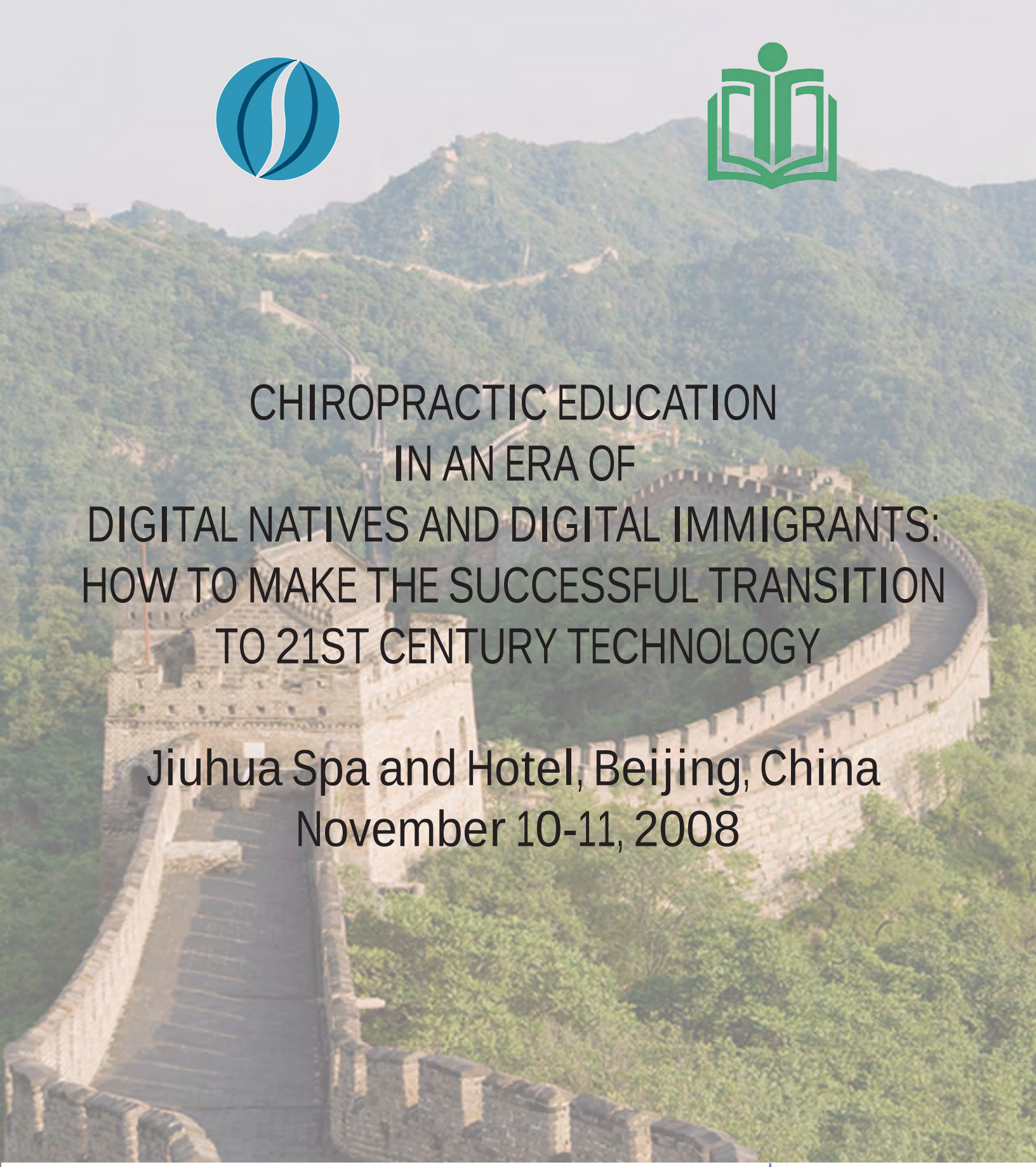

CHIROPRACTIC EDUCATION IN AN ERA OF DIGITAL NATIVES AND DIGITAL IMMIGRANTS: HOW TO MAKE THE SUCCESSFUL TRANSITION TO 21ST CENTURY TECHNOLOGY

Jiuhua Spa and Hotel, Beijing, China
November 10-11, 2008

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Proceedings from a conference on

Chiropractic Education in an Era of Digital Natives and Digital Immigrants: How to Make the Successful Transition to 21st Century Technology

Programme Directors:

David Byfield, BSc(Hons), DC, MPhil, FCC(Ortho)
Head, Welsh Institute of Chiropractic – Wales

Gerard Clum, DC
President, Life Chiropractic College West – USA

Phillip Ebrall, BAppSc(Chiropractic), PhD, FICC, FACC
Head, Division of Chiropractic, RMIT University, Australia

Ronald Rupert, MS, DC
Dean of Research, Parker College of Chiropractic
Editor-in-Chief, MANTIS Database - USA

November 10-11, 2008
Jiuhua Spa and Hotel
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FCER Foundation for Chiropractic Education and Research

November 10, 2008

Dear Colleagues,

It is a pleasure to welcome you to Beijing and the fifth joint meeting fo the World Federation of Chiropractic and the Association of Chiropractic Colleges. We are honored to have the sponsorship and participation of the National Board of Chiropractic Examiners, the International Board of Chiropractic Examiners, and the Foundation for Chiropractic Education and Research at this conference.

The theme of this year's conference is: "Chiropractic Education in an Era of Digital Natives and Digital Immigrants: How to Make the Successful Transition to 21st Century Technology." Based upon our expert panel of speakers, both those invited and those selected from abstracts submitted, we are confident that there will be an exciting and stimulating program for all.

We thank you for taking the time and making the effort to travel to Beijing, where many of you will have just participated in the World Health Organization's Congress on Traditional Medicine. We hope you will find time to see this magnificent city and the Great Wall just to the north.

This conference will owe a considerable part of its success to the organizing committee of Dr. David Byfield, Dr. Gerard Clum, Dr. Phillip Ebrall and Dr. Ronald Rupert together with WFC staff members Mr. David Chapman-Smith, Ms. Linda Sicoli and Ms. Sarah Yabut. Our grateful thanks to them.

Finally our thanks to our hosts in Beijing – Dr. Anli Dong, Dr. Ferida Khanjani and Dr. Roger Hinson of the Chiropractors' Association of China.

Yours sincerely,

Efstathios Papadopoulos, DC
President
World Federation of Chiropractic

Carl Cleveland III, DC
President
Association of Chiropractic Colleges

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CONFERENCE REPORT FROM THE PROGRAM DIRECTORS

December 1, 2008

INTRODUCTION

The WFC and the ACC had held four previous conferences – on Philosophy in Chiropractic Education (Fort Lauderdale, Florida, November 2000), Chiropractic Clinical Education (Sao Paulo, Brazil, October 2002), Patient Examination, Assessment and Diagnosis (Toronto, Canada, October 2004) and Professional Identity (Cancun, Mexico, October 2006).

This Conference was held to review new web-based and other teaching technologies, their use in chiropractic education, and the challenges and opportunities these technologies present – especially as many faculty members are digital immigrants who are challenged by new technology and most students are digital natives who have grown up in the digital world. Beijing was chosen as the location because of a World Health Organization Congress on Traditional Medicine and Symposium on Manual Methods of Healthcare that were being held at the same venue immediately prior to the WFC/ACC Conference.

The members of the Planning Committee were Dr. David Byfield, Head, Welsh Institute of Chiropractic, University of Glamorgan, Wales; Dr. Gerard Clum, President, Life College of Chiropractic West, Hayward, California; Dr. Phillip Ebrall, Head, Division of Chiropractic, RMIT University, Melbourne, Australia, Dr. Ronald Rupert, Dean of Research, Parker College of Chiropractic, Dallas, Texas and Editor-in-Chief, MANTIS and David Chapman-Smith, Secretary-General, World Federation of Chiropractic.

In summary, the meeting was smaller than past conferences, but the quality of the program was extremely high. For this we, the Program Directors, express most grateful thanks to the invited speakers and those who submitted abstracts. Participants received printed copies of the Proceedings. This DVD record contains:

- The papers and abstracts submitted by speakers – i.e. the Proceedings as distributed at the meeting.
- The power point presentations given at the meeting.
- A selection of photographs – Appendix A.

ATTENDANCE

See the list of participants (**Appendix B**) which includes addresses and contact information. There were 85 delegates. They represented 22 educational programs in 9 countries as listed in Table 1, and a number of other organizations and associations.

