand, but not often described in basic paediatric texts such as acute rheumatic fever and bronchiectasis. Figures 1.1 and 1.2 show the *'Study focus'* on the webpage **'Children and Adolescents presenting with Headaches'.**

Figure 1.1: myPaediatrics website

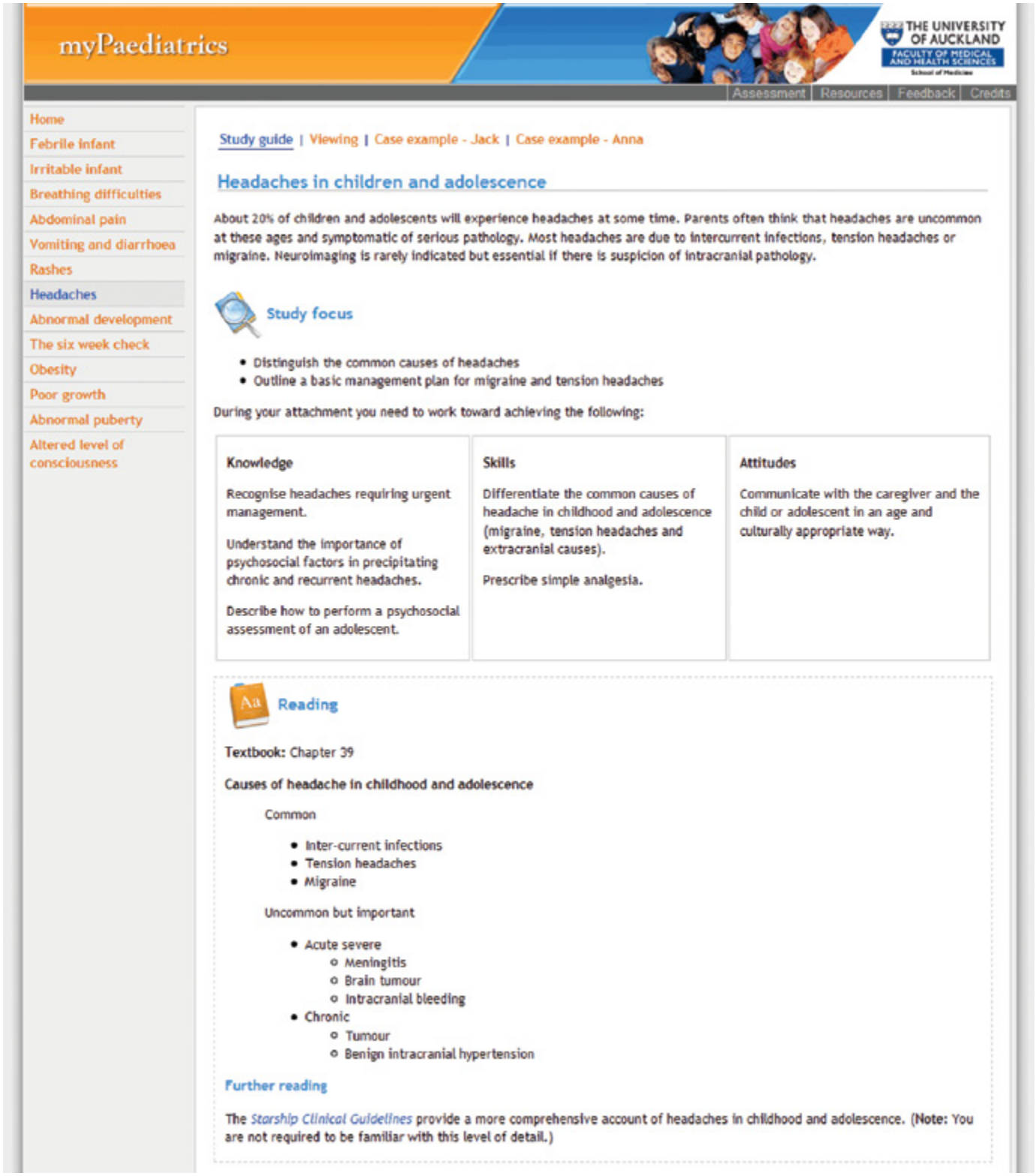
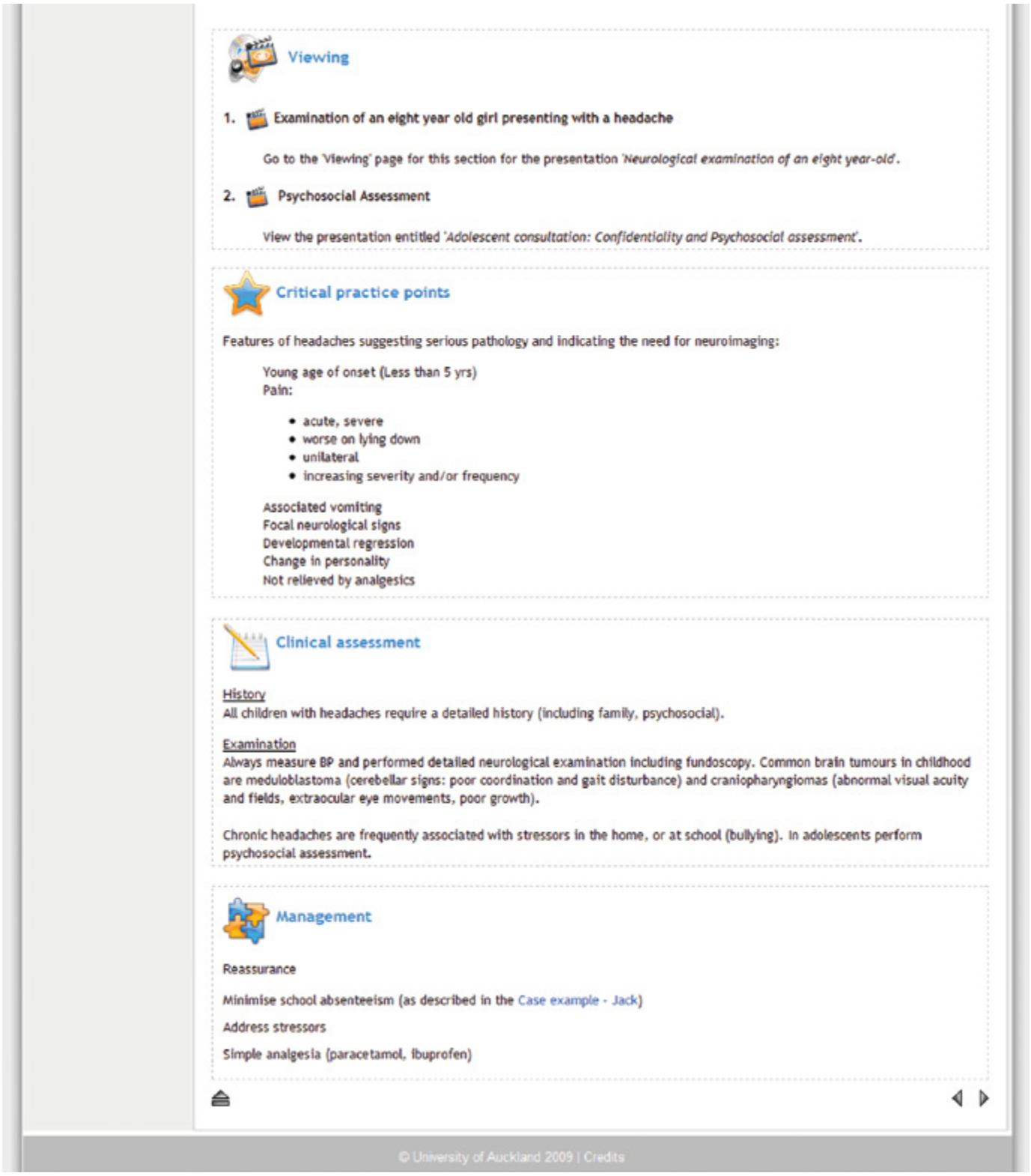


Figure 1.2: myPaediatrics website



Physical examinations

To assist in the acquisition of clinical skills we recorded videos of paediatricians examining young children. We chose to demonstrate the physical examinations of children younger than 6 years of age because these are the patients our students find most challenging. Other videos have been made to demonstrate, for example, how to interview adolescents; how to demonstrate spacer device technique to a 2 year old child with asthma; a dramatisation of the 'ABCD' approach to resuscitation; and a mother describing how she received her daughter's diagnosis of cerebral palsy and the daily challenges of caring for her.