Table 1

Australia	**Spain**
Macquarie University	RCU Escorial María Cristina
Murdoch University	
RMIT University	**United Kingdom**
	Anglo-European College of Chiropractic
Brazil	University of Glamorgan
University Anhembi Morumbi	
	USA
Canada	Cleveland Chiropractic College – Kansas City and Los Angeles
Canadian Memorial Chiropractic College	Life Chiropractic College West
	Life University
Japan	Logan College of Chiropractic
Murdoch University International Study Centre	New York Chiropractic College
Tokyo College of Chiropractic	Northwestern Health Sciences University
	Palmer College of Chiropractic – Davenport,
Mexico	Florida and West Campuses
Universidad Estatal del Valle de Ecatepec	Parker College of Chiropractic
	Sherman College of Straight Chiropractic
South Africa	Western States Chiropractic College
Durban University of Technology	

GOALS AND METHODS

As indicated in the initial notice of the meeting, which is included on this DVD, goals were:

- To review new web-based and other teaching technologies and products relevant to contemporary chiropractic education.
- To understand how they influence teaching and learning methods for faculty and students and the behavioral and technical challenges involved.
- To understand how new technologies and products can be used effectively in chiropractic education.
- To identify areas of collaboration and common purpose for institutions.

Methods, as at previous WFC/ACC Education Conferences, included a combination of invited lectures in key areas, many short presentations from speakers selected from individuals responding to the Call for Abstracts, and panel and audience discussion. Various presentations benefited from internet access and demonstrations, such as those by Dr. Len Faye on a web-based technique lecture series, Dr. Reed Phillips on FCER's new DC Consult website, and Dr. Ron Rupert's on searching the scientific literature.

PROGRAM

For details consult the final program as given on this DVD. The program describes the content of each session, and for each speaker there is a written summary and a power point presentation.

Unlike previous WFC/ACC Conferences, there were no consensus statements developed or discussed. This was because the subject matter of the meeting did not lend itself to consensus statements. However there was widespread agreement voiced that those present and all chiropractic educational programs should continue to communicate and collaborate on how to make fuller and more effective use of digital technology in chiropractic education.

David Byfield, BSc(Hons), DC, MPhil, FCC(Ortho)
Head, Welsh Institute of Chiropractic – Wales

Gerard Clum, DC
President, Life Chiropractic College West – USA
Phillip Ebrall, BAppSc(Chiropractic), PhD, FICC, FACC
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Program

CHIROPRACTIC EDUCATION IN AN ERA OF DIGITAL NATIVES AND DIGITAL IMMIGRANTS: HOW TO MAKE THE SUCCESSFUL TRANSITION TO 21ST CENTURY TECHNOLOGY

Jiuhua Spa and Hotel, Beijing, China – November 10-11, 2008

Program Directors:

David Byfield, BSc(Hons), DC, MPhil, FCC(Ortho) - Head, Welsh Institute of Chiropractic - Wales
Gerard Clum, DC - President, Life Chiropractic College West – USA
Phillip Ebrall, BAppSc(Chiropractic), PhD, FICC, FACC - Head, Division of Chiropractic, RMIT University, Australia
Ronald Rupert, MS, DC - **D**ean of Research, Parker College of Chiropractic, Editor-in-Chief, MANTIS Database – USA

Day 1 — Monday November 10, 2008

Session One — Applications of Course Management Software

Purpose*:* To discuss the benefits, limitations and potential of different forms of CMS technology (e.g. Blackboard, Edufolio) that provide the digital interface between faculty and students. Abstracts submitted should discuss experience at chiropractic educational institutions and/or other educational programs.

Moderator: *Phillip Ebrall, BAppSc(Chiropractic), PhD, Head, Division of Chiropractic, RMIT University, Australia*

8:30 – 10:30 AM

Welcomes
Stathis Papadopoulos, DC, President, World Federation of Chiropractic
Carl Cleveland III, DC, President, Association of Chiropractic Colleges

Keynote Presentation: *Report of a Survey of Technologies Being Used By Chiropractic Institutions*
Joe Ferguson DC, Dean of the College, Life Chiropractic College- West – 15 minutes

Introduction and Overview

David Byfield, DC MPhil and Haydn Blackey, BA BSc MBA University of Glamorgan, Wales – *15 minutes*

Presentations from Abstracts

Five 10 minute presentations selected from abstracts submitted:

1. **Michael Shreeve, DC LCP** (Palmer) - *The Digital Bridge – A Tale of One Dinosaur's Experience Integrating CMS Technology with Classroom Instruction*
2. **Jeffrey Cooley, DC DACBR** (Murdoch) - *Pearls & Perils: Integrating a Web-Based Communication Interface into the Teacher-Learner Relationship*
3. **Thomas Bergmann, DC** and Glori Hinck, RD MS DC (Northwestern) - *The Use of an Online Learning Management System (Moodle®) for Case Study Presentation & Student Assessment*
4. **David Wickes, DC DABCI** (Western States) - Modeling blended learning in a faculty development program for a new course management system
5. **Curtis Thor Rigney, DC** and Margot McNeill (Macquarie) - *The Impact of a Whole Curriculum Approach to Integrating Web-Based Lecture Technology: a Case Study*

Audience Discussion – 20 minutes

NUTRITION BREAK – 30 MINUTES

SESSION TWO — GRAPHIC TECHNOLOGIES AND MATERIALS FOR INSTRUCTORS, AND INNOVATIVE APPLICATIONS

Purpose: Make delegates aware of what technologies and materials are available and how they are being applied, including podcast technologies, video and sound clips, etc.

Moderator: *Sharyn Eaton, MPhil PhD DC, Head of Department, Macquarie University, Australia*

11:30 AM-12:30 PM

Introduction and Overview

Lenore Edmunds BA MEd, Dean, Undergraduate Education, CMCC – *15 minutes*

Presentations from Abstracts

Three 10 minute presentations selected from abstracts submitted:

1. Palle Pedersen, DC, **David Byfield, DC MPhil**, Peter McCarthy DC (Welsh Institute of Chiropractic - *Simulation Technology – Innovation in Clinical Learning & Teaching*
2. Thomas Bergmann, DC and **Glori Hinck, RD MS DC** (Northwestern) - *Technology Applications in Online Learning at NWHSU*
3. **Medhat Alattar, MD MS DC** (Palmer) – *Incorporating Electronic Wireless Transmitters in Interactive Lecture Presentations*

Audience Discussion – 30 minutes

LUNCHEON 12:30 – 2:00 PM

SESSION THREE — WEB-BASED SEMINAR PRODUCTS AND EXPERIENCE – INTRA-INSTITUTIONAL

Purpose: To review and discuss what web-based programs/products have been developed (e.g. using gotomeeting.com, webinar.com, Adobe Acrobat Connect Professional) and share experience, strengths and weaknesses. This is both for the degree program and in continuing education. In this session the focus is *intra-institutional*. In the next session it is *inter-institutional.*

Moderator: *Ricardo Fujikawa, DC MD, Head of Chiropractic Studies, RUC Maria Christina, Spain*

2:00 – 3:30 PM

Introduction and Overview

Don Petersen, Jr. BS – MPA Media and Dynamic Chiropractic, USA – *20 minutes*

Presentations from Abstracts

Three 10 minute presentations selected from abstracts submitted:

1. **Peter Miller, DC** (Anglo-European College of Chiropractic) - *Introducing Web-based Resources to the Anglo-European College of Chiropractic*
2. **Richard Ruegg, BSc PhD DC**, Ann Taylor-Vaisey, BA MLS, Dean Wright, DC (Canadian Memorial Chiropractic College) - *Translation of Clinical Practice Guidelines in a Teaching Clinic Using Adobe Connect*
3. **Patrick Sim, BSc MChir** (Chiropractors' Association of Australia) - *The Strategic Use of Technology for Installing Wellness Programs in Australian Chiropractic Colleges*

Audience Discussion – 30 minutes

NUTRITION BREAK – 30 MINUTES

SESSION FOUR — WEB-BASED SEMINAR PRODUCTS AND EXPERIENCE – INTER-INSTITUTIONAL

Purpose: To review and discuss what web-based programs/products have been developed (e.g. using gotomeeting.com, webinar.com, Adobe Acrobat Connect Professional) and share experience, strengths and weaknesses. This is both for the degree program and in continuing education. In this session the focus is on what products/courses exist from other institutions and sources, for i*nter-institutional* use.

Moderator: *Jon Schwartzbauer, DC, President of Sherman College of Straight Chiropractic, USA*

4:00 – 5:30 PM

Keynote Presentation: A Case for Learning Chiropractic Technique Assisted by a Web-Based Lecture Series: Principles and Practical Aspects

John Faye, DC, USA – *20 minutes*

Presentations from Abstracts

Two 10 minute presentations selected from abstracts submitted:

1. **Sharyn Eaton, DC PhD, *Ramon Fernandez Caamano, PhD*** (Macquarie University) and Dennis Richards, DC, private practice, Australia – *The Utilization of Web 2.0 Technologies to Facilitate Change and Promote a Research Culture within the Chiropractic Profession.*
2. **Dennis Richards, DC,** private practice, Australia, Sharyn Eaton, DC PhD, Ramon Fernandez Caamano, PhD (Macquarie University) – *Facilitating a Change in the Approach to Health: The Utilization of Technologies to Promote 'Chiropractic Plus', a Part of CAA's Wellness Initiative*

Panel and Audience Discussion – 45 minutes

What Barriers and Opportunities have been Identified? How Should Institutions Collaborate?

Day 2 — Tuesday November 11, 2008

SESSION ONE - SEARCHING AND REVIEWING THE LITERATURE – ALONE AND WITH OTHERS

Purpose: Discuss literature search engines and technology, and the use of chat rooms/blogs/group forum, at all levels of institutional and continuing education.

Moderator: *Carl Cleveland III, DC, President, Cleveland Chiropractic College, USA*

8:30 – 10:30 AM

Keynote Research*: FCER's DC Consult Website – Translating Research into Practice*
Reed Phillips, DC PhD, Chair FCER Education Committee – *30 minutes*

Keynote Presentation*: Searching the Scientific Literature*
Ron Rupert MS DC. Dean of Research, Parker College of Chiropractic– *30 minutes*

Presentations from Abstracts

Two 10 minute presentations selected from abstracts submitted:

1. **John Zhang, MD PhD,** Rodger Tepe, PhD (Logan) - *Library Online Supports University Research Activity*
2. Rachel Morgan, **David Byfield, DC MPhil** (Glamorgan) - *Talislist – An Online Reading List at the University of Glamorgan to Facilitate Learning*

Audience Discussion – 30 minutes

NUTRITION BREAK – 30 MINUTES

SESSION TWO - TECHNOLOGY IN ASSESSMENT OF STUDENT STUDY METHODS, ACHIEVEMENT AND LEARNING OUTCOMES

Purpose: Hear from teaching institutions and examination boards and regulatory bodies on current methods of discovering study methods (e.g. VARK) and assessing achievement and learning outcomes.

Moderator: *Kenneth Vall, DC, FCC, MA(Ed), FHEA, Principal, Anglo-European College of Chiropractic, UK*

11:00 – 12:30 PM

Introduction and Overview

Martin Kollasch DC MBA Director of International Services, NBCE – *15 minutes*

Presentations from Abstracts

Four 10 minute presentations selected from abstracts submitted:

1. **Mark Christensen, PhD** (NBCE) - *Technology & the Assessment of Student Achievement & Learning Outcomes*
2. **David Byfield, DC MPhil** (Glamorgan) - *Technology & Psychomotor Skill Assessment & Progression*
3. Thomas Bergmann, DC **Glori Hinck, RD MS DC** (Northwestern) - *Assessment of Online Learning in a Chiropractic Technique Course*
4. **Robyn Bierman, MB BS (Hons) MHPEd,** Aron Downie, BSc, MChir (Macquarie) - *A Curriculum Mapping Database to Meet the Learning & Teaching Demands of Chiropractic Training*

Audience Discussion - 30 minutes

LUNCHEON 12:30 – 2:00 PM

SESSION THREE — THE IMPACT OF ELECTRONIC MEDICAL RECORDS, DIGITAL X-RAY AND OTHER SPECIFIC TECHNOLOGIES ON EDUCATION

Purpose: To share experience, and discuss the significant implications, of introducing EMR, digital x-ray and other specific technologies in educational institutions.

Moderator: *Charmaine Korporaal, M Tech Chiro, Head, Department of Chiropractic, Durban University of Technology, Republic of South Africa*

2:00 – 4:15 PM

Keynote Presentation: Introducing EMR in Chiropractic Education – Impact on the Educational Process:
Larry Stolar, DC, Dean of Clinics, Parker College of Chiropractic, USA – *15 minutes*
Keynote Presentation: Introducing Digital X-ray Systems in Chiropractic Education - Impact on the Educational Process
Gerard Clum, DC, President, Life College of Chiropractic West – 15 minutes
Presentations from Abstracts

Three 10 minute presentations selected from abstracts submitted:

1. **Jeffrey Cooley, DC DACBR** (Murdoch) - *Digital Imaging: More Than a Clinical Tool*
2. **Kristin Grace, DC** (Glamorgan) - *Conversion to Computed Radiography at the Welsh Institute of Chiropractic (WIOC) & Integration to a PACS System for Data Storage & Sharing*
3. **David Wickes, DC PhD** (Western States) – *Virtual Microscopy Can Replace Light Microscopy in Chiropractic Education*

Audience Discussion

PRESENTATIONS BY CHIROPRACTORS' ASSOCIATION OF CHINA

Anli Dong, DC, President

Roger Hinson, DC, Secretary

Ferida Khanjani, DC, Member

CLOSING REMARKS

Carl Cleveland III, DC, President, Association of Chiropractic Colleges

Gerard Clum, DC, Past President, World Federation of Chiropractic

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WFC/ACC EDUCATION CONFERENCE ON TECHNOLOGY

November 10-11, 2008, Beijing, China

CALL FOR ABSTRACTS

This document and all documentation for the WFC/ACC Education Conference may be found at www.wfc.org.

Representatives of chiropractic educational institutions, chiropractic associations and others are invited to submit short, summary papers (500-1000 words) for presentation at a conference titled *Chiropractic Education in an Era of Digital Natives and Digital Immigrants: How to make the Successful Transition to 21st Century Technology*, to be held at the Jiu Hua Spa and Hotel, Beijing, China, November 10-11, 2008. The Conference is sponsored by the World Federation of Chiropractic (WFC), the Association of Chiropractic Colleges (ACC), the International Board of Chiropractic Examiners (IBCE) and the Foundation for Chiropractic Education and Research (FCER).

These presentations, which will be given orally and will form the basic subject matter of the meeting and its discussions, are to be submitted in one or more of the subject categories listed below. Before preparing a paper, and to obtain a full understanding of the purposes and content of the meeting, please read the Notice of Meeting and Program. (*If you have not received these, they may be found at* www.wfc.org.)

As explained in the Notice of Meeting, the WFC/ACC Education Conference, a WHO Congress on Traditional Medicine/Complementary and Alternative Medicine, being held at the same venue November 7-9, 2008. Many delegates will be attending both meetings.

Categories of Presentation. Papers should be submitted in one of the following categories:

1. *Applications of Course Management Software*. Four papers will be selected for presentation in Session 1, Day 1 (Monday). Papers submitted should discuss experience at chiropractic educational institutions and/or other educational programs in the use, benefits, limitations and potential of different kinds of technology (e.g. Blackboard, Edufolio) that provide the digital interface between faculty and students.
2. *Applications of Graphic Technologies and Materials for Instructors.* Four papers will be selected for presentation in Session 2, Day 1. Papers should discuss available technologies and materials (e.g. podcasts, video and sound clips) and innovative and successful ways in which they are being applied.
3. *Web-based Seminar Programs/Products and their Applications – Intra-Institutional.* Four papers will be selected for presentation in Session 3, Day 1. Papers may share experience, successes and weaknesses in the use of web--based programs/products (e.g. using Gotomeeting.com, webinart.com, Adobe Acrobat Connect Professional). Papers may address experience in either the degree program or continuing education. This category focuses on i*ntra-institutional* use (for inter-institutional use – see next category).
4. *Web-based Seminar Programs/Products and their Applications – Inter-Institutional.* Four papers will be selected for presentation in Session 4 Day 1. Papers may share experience, successes and weaknesses in the use of web--0based programs/products (e.g. using Gotomeeting.com, webinart.com, Adobe Acrobat Connect Professional). Papers may address experience in either of the degree program or continuing education. This category focuses on *inter-institutiona*l use.
5. *Methods of Searching and Reviewing the Literature.* Five papers will be selected for presentation in Session 1 on Day 2 (Tuesday). There are now many online literature search engines and technologies and there is much use of chat rooms/blogs/group forums. Papers should address any aspect of this subject, and at any level of institutional or continuing education.
6. *Applications of Technology in the Assessment of Student Study Methods, Achievement and Learning Outcomes.* Four papers will be selected for presentation in Session 2, Day 2. These may explore the use of technology for helping faculty and students to understand student study methods (e.g. VARK) or the use of technology in assessing achievement and learning outcomes.
7. *The Impact of Electronic Medical Records, Digital X-ray and Other Specific Technologies on Education.* Three papers will be selected for presentation in Session 3, Day 2. Many new specific technologies are being used in educational settings including for example EMR and digital x-ray. Papers should share experience and discuss implications of introducing such specific technologies in educational institutions.

Deadline for papers. June 30, 2008.

Notification of acceptance. Authors of papers selected for presentation will be advised by July 31, 2008.

Publication. Papers will be published in the written proceedings of the conference, and will be available for all participants at the time of the conference.

Paper length and submission instructions. Papers should be between 500 and 1000 words in length. Use the following form to submit your paper directly to the WFC Secretariat by e-mail.

A printable online version of the paper application form has been provided in Adobe Acrobat (.pdf) for your reference. To download the form, please click here. **Please remember that you must submit your paper by e-mail**.

Please list all authors, including degree(s), institution/organisation, and contact information. Please note who will be the presenter.

Submissions will be only accepted by e-mail.

If you have any questions, please direct these in the first instance to Linda Sicoli at the WFC at education@wfc.org.