The website has hyperlinks to other websites, for example, the New Zealand Ministry of Health website which provides information on topics such as breast feeding, or sudden unexplained death of infancy; another example is hyperlinks to other institutional websites which provide access to digital recordings of heart murmurs.

Clinical reasoning

To encourage our students to practice using their knowledge, as they learn, we have developed *'Case examples'* for each presentation. Cases are based on real scenarios, providing students with an authentic context in which to safely test their knowledge and skills and identify gaps for review. They are presented in such a way that the students progress systematically through each case with information 'unfolding' as the case ensues. Each case consists of a caregiver and child presenting with a clinical problem. The students are prompted to consider what information they might need to obtain on history taking and then compare this with the history that was actually taken. They then work through what findings they should seek on physical examination, what investigations they might order and how they would manage the child. At each stage of this process, the student checks their responses against the answers provided. Figures 2.1 and 2.2 show the case example for the presenting complaint **'Headaches in children and adolescents'**.

Figure 2.1: myPaediatrics website

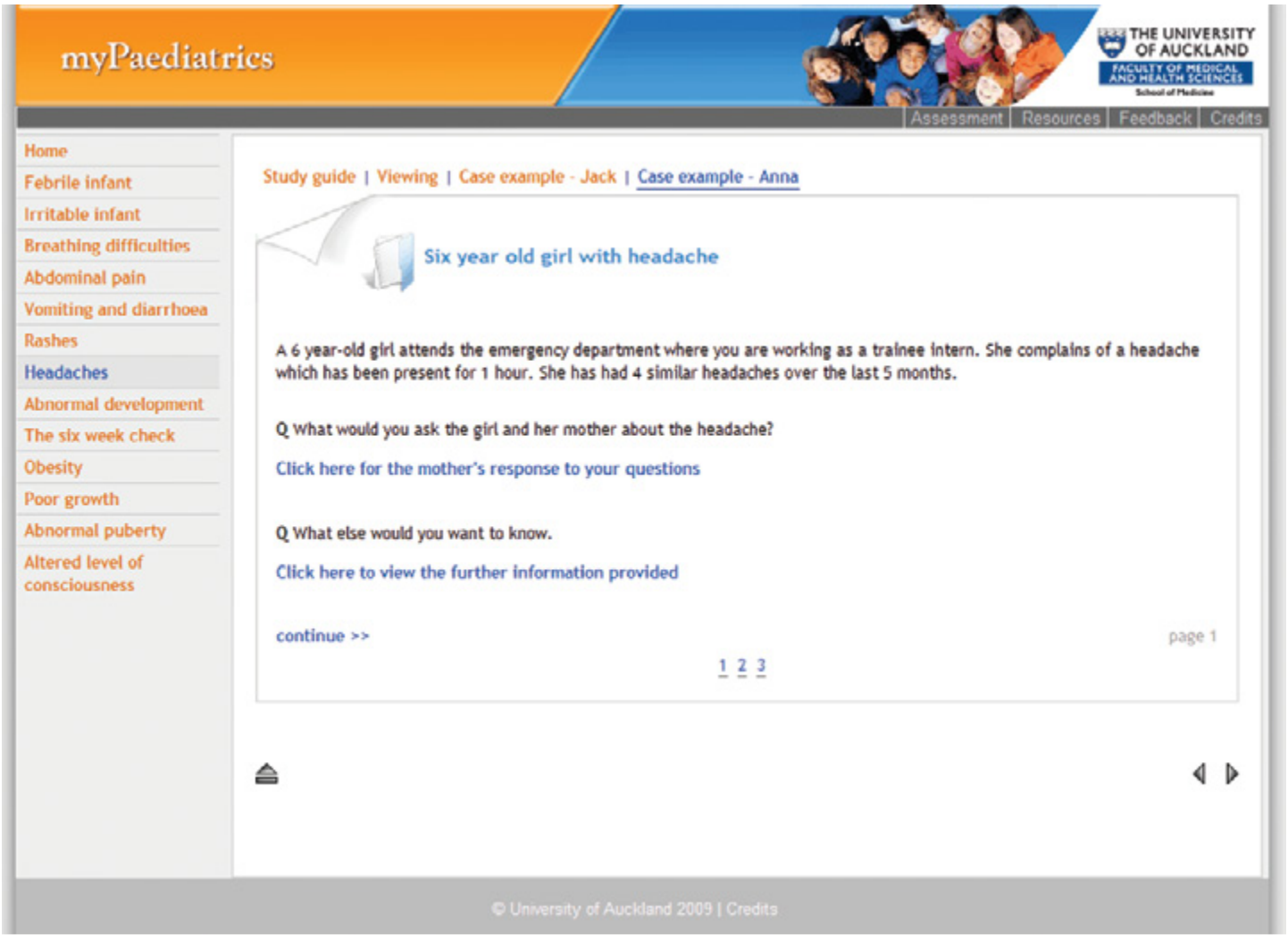


Figure 2.2: myPaediatrics website

Cultural competence

Maori refers to a member of the indigenous Polynesian population of New Zealand. Lower respiratory tract infections occasionally resulting in bronchiectasis are more common among Maori than non-Maori children. One of our case examples in the presenting complaint **'Breathing difficulties'** is a Maori child. In order to manage the child effectively, students need to manage the difficulties these children encounter in accessing health care and show an understanding of the socioeconomic and environmental factors that determine care. They must explore the family's belief and dynamics, and ensure these are taken into account when developing a management plan.

Evaluation

Students provide feedback by completing a questionnaire on the website which automatically summarises the data as it is entered. Their opinions are sought on the curriculum design, ease of access of the website and the usefulness of the videos and case examples. They are asked to give reasons for their feedback. Additionally, a learning designer interviewed all students in small groups as they rotated through paediatrics.

Software

A unique feature of the development of the website was the use of CourseBuilder™, a development tool created by the University of Auckland's e-learning design and development team. CourseBuilder™ allows you to add content to templates designed for e-learning. The templates are generated using Python™ scripting which accesses content stored within (XML) files [6, 7]. This allows for scalability, flexibility and rapid development; course pages or topics (chapters) can be cloned from one course to another. Content can be output in various formats to either fit within a Learning Management System, or published to a standalone website. Use of the tool means the update and maintenance of our website will be very easy for teaching and administrative staff, with minimal input from technical staff.

Design and development team

While the senior clinician and learning designer were key players in terms of design and content issues, the site relied heavily on the expertise of The University of Auckland's film and television crew. Filming took place in the University's studio and also on location,

to ensure accuracy and authenticity. The initial set up of the website, and assistance with the site architecture, was provided by the web developers. Upload and editing of the content was largely undertaken by the learning designer and the clinician.

The website has taken nearly a year to complete, involving one to two days a week each from the senior clinician and learning designer.

Ethics

Approval for the filming of the videos of children and for student evaluation of our website was granted by the Northern Regional Ethics Committee, New Zealand.

Results

A demonstration example of the 'myPaediatrics' website is available to view at http://www.flexiblelearning.auckland.ac.nz/mypaediatrics_example_pages/

We used the results of the surveys of our students to evaluate the website. The 85 students in the first three rotations in paediatrics in 2009 were surveyed and 52 responded (61%). The students' responses to the questionnaire are summarised in Table 1; in addition, the students were asked to give reasons for their responses and these are discussed.