Completed papers must be received at the WFC secretariat via e-mail by June 30, 2008.

*Please type all information to ensure an accurate listing in the Program and Index of the Proceedings. Fields marked with an asterisk are required. Do not capitalise the title, only the first letter of each word, and state all authors' names, degree(s) and addresses.

Be sure to click on the "Submit" button when you are finished.

Paper Title*	
First Author*	
Organisation/Institution*	
Address*	
State/Province*	
Postal/Zip Code*	
Country*	
Telephone*	
Fax*	
E-mail*	

Paper Title*	
Second Author*	
Organisation/Institution*	
Address*	
State/Province*	
Postal/Zip Code*	
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Telephone*	
Fax*	
E-mail*	

Paper Title*	
Third Author*	
Organisation/Institution*	
Address*	
State/Province*	
Postal/Zip Code*	
Country*	
Telephone*	
Fax*	
E-mail*	

Presenter*	

Choose the category that best fits your subject. *	

Please enter your paper in the box below.

Submit your paper	Clear

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Notice of WFC/ACC Education Conference 2008

June 20, 2008

This notice and all other documentation for the meeting may be found at **www.wfc.org.**

Title

Chiropractic Education in an Era of Digital Natives and Digital Immigrants: How to Make the Successful Transition to 21st Century Technology

Location

Hotel Jiuhua Spa and Resort, Beijing, China

Dates

Monday November 10 and Tuesday November 11, 2008

Follows WHO Congress and Symposium on Manual Methods of Health Care – November 7-9, 2008 – see below. For details see of this go to www.wfc.org/WHOBeijingSymposium

Program Directors

David Byfield, BSc(Hons) DC MPhil, FCC(Ortho), Head, Welsh Institute of Chiropractic, University of Glamorgan, Wales.

Gerard Clum, DC, President, Life College of Chiropractic West, Hayward, California, USA.

Phillip Ebrall, BAppSc(Chiropractic), PhD, FICC, FACC, Associate Professor of Chiropractic Education and Head, Division of Chiropractic, RMIT University, Melbourne, Australia.

Ronald Rupert, MS, DC, Professor & Dean of Research, Parker College of Chiropractic, Dallas, Texas, USA, Editor-in-Chief, MANTIS.

Subject matter. This Conference is to review new and emerging web-based and other teaching aids and technologies and how they can be used to enhance chiropractic education and continuing education. Today students are 'digital natives', at ease with use of new technologies. Most faculty members are 'digital immigrants', working hard to identify, understand and apply new technologies. This conference is for all of us whether natives or immigrants.

Location: Beijing, China. Beijing has been chosen so that the Conference may be combined with the WHO Congress on Traditional Medicine which is being held at the same venue from November 7-9, 2008. This Congress includes a WHO Symposium on Manual Methods of Health Care organized and hosted by the World Federation of Chiropractic. For all information on the Congress, including the draft program for the Symposium, go to www.wfc.org/WHOBeijingSymposium.

WFC/ACC Conferences normally run for three days. This year, because of the WHO Congress, the Conference is reduced to two days. The proposed timetable is:

- **Friday November 7 to Saturday November 8** – WHO Congress, including Symposium on Manual Methods of Health Care.
- **Sunday November 9** – rest day – optional visits to traditional Chinese medicine (TCM) hospitals, including Wangjing Hospital of the China Academy of TCM, and tours to Great Wall and in Beijing.
- **Monday November 10 and Tuesday November 11** – WFC/ACC Conference

Goals

- To review new web-based and other teaching technologies and products relevant to contemporary chiropractic education.
- To understand how they influence teaching and learning methods for faculty and students and the behavioral and technical challenges involved.
- To understand how new technologies and products can be used effectively in chiropractic education.
- To identify areas of collaboration and common purpose for institutions – e.g. collaboration on the creation and use of computer or web-based learning modules in subject matter that is consistent across all program curricula (e.g. chiropractic history, ethics, biomechanics, basic examination procedures, basic treatment procedures, etc.)

Methods

As at previous WFC/ACC education conferences, a combination of:

1. **Lectures**. Invited lectures in key areas.

2. **Paper Presentations**. Many short presentations (10 minutes) from speakers selected from individuals responding to the Call for Abstracts. Subject areas are indicated in the program and Call for Abstracts. These presentations will give

   examples of how specific technologies/products are being used – successes, problems, innovations and impacts on faculty and students.

3. **Discussion**. There will be ample opportunity for discussion through the use of panels and discussion time.

4. **Final plenary session**. A closing session with panel and audience discussion to review what has been learnt and look to the future.

Program Summary

Consult the program. This gives the name and describes the purpose of each session. The various sessions are designed to cover all aspects of technology relevant to any aspect of chiropractic education, whether in the degree program or in continuing education.

Who should attend?

This will be a technical meeting on chiropractic education – not only at undergraduate level but also in postgraduate and continuing education. It is therefore targeted not only at leaders and faculty members from chiropractic colleges, accrediting agencies and examining and licensing boards, but also representatives of chiropractic associations and others interested in continuing education opportunities.

Language

The principal language for the meeting will be English.

The Program

See the draft program

Call for Abstracts

See the Call for Abstracts

Accommodation and Travel

The Jiuhua Spa and Resort, an extensive convention complex to the north of Beijing with famous indoor, outdoor and private natural hot spa waters, will host the convention. This venue was chosen because the WHO Congress is being held there.

The WFC has reserved a block of rooms for delegates in the Grand Palace or 15th District Building. Special rates, inclusive of breakfast and lunch and all taxes, have been

negotiated, ranging from RMB 970 (US$142) for a standard double room with single occupancy to RMB1,540 (US$225) for a suite with double occupancy. See the registration and hotel booking form (a separate document at this website) for details and to make reservations. Visit the website to view facilities.

Jiuhua Spa & Resort
Chang Ping Xiao Tang Mountain
Beijing 102211, China
Tel.: (+86) 10 6178 2288 Fax: (+86) 10 6178 2246
Web: www.jiuhua.com.cn

Transfers from Beijing International Airport to the Jiuhua Spa & Resort by shuttle bus are being provided for delegates who arrive on Thursday November 6, prior to both the Conference and the WHO Congress. That day there will be hotel staff at the airport arrivals area after you pick up your luggage. Taxis are also plentiful and inexpensive, and the fare is approximately RMB120(US$17) for the 40 minute trip to the hotel. Those arriving after November 6 should travel to the hotel by taxi.

Every day a complimentary hotel shuttle bus service operates between the Jiuhua Spa & Hotel and the nearest subway stop every 30 minutes, for those wanting to visit central Beijing. Taxis for this 15 minute trip are approximately RMB35 (US$7). The subway system is new, safe and easy to use with all information given in Chinese and English. The subway trip to central Beijing and Tiananmen Square takes 40 minutes

Registration

Registration fees are:

North America/Europe/ Australasia	
Educational Institutions and Organizations	
First representative	US$595
Second and subsequent representative(s)	US$395
Other individuals	US$395
Other World Regions – e.g. Africa, Eastern Mediterranean, Latin America	
Educational Institutions /other Organizations	
First representative	US$395
Second and subsequent representative(s)	US$295
Other individuals	US$395

These fees entitle delegates to attend the WHO Congress also.

VISAS

Tourist visas can be obtained at Chinese embassies and consulates worldwide. Please ask the Chinese embassy or consulate in your country whether or not you need a visa and, if you do, what you should do and how long this procedure will take. You may also visit the following website: www.chineseembassy.com which contains a complete list of Chinese Embassies around the world and China Visa Information. Visa application forms can be downloaded from this website. In Canada, home of the WFC, a tourist visa can be obtained within 4 business days of filing the application, and without need of any invitation from China. You must, however, enter China within 3 months of the date of issue of the visa.
Should you in your country need an official invitation letter, please contact the WFC - Lorraine Rhoden at lrhoden@wfc.org.

Climate

The climate in Beijing in early November is not extreme, but may be cold during the day and at night. Delegates should pack warm clothing and a raincoat/overcoat.

Currency and Shopping

At the present exchange rate there are approximately 7 Chinese Yuan to the US dollar. Prices for most products and services, including clothing, are comparatively low in China and you may well want to leave time for shopping.

Pre and Post-Conference Tours

For those interested, guided tours of Beijing and surrounding areas at additional cost are being organized through the Beijing Jiuhua Travel Service. These include 3 separate day tours (featuring, for example, the Great Wall, Ming Tombs, Forbidden City, temples, Olympic venues, shopping) and post conference 2 and 3 day tours (e.g. Xian and terracotta warriors, Shanghai and district). See the separate tours information and registration form. Day tours can be booked one day in advance while at the conference from the travel desk in the hotel. Longer tours, which require airfare bookings, must be booked at least one week in advance.

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NBCE NATIONAL BOARD OF CHIROPRACTIC EXAMINERS

IBCE INTERNATIONAL BOARD OF CHIROPRACTIC EXAMINERS

FCER Foundation for Chiropractic Education and Research

Program Presentations

These are given in the order that they were presented at the conference. Please refer to the conference program at the beginning of these proceedings.