Table 1: Students' responses to feedback on myPaediatrics website

No.	Question	Not at all helpful	Somewhat helpful	Neutral	Helpful	Very helpful	Total
1	How helpful did you find the website in learning paediatrics?	0	1 (2%)	5 (10%)	24 (46%)	22 (42%)	52
2	How helpful did you find the curriculum being presented as a series of 'presenting complaints'?	0	0	3 (6%)	16 (32%)	31 (62%)	50
		Not at all logical	**Somewhat**	**Neutral**	**Logical**	**Very logical**	**Total**
3	How did you find the layout and design?	0	1 (2%)	7 (14%)	27 (53%)	16 (31%)	51
		Not at all	**Somewhat**	**Neutral**	**Well**	**Very well**	**Total**
4	Did the website help focus your study of paediatrics?	0	2 (4%)	9 (17%)	14 (27%)	27 (52%)	52
		Not at all useful	**Somewhat useful**	**Neutral**	**Useful**	**Very useful**	**Total**
5	How useful did you find the 'case examples'?	0	1 (1%)	11 (23%)	18 (38%)	18 (38%)	48
6	How useful did you find the pictures?	0	0	6 (12%)	18 (37%)	25 (51%)	49
7	How useful did you find the videos in learning how to examine children?	0	1 (2%)	6 (12%)	14 (27%)	30 (59%)	51

1. How helpful did you find the website in learning paediatrics?

A total of 88% of respondents found the website 'helpful' or 'very helpful'. Students commented that the website described the curriculum in sufficient detail to gain a clear understanding of the skills and knowledge that they were expected to acquire. They also valued having the curriculum presented as a series of presentations through which they could work. Many commented that the case examples and videos were particularly useful.

Two students commented that they would like more details of the presentations on the website.

2. How useful did you find the curriculum being presented as a series of 'presenting complaints'?

94% of respondents found the website 'helpful' or 'very helpful' in terms of being presented as a series of 'presenting complaints'. Students who found the format of the curriculum helpful made comments that could be interpreted as assisting them to develop some of the skills of clinical reasoning. These comments included:

"Much easier to retrieve knowledge efficiently when seeing patients."
"Helps develop an approach to the way you encounter patients as opposed to having to learn a list of diseases."

"More relevant to clinical practice, helps us formulate and develop thinking patterns that we will use when faced with real patients."
"Teaches us to manage patients as they present; helps convert a clinical presentation into a differential diagnosis."
"It is as good as seeing a child in real life. They present to us with complaints that could be due to a number of causes, so learning this way is more practical and clinical."
"This structured our learning to a more real experience. By learning in such a way it is easy to transfer material learnt to clinical practice"
"Links directly with the approach to seeing patients in clinical practice. Helps to shape a working diagnosis and think in terms of likely differential diagnoses."
"It is really helpful to think about medical problems in terms of presentations as this is most applicable to everyday practice and makes it easier to become familiar with a topic."
"This format maximises the clinical relevance of the curriculum."

3. How did you find the layout and design?

The majority of students found the site easy to use and navigate (84% responded 'logical' or 'very logical').

4. Did the website help you to focus your study?

Most students (79%, answering 'well' or 'very well') considered that by using the website they had a clear understanding of what they were expected to know.

5. How useful did you find the 'case examples'?

Students commented that 'case examples' allowed them to practise using their knowledge as they were learning (76% answering 'useful' or 'very useful'). They considered them very relevant to what they saw on their clinical rotation.

6. & 7. How useful did you find the videos and pictures?

Approximately 86% of responding students found that these were 'useful' or 'very useful' in revising the clinical skills they learn in their small group bedside teaching sessions. They could access the videos after the teaching sessions and this helped reinforce how to perform physical examinations. It also gave students the opportunity to learn physical examinations that may not have been covered in their bedside teaching.

Results from small group interviews

Feedback received from students in eight face-to-face group interviews and nine individual telephone interviews indicated a positive response to the website from the majority. As the interviewer was impartial to the students' teaching programme, the discussion was frank and informative.