"A New Road Map, Step One--Point of Origin: A Report of a Survey of Technologies Being Used By Chiropractic Institutions."

Joe Ferguson, MS, DC, CCSP
Dean of the College
Life Chiropractic College-West
Hayward, California USA

"Eventually, teachers and administrators will have difficulty defending traditional pedagogies from the challenge of new perspectives toward learning."

"Future Learning Landscapes:

Transforming Pedagogy through Social Software"

Catherine McLoughlin and Mark J. W. Lee

Innovate, Innovate 4 (5), 2008

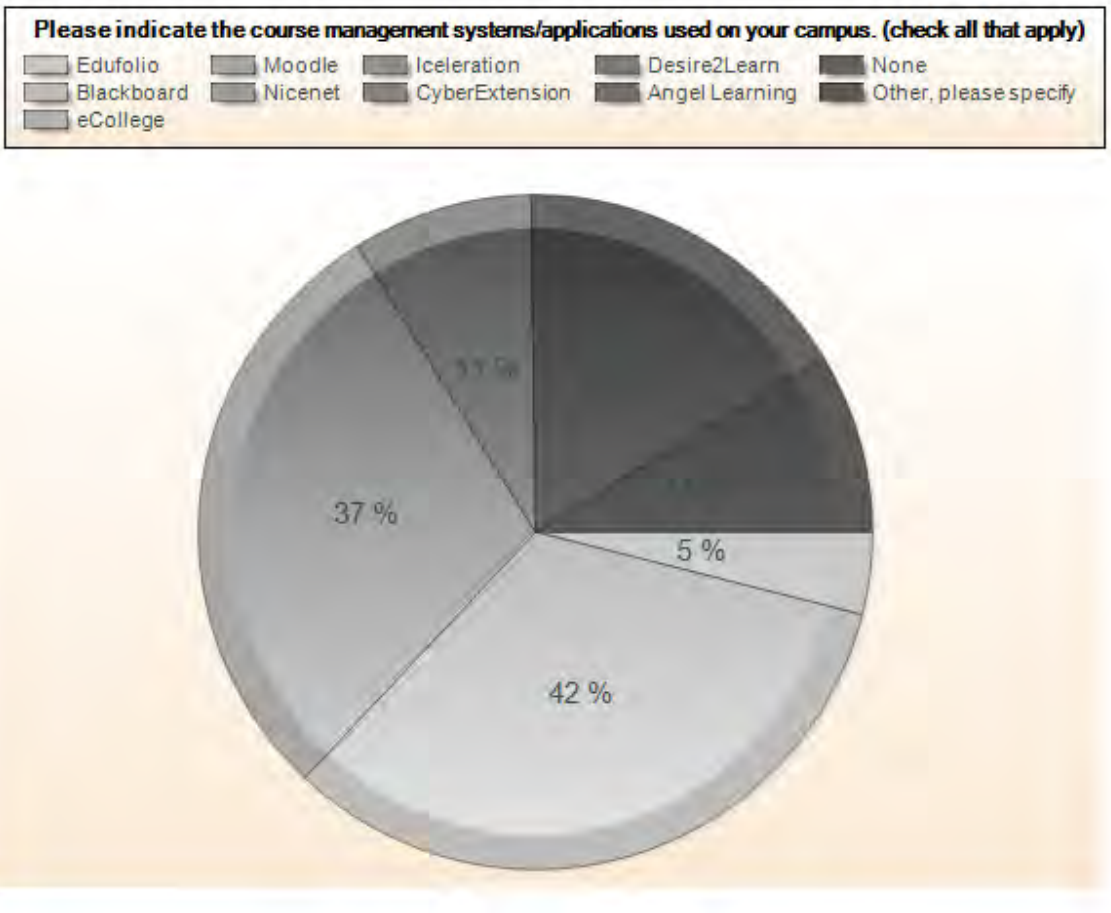
The first step in getting directions to any location is establishing a starting point. With that concept in mind, a survey was sent to all WFC-ACC colleges to determine exactly, as far as technology is concerned, where we currently stand.

The survey was administered in two parts. Part 1 consisted of 31 questions and was concerned with determining how technology is being used in chiropractic colleges--this was not limited to educational technology, but considered any technology used (records keeping, security, etc.). Areas evaluated included:

- Comprehensive campus management systems
- Course management software
- Areas in which online classes were offered
- Online content as part of hybrid classes/blended learning
- Electronic medical records
- Imaging systems and applications
- Computerized balance training and rehab
- Patient education
- Office suites and publishing applications
- Email and emergency notification systems
- Social networking sites and software
- Video capture
- Library and research software
- Assessment software
- Collaborative writing software
- Computer or web-based faculty development
- Web design and updates

An evaluation of the survey results was performed to determine which of these technologies, as well as which specific applications, are being used. This gave us an indication of the percentage of chiropractic institutions currently using technology in several different areas of education and administration. It also revealed which applications institutions were using in each area. The use of proprietary vs. open source software was also determined.

For instance, at the time of this writing we know that 79% of colleges responding are using some form of course management system (CMS). Of those colleges, 42% are using Blackboard and 37% are using Moodle (see below). From this we see that most chiropractic colleges are providing some content online, and that the use of proprietary vs. open source CMS software is nearly evenly split. Collaboration and inter-collegiate faculty development may be facilitated with this information.



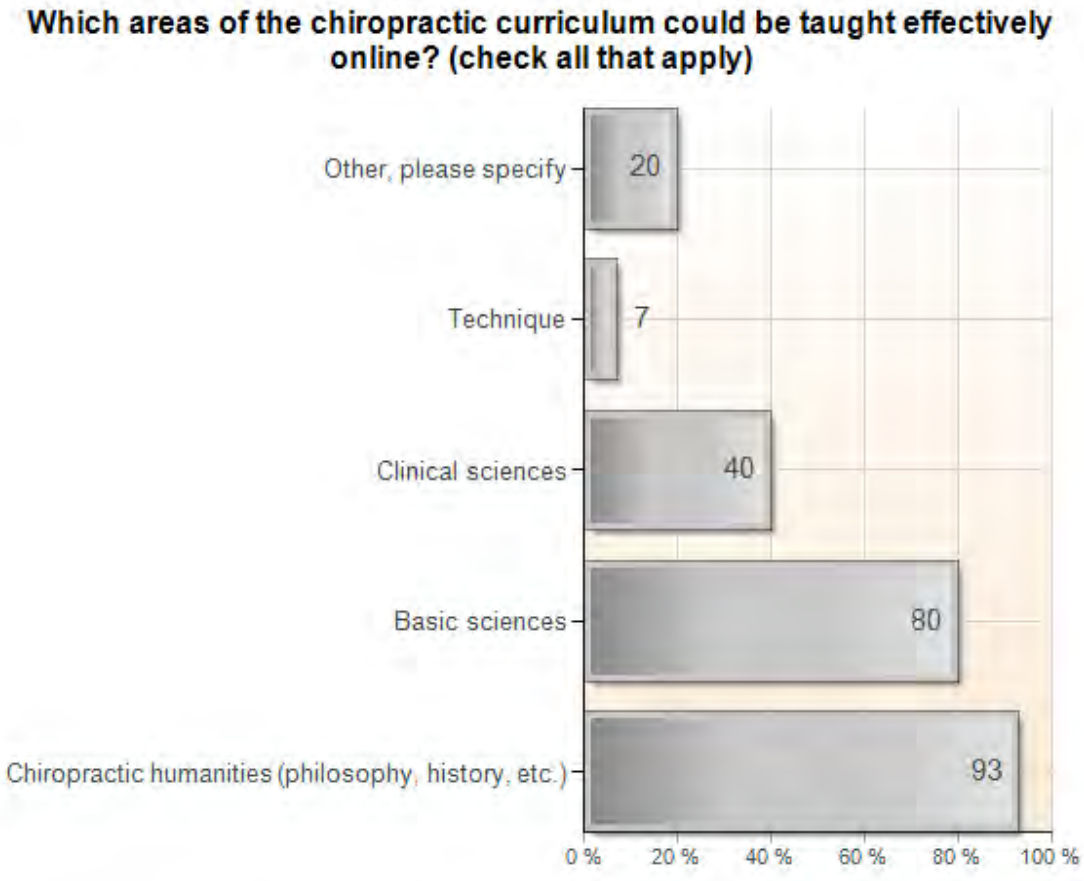
Part 2 of the survey consisted of 25 questions designed to evaluate administrative attitudes toward the integration of educational technology into the chiropractic curriculum. Survey questions were yes/no, Likert style, and fill-in The areas evaluated included:

- Quality of online vs. onsite instruction
- Effectiveness of online classes

- Appropriate and inappropriate areas of online instruction

- Importance in the chiropractic curriculum (instruction, student expectation, competitiveness with other institutions, etc.)
- Use of online content in developing clinical reasoning
- Use of online content to prepare students for technology in practice and continuing education
- Perceived barriers to implementing online classes
- Responsibilities of the institution in implementing online content/classes

An evaluation of the survey results revealed some of the perceived objectives, roadblocks, and concerns about integrating technology in chiropractic classrooms and/or offering some education exclusively online. For instance, when asked which areas of the chiropractic curriculum could be taught effectively online, most respondents felt chiropractic humanities (philosophy, history, etc.) could be taught online, but fewer believed clinical sciences could be taught online (see below).