Mostly students found the website helped them prioritise their study and made clear what they were to learn for each presenting complaint. The 'presenting complaints' curriculum was considered a real-life way of learning by all except two students. Nearly all of the students found the case examples helpful as self-tests in realistic, clinical contexts. A number of students commented that they used the cases to identify gaps in their learning and then undertook more study in that identified area.

The videos were helpful as they provided the opportunity to watch experts carrying out examinations they may not have had a chance to see before. Several students felt the videos served as a model for their practice and gave them increased confidence. Some of the students commented on the inability to download the videos and found the load time of them slightly frustrating. Other feedback was mostly related to frustration of having to access a number of resources, rather than having everything accessible from the website. Although, most students had no changes to suggest, some students thought that there should be more text and several suggested we develop more case examples.

Five themes elucidated from the small group interviews are summarised in Table 2.

Table 2: Themes on the 'myPaediatrics' website from small group interview of students

»	The website is useful in guiding learning
»	Learning objectives are clear and detailed
»	The 'presenting complaints' format is useful because it exemplifies how patients present
»	Case examples are realistic and useful for self-testing
»	The videos of physical examination complement the other teaching of clinical skills

Discussion

Our website uses a well established curriculum design and readily available technology to help deliver our undergraduate paediatric curriculum [8]. A systematic approach was taken to the learning design and development process to optimise learning [9]. The website aims to foster self-study and independent learning skills which are fundamental for life long learning [10].

Structuring the curriculum as a series of common clinical presentations helps students to store knowledge in a way that is easily accessible when they have to retrieve it to solve clinical problems. According to some experts, as knowledge is acquired it is organised in 'schemes'. These organised knowledge structures are well developed in experts, whereas novices have less well developed and organised schemes. Providing a structure (in this case the series of 'presenting complaints') has been shown to influence diagnostic accuracy [11]. The comments of our students as to why they found our format of 'presenting complaints' helpful supports the notion that learning in this way encourages them to develop clinical reasoning skills.

The *'Study focus'* defines the knowledge, skills and attitudes students need to acquire. The students' in-service assessments and mini-CEXs are based on these. This ensures that the assessments are transparent and aligned with the objectives [12]. Supporting this alignment, the focusing elements for each topic (eg *Viewing, Critical practice points, Clinical assessment*) assisted students to direct their learning. The 'case examples' provided

contextually rich, active learning tools [13]. There was strong support in the student feedback to assure us that we had indeed achieved these design intentions.

The CourseBuilder™ software is easily adapted to the changing needs of the students. There is a feedback link on the website for rapid, iterative review and re-design which allows for development, testing and evaluation.

We are encouraged by our students' enthusiastic reception of the 'myPaediatrics' website. Based on the success of our 'case examples', our next project is to develop some virtual patients. Future developments will include more interactive learning opportunities such as discussion groups and online assessments.

Conclusion

Our undergraduate paediatric website, which is readily accessible from our five teaching sites, helps guide and focus our students' learning. Our 'case examples' encourage students to practise using knowledge as they learn. Acquiring knowledge based on 'presenting complaints' encourages students to store what they learn in a way that is easy to retrieve when they are faced with real life patients and encourages them to practice the skills of clinical reasoning. They find the videos of paediatricians examining young children helpful in learning physical examination skills. The learning of cultural competence is learnt in the context of learning clinical skills. The design of our website could be used as a framework for other undergraduate clinical courses.

Acknowledgements

We wish to acknowledge the help of the caregivers, children and colleagues who helped make the videos.

Author information

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Clinical Skills Lab (CSL)

The Clinical Skills Lab database will comprise information on over 200 clinical skills, broadly separated into:

- ➔ History taking skills
- ➔ Communication skills
- ➔ Clinical examination/interpretation skills
- ➔ Practical skills

Not only will this valuable resource provide material to students as a learning tool and revision aid, for example, OSCEs, it will also offer educational materials for teachers from all disciplines, allowing some standardisation of practice. The Clinical Skills community will also be encouraged to contribute, making this database interactive.

CSL is a free not for profit database. Visit **www.ijocs.org** for access