While similar studies have been performed at institutions of higher education throughout the world, this survey was specfically designed to evaluate technology usage and administrative attitudes at chiropractic institutions. As mentioned previously, the results of this study serve as a starting point for greater exploration into the possiblities and benefits of technology within chiropractic institutions. Chiropractic is a unique profession and

therefore has unique educational needs that must be taken into consideration before adding or changing current practices.

What is not unique about the students entering our colleges, however, is that they largely come from a generation of people who expect technology to be a part of nearly every aspect of their lives, including their education. Meeting student expectations is part of what leads to greater student satisfaction. Students who are satisfied with their educational experiences are more motivated and more likely to complete the program, injecting the profession with well-prepared and enthusiastic new doctors. In order to meet the needs and expectations of chiropractic students we must consider how techonology fits into our curriculum and clinical training as well as how it can enhance administrative procedures such as registration, notifications, grade reporting, etc.

It may be relatively easy to determine how or where technology can be incorporated into our institutions, but without administrators, faculty, and staff who are enthusiastic and appropriately trained to implement it, even the best technology will be rendered impotent. The second part of this survey, therefore serves as an attitudinal starting point.

Once we understand our own perceptions of technology in general and our concerns, desires, and goals for technology in our institutions, we can choose an appropriate course for further investigation, training, and collaboration. This will allow us to make educated technological decisions and give us the best possible opportunity to successfully implement new technologies into our colleges.

Course Management Systems in Higher Education

Introduction and Overview

Haydn Blackey

Deputy Head of CELT and Head of Innovations in Learning and Teaching

Centre for Excellence in Learning and Teaching

David Byfield

Head of Division – Chiropractic & Head of the Welsh Institute of Chiropractic

University of Glamorgan

Course management systems (CMS) are not a new concept as early forms were being used in the USA in the early 1980's. An example of this goes back to the era of Lotus Notes (an early e-mail system) which Lotus adapted to create Lotus Learning Space. IBM was using this at the time and focus of training staff (by this time IBM had bought Lotus) was clearly on delivery of content. Computer scientists who developed these systems were more interested in the efficiency of the system (ie hardware and software) and were less concerned about the people who used them.

The case we are making in this presentation is that any technological advancement in learning and teaching needs to be designed around **the learner**. So, in essence, we have pedagogy of "*technology enhanced learning*". Therefore, as educators we should be contributing to this pedagogy, as they need to reflect on the application of the approaches to learners in their context – i.e undergraduate chiropractic education and the various levels of this type of integrated, professional and graded learning structure.

All the content management systems embed a pedagogic approach which they have chosen. This approach, often from computing science, may not be appropriate for other disciplinary expectations. The challenge is to develop learning opportunities which enhance the learner's experience. Thus moving us from discussions of which CMS to use, to discussions about the most effective way for learners to engage with the discipline practice at a time when we are in a era of rapid change. This is particularly relevant as students no longer trawl through library stacks but prefer to learn with each other around the PC or in fully immersive sits online (ie Library in Second Life).

As educators, we should not start to believe that just adding technology is going to solve all the problems of learning and learning design as it will definitely will not. The technology may be fascinating, but it is the learning that should be the focus and how the student engages. In a sense one of the key tests for the abstracts in this section will be if the focus is on the course and the learner or primarily on the technology. Hopefully it will be the former, but this may be a challenge to these authors and the delegates to listen carefully to the presentations and determine this differentiation and reflect on the outcome during the discussion period.

The concept behind much learning through technology links back to an older pedagogic premise, that which suggests that people learn best in collaboration with each other. The key authors in this area – Dewey and Vygotsky – suggest that we create and understand the world through socially mediated processes of knowledge construction. This is either enhanced or made more difficult by the processes which support learning. They argue that learner-centricity is central to good learning. i.e. we design learning with the learners and their learning processes firmly in mind. John Dewey, a believer in what he called "the audacity of imagination," was one of the first national figures in education policy. He rejected the notion that schools should focus on repetitive, rote memorization. Instead he proposed a method of "directed living" in which students would engage in real-world, practical workshops in which they would demonstrate their knowledge through creativity and collaboration. Students should be provided with opportunities to think from themselves and articulate their thoughts. Lev Vygotsky pioneered research in learning sciences and made a strong argument for the need for students to demonstrate their knowledge by creating explanations and interpreting their work for others. To Vygotsky, teachers served as mediators who coached and encouraged students to formulate their own level of understanding. Each student has a base level of knowledge, but they can increase it by practicing what they know well and adding onto it. The social interaction between the student, teacher and other students reinforces their increase of knowledge.

Moreover, the concept of resource-based learners is central to social constructivism as it allows learners to learn in their own way. i.e. we provide resources for learning, but the way the learners make sense of these things will be different in each case and dependent upon the subject matter they are attempting to master. This will have particular relevance for the clinical sciences and the complexity of the learning and critical thinking required to manage a patient's healthcare.

The World Wide Web has liberated resource based learning. Now educators do not have to create their material from scratch each time the wish to teach. Rather they take on the role of researchers and focus on their ability to point their students towards appropriate resources. Many institutions of higher learning (including the University of Glamorgan) have a policy of sharing content, so that people across the world can benefit from it. The whole focus now is not on the content of the resources, but on the way we as educators can enable the students to find, analyse and critically reflect on the resources. This is a fundamental concept underpinning Evidence Based Practice. Notwithstanding, learning becomes learner-centric when we offer different approaches to learning the same thing to students with different learning styles and backgrounds. This is why the role of research in Higher Education is so essential; academics do not have to cut and paste the work of others, rather they can discover it and provide a route map for the students to follow.

Furthermore, the way we access and process knowledge has changed dramatically. The fact that one daily newspaper has more information in it than a person in the 17th century might have encountered in their life – changes the dynamic for learners. It means if we design

courses in CMS once and hope they will last we are going to be clearly disappointed. For example, in the USA 50% of current jobs did not exist a decade ago. We are preparing learners for a world we can't picture and this has contextual relevance for the primary health care practitioner in a changing healthcare environment. Using resource-based learning in a web environment is giving our students skills for life rather than knowledge which will quickly date. This is clearly an issue in the rapidly changing health care world of a primary care practitioner. So the focus becomes research skills so they can discover new things for themselves, not the lecturer repeating material and them learning it by rote. If this were the case, students would have to return to their institution to study every two to three years as things change. Practitioners become quickly outdated which reinforces the need for structured continuing professional development.

Then there is the issue surrounding "e" learning and what "e" can do. It is the Information Systems determinist view of learning that many have argued against because there are the e-elements of learning, but are students learning at all? People simply learn from each other by sharing and collaborating not by sitting or listening and the University of Glamorgan's Researchers Site on Facebook is a very good example of this learning environment.

In the UK, the Joint Information Systems Committee (JISC) has done a lot of research into learning through technology. They have reported a key point from their investigations – learners don't see 'e' as different or special, it is part of the important mix. This confirms what we have been doing at Glamorgan with the focus on the blend of activity and not just the 'e' content.

Vaughn and Garrison (2005), two Canadian researchers make the point so well. Good learning is about re-designing learning to make the most of the CMS and web-resources, but not to lose the huge benefits of face to face. This is particularly pertinent in chiropractic education and an easy case to make as students must interact with people as well as use the technology, for example in their outpatient clinic training experience. This supports the rationale that got Glamorgan into Blended Learning because the university believes it will enhance learning and get academics to reflect more on their learning and make it student centric.

It has been muted that CMS's are about to disappear. We have spent a lot of time developing delivery technologies, well now through Web 2.0 (this is sometimes called the social web or social networking) technologies are appearing in the hands of our learners which are more flexible than CMSs. Instead we have personal learning environments on our PDA, Blackberry, mobile phone. A student can now work at his/her work desk with his Blackberry and integrate multiple sources together. This is the thinking behind Glamorgan's Portal Project. It is designed to include the student's social engagement with the University alongside their education ones. *Creating one stop shops for learning.* So the CMSs are great for now, but future technology will take us further.

So today we can look at what CMSs can do for the learner – as long as we focus on the

learner not the technology, but we face interesting times – when the convergence of new personalised approaches to learning (UK Government now insist on personalised learning in primary education) are met by new personal technology – blogs, wikis, podcasts, social networks (like Facebook) to create a brand new challenge to educators to move beyond the CMS.

This presentation will function to set the stage for the following group of abstracts and provide background and questions to consider for the following discussion.

Reference:

Vaughn N & DR Garrison (2005) Creating cognitive presence in a blended faculty development community. The Internet and Higher Education, Vol 8 Issue 1, Fist Quarter, pp. 1 – 12.

The Digital Bridge – A Tale of One Dinosaur's Experience Integrating CMS Technology with Classroom Instruction

Michael W. Shreeve, D.C., L.C.P.
Palmer College of Chiropractic Florida

Background:

Universities are exploring the use of online learning and Course Management Software systems (CMS) in their instructional methodology to meeting the distinctive learning needs posed by the student population from Gen Y, or the Net Generation community.[1] The Net Generation (1980-1994) became digital natives in a world immersed with technology incorporating personal computers, the Internet, Instant Messaging, file downloading and gaming. University faculty, predominately Baby Boomers (1946-1964), are being challenged with using technology to meet the preferred learning, communication, and educational methods of these digital natives.

A chiropractic college was established as a digital campus enabled for wireless technology and using a course management software (CMS) system. As a 'digital dinosaur' from the Boomer generation, I evaluated the use of CMS technology to supplement traditional instructor-driven lectures.

Objective:

This paper discusses using a CMS system to augment traditional classroom instruction in the context of meeting the learning needs of Gen Y students. Cluett and Skene characterize Gen Y students as being familiar with the Internet, instant messaging and downloading, requiring choices in everything, wanting 24 x 7 responses to questions, believing technology can solve most problems, and prefer almost any method other than simply being "taught".[2]

The following questions are explored in discussing the benefits, challenges, and potential in using a CMS system as part of educational pedagogy:

Is CMS a good vehicle for authentic case investigation to produce a better quality critical thinker?

Is college administration prepared to provide the training, infrastructure, and support required by digital technology?

Methods and Processes:

WebCT 4.0 was used as the course management system for all courses and then was transitioned to Blackboard's WebCT 6 Instructional Design Learning System. I developed six courses using the same layout, function, and CMS tools for course materials, communications, assessments/surveys, and a grade book.

Course materials included topical learning modules, a syllabus, course calendar, and assignments. A learning module included the lecture outline, links to external learning resources, assignments, formative Web-based interactive learning games, and assessments within the CMS system. The course calendar was populated with key deliverable dates, exam dates, campus closings, and assignments. Assignments were released at the appropriate time in the term. Students submitted assignments either via the CMS system or in a traditional paper format.

Communications tools included pop-up announcements, discussion forums, and course e-mails. Students were greeted on the first day with a brief welcome message guiding them to review key areas of the course site. Pop-up announcements were used for items requiring immediate student attention.

Discussion forums were used for small group projects to facilitate collaborative learning, along with a discussion forum to share information with the entire class. The CMS system's e-mail function was used for course-specific communications.

The CMS system's assessment function was used to administer examinations. Technological challenges from system compatibility issues necessitated a change to traditional paper-based examinations. Anonymous student surveys for feedback about learning activities were conducted. This feedback was used for course modifications to improve the learning experience.

The grade book was used to communicate grades. Grades were promptly released to students after item analysis.

Results:

Three factors contributed to student utilization of CMS technology. Utilization was highest when 1) they were rewarded for using Web-based course tools, 2) the instructor facilitated student feedback and collaborative learning, and 3) the institution provided support and training.

Gen Y students require concrete forms of motivation to use and accept new instructional pedagogies brought about by technology.3 Students are highly motivated to use CMS course tools that directly correlate to a course grade. Student use of Web-based formative learning games was highest when there was a point incentive towards their course grade. In contrast, when there was not a grade point incentive associated with using formative learning games, student utilization was minimal.

Students are motivated when they receive confirmation of mastery of learned concepts. The immediate feedback that is provided from on-line assessments or quizzes gives students a regular check of their progress. These evaluations must also provide corrective feedback to help students understand what they have yet to learn.4 Positive feedback encourages students to reach out for another positive event and continue to use Web-based tools.

Three factors influenced student participation in the CMS system surveys. Response rate was highest when 1) the survey provided for student reflection of the learning, 2) the purpose was explained by the instructor, and 3) the instructor explained how the feedback would be used to improve course materials. Response rate was minimal when a survey was used to gather the same information without verbal discussion and explanation from the instructor.

Group discussion forums were most extensively accessed by students when associated with case-based group exercises with instructor facilitation.

The transition from WebCT 4.0 to Blackboard's WebCT 6 Instructional Design Learning System posed challenges in the areas of training, technology infrastructure, and sufficient 24 x 7 technical support.

Faculty members were trained using online training modules. Faced with heavy workloads and a shortened migration timeline, many faculty members only used the

syllabus and grade book in the new system. Diminished faculty utilization of the system resulted in diminished student utilization and perception of its usefulness in their educational process.

Technical hardware and software incompatibility resulted in users experiencing frequent and extended periods of slow system response creating barriers to utilization.5 Limited IT support staff was unable to provide the 24 x 7 support expected by Gen Y students. Once confidence in the system has been compromised, it is difficult to gain acceptance and utilization.

Conclusion:

Implementing a CMS system can function very much like taking a patient history. If one component is missing, it is not possible to have a clear understanding of the problem. If a clear understanding of the problem cannot be ascertained, then potential benefits cannot be realized. Successfully implementing a CMS system requires teamwork, training for faculty and students, time, and the willingness to adapt to a change in educational pedagogy to realize its potential benefits.6,7

Key Words: ***course management system, chiropractic, education, digital immigrants, digital natives***

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Pearls And Perils: Integrating A Web-Based Communication Interface Into The Teacher-Learner Relationship

Jeffrey R. Cooley, DC, DACBR

Murdoch University

In this digital age, multiple options are available for integrating new communication technologies into the classroom. In creating an innovative decision-making unit at Murdoch University, an alternative to face-to-face communication was needed, as summarized in the following discussion.

Through clinical case development and the use of evidence-based decision making models, students – working in small groups – are given two weeks to fully assess and arrive at a working diagnosis for an assigned "virtual case". Their findings, differential considerations, and decision making processes are then presented to the rest of the class. While ultimately moderating these presentations, the instructor's initial function is to serve as both the "patient" and the information gate-keeper. To work effectively, a method of communication was needed that would allow for discussion amongst students within a group, as well as between the group and the instructor. It had to allow for 24-hour per day asynchronous communication in a digital, but written, format and had to remain confidential within each group while still allowing the instructor to communicate with multiple groups simultaneously.

These communication issues were resolved with the implementation of the Web-based learning management tool, WebCT 4.1 (more recently, Blackboard Campus Edition 6.2 [CE6]). While serving as the primary means of communication between the instructor and the whole cohort, CE6 also allows the instructor to set up as many controlled access groups as needed. By including themselves as a member of each group, instructors can communicate with and monitor the students. For this unit, students have the option of meeting in person; however, they are encouraged to meet in the online forums available in CE6 (chat room, discussion forum, blog). All communication with the instructor is required to be online – to create a digital paper trail as part of the assessment and monitoring process.

Additional benefits of a digital interface:

- Access to digital presentations. CE6 allows for presentations (eg, PowerPoint) to be posted in an open access section for later review [it is also possible to digitally videotape a presentation and post it on CE6 using tools such as Lectopia];

- Confidential feedback / posting of grades. CE6 allows the instructor to post group-related feedback from peer review in a timely, confidential, and non-threatening manner. Individual exam results can be securely released;

- Overcoming challenges of group work. In the group setting, certain students dominate, while others defer all responsibility to others in the group. CE6 tracks the source of all electronic submissions, allowing the instructor to monitor involvement and encourage more equitable engagement by all participants;

- Gaining group insight. The asynchronous communication process provides the instructor an opportunity to be the proverbial "fly on the wall", obtaining an insight into the evolution of a group's thought process as students research and work through a case. It also allows the instructor timely opportunities to nudge a group back on track when necessary;

- Scheduling conflicts. The 21st century student's schedule is full of varying external commitments, and differing clinical rotations can add to the difficulties in finding time to meet as a group. Online discussion forums help overcome this obstacle.

- Teaching smarter. Ostensibly, integrating digital systems into the classroom could help reduce the teaching load for academic staff, but this depends highly on the design of the unit. In this unit, while lecture preparation time was dramatically reduced, "virtual" teaching and student interactions increased and in the end the overall load was greater.

As with any system, there are potential limitations for using a digital interface as a teaching and learning tool. These would include:

- Learning curves. It takes time for teaching staff to grasp the nuances of some learning management systems, and to fully utilize their functionality requires a commitment of time and resources. Failing that, users of the system will struggle to achieve their primary purpose, and the system will be abandoned before it has a chance to work;

- Assumptions. While it is generally true that students are digital natives, some students are still digital immigrants while others are digital recalcitrants! When implementing a digital interface into a unit it is best to forewarn students of your expectations, to avoid assumptions, and to ensure that students are in fact up-to-speed with the system being used.

- Technology infrastructure. If online contact is needed away from school, not all students will have access to high speed internet systems. This can affect their ability to access large files being exchanged, and can discourage involvement in the process.

As part of the development of this new unit, student surveys were conducted to ascertain, among other things, the effectiveness of the applied technology in achieving its purpose. Students were generally in agreement that using the CE6 system to communicate with the instructor was the best format for the design of the unit; however, they were more ambivalent about its usefulness as an adjunct in communicating with each other, still preferring face-to-face interaction as the primary means. They were in stronger agreement that the use of digital technology in general improved their learning in the unit, and that they were sufficiently trained in the use of the CE6 system to fully participate in the online discussions. There were some noted exceptions, with a few students finding the whole process distasteful and some unable or disinterested in participating in an online learning format.

The big picture: The use of digital technology as an alternative interface in the learning environment offers many pearls and if properly implemented will create new, positive avenues to interact with students. Most perils arise during the initial planning and implementation. Careful reflection on the overall purpose for implementing a digital interface is needed to avoid using the technology for technology's sake, and it should not be assumed that digital natives will naturally gravitate towards a heavy diet of technology-based learning.

The Use of an Online Learning Management System (Moodle®) for Case Study Presentation and Student Assessment.

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In graduate or professional schools, the use of the case study is a valuable tool for bringing real world situations into the classroom for students to assess, thereby developing decision-making skills and integrating knowledge gleaned across individual coursework. This presentation will address the use of an online learning management system to make this learning experience more efficient and potentially more effective. Moodle is the course management system (CMS) that is used by Northwestern Health Sciences University. Moodle is a free, open source software package designed using sound pedagogical principles, to help educators create effective online learning communities. It can be download and used on any computer (including webhosts), yet it can scale from a single-teacher site to a 50,000-student University.

Clinical decision-making is a skill, and skills are developed by practice. The primary objective of the case method is to develop clinical decision-making skills (Blunden and McGuinness 1993). The case method has several advantages over the traditional lecture method of instruction including active participation of students and integration of information from different academic fields. Students, individually and collectively, take responsibility for their own learning. However, because the case method relies on the active participation of students, large class sizes and time constraints may make their use difficult or inefficient. The use of an online learning management system such as Moodle allows all students equal access to the case information, time alone with the information to appraise it and then to make clinically oriented decisions. The instructor can provide immediate personal feedback. Additional consideration and augmentation can follow in classroom group discussions or tutorials. Introducing clinical cases for interpretation early in the curriculum with a course management system enables an institution to assess the students' progress in learning this critical skill.

Case study evaluation is a form of problem-based learning. An essential of problem-based learning is that learners should be able to integrate information from all the disciplines basic to their intended professional/technical career during their self-directed learning and apply what was learned back to the resolution and understanding of the problem. This learning in the context of work enhances later recall, adaptation and application of what is learned to the problems they will to face in their career. The basic goals of case study problem-based learning are to acquire a rich, integrated knowledge base that can be recalled and applied in the contexts of future work and to develop effective problem-solving, self-directed learning skills.

A course management system provides the platform for enabling the management, delivery and tracking of blended learning (i.e., online and traditional classroom). A robust CMS can and should integrate with other individuals and departments. Tasks can be streamlined and automated and the overall cost and impact of education can be tracked and quantified, making assessment of this skill development possible. Furthermore, an CMS should support a collaborative learning community, offering multiple modes of learning—from self-paced coursework (Web-based seminars and classes, downloadable, CD-ROM and video content) to scheduled classes (live instruction in classroom settings or online) to group learning (online forums and chats). Moodle can provide this platform at no cost to the institution.

This presentation will show case how Moodle can be effectively used to present clinical cases for student interpretation, instructor feedback and institutional assessment.

Modeling Blended Learning in a Faculty Development Program for a New Course Management System

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Blended learning is the pedagogical method combining traditional face-to-face instruction with online learning. The online component is often provided through a course management system. By using a blended learning approach, faculty members at the Western States Chiropractic College are being trained how to use Moodle, an open-source course management system, and to become knowledgeable in the use of blended learning as a way to improve their traditional course delivery. The faculty development program, entitled "Learning to Use Moodle" was conducted over the summer quarter of 2008 (July through September).

Blended learning , sometimes referred to a hybrid learning, is the combination of different types of educational delivery systems. In the educational technology context, blended learning most often refers to the combination of face-to-face instruction with web-based distance learning methods (Osguthorpe & Graham, 2003). Although faculty members at the Western States Chiropractic College have long used network file servers to provide students with access to electronic resources, it is only recently that a specialized course management system (CMS) was introduced to the campus. This allows the faculty members to not only provide easier access to these resources, but also to create more sophisticated learning opportunities and incorporate blended learning methods as desired.

Blended learning has gained popularity in higher education, partially because it addresses a wide range of learning theories, styles and preferences. Behaviorism, cognitivism, and constructivism can be addressed and applied through online learning (Alonso, Lopez, Manrique, & Vies, 2005). In health sciences education, blended learning has become increasingly used in all phases of education, from basic science instruction through residency training (Carbonaro et al., 2008; Choules, 2007; Maley, Harvey, de Boer, Scott, & Arena, 2008; Pereira et al., 2007). In intensive chiropractic degree programs, the opportunity to favorably change the ratio between didactic and student-centered learning through the use of technology is particularly appealing. A blended learning approach using a course management system is a reasonable means of introducing online learning while preserving the pedogological advantages of traditional instructional methods (Welker & Berardino, 2006).

The CMS (also referred to as a learning management system or virtual learning

environment) implemented at the college was Moodle, an open-source system that provides a full set of CMS features. Because of the inherent complexity of a CMS for novice users, a training program for interested faculty members was designed and implemented. A survey of the faculty and several focus group sessions enabled the instructional designer to identify the instructional goals and the instructional format. Interestingly, although only a few faculty members had previous experience in blended learning applications, the instructional design phase of this project demonstrated a strong desire of the faculty members to have a combination of traditional lecture and demonstration with an online opportunity to practice skills and acquire additional knowledge. This provided the College with an opportunity to provide a faculty development program using blended learning that would both teach faculty how to use the learning management system and also expose them to the advantages of using blended learning in their own classroom instruction.

The Moodle training program consists of four 45-minute large group sessions, coupled with an online training Moodle site and individual participant practice Moodle sites. The large group sessions and online training components are arranged in convenient learning "chunks", designed to allow participants to select those components in which they had the most interest in learning. Each of the large group lecture/demonstration sessions had a corresponding topic area in the main Moodle course site for the training program. The resources available in this area include a digital version of the large group presentation recorded during the live session, copies of the presentation slides and notes, and short tutorials on each topic. The demonstration portion of each session is done using an interactive electronic whiteboard and videoprojector. This allows the instructor to download whiteboard drawings and notations to the main Moodle course site. As each large group session is conducted, additional components introduced in the lectures – such as discussion boards and web links – are added. Each participant is also given a practice Moodle course site in order to practice the newly acquired skills. The four sessions are spaced a few weeks apart in order to provide ample time for practice.

Session I, required for all participants, provides an overview of course management features, explores the Moodle user interface from both the faculty and student perspectives, covers basic Moodle course administrative functions, and demonstrates the development of a Moodle course topic list and syllabus.

Session II focuses on using static resources in Moodle. Participants learn how to upload files, make PowerPoint presentations available to students, enter calendar events, and insert links to web sites.

Session III introduces participants to concepts of interactive learning objects. Theories and practices relating to constructivism, social learning and active learning will be discussed. Participants will establish discussion boards, assign discussion groups and group activities, use email within Moodle, and set up digital drop boxes. Fellow participants will be enrolled in other participants' practice courses to act as "students".

Session IV focuses on the development of Moodle lessons, and on assessment methods. Participants will learn how to create online instructional lessons and how to embed quizzes. Uses of the electronic grade book and logs of student activity will be introduced.

Each participant will be asked to fill out a brief online survey at the end of each session. This will provide feedback to the instructor about any weaknesses in the presentation or accompanying resources. At the end of the training program a lengthier survey will be administered to assess attainment of learning objectives and the attitude of participants towards the use of a blended learning approach in their own courses in the future.

Results of the data collected from participant surveys in this training program, as well as a demonstration of some of the online instructional resources, will be provided at the WFC conference.

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The Impact of a Whole of Curriculum Approach to Integrating Web-Based Lecture Technology: a Case Study

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BACKGROUND: Many universities have implemented tools such as web-based lecture technologies (WBLT) to increase the flexibility they can offer learners. While the popularity of these technologies with students is well documented (1), they have had a disruptive influence and create an increasingly complex environment. This paper describes the results of a case study conducted in a second year chiropractic teaching unit. It outlines the changes required to integrate WBLT into the whole curriculum, rather than treating it as merely a delivery option and the resulting impact on both staff and student perceptions. It stems from a larger Carrick-funded* project that studied the impact of WBLTs on teaching/learning. The term web-based lecture technology encapsulates the range of technologies used for digitally recording lectures for web delivery. "iLecture" is a proprietary example of this type of technology.

In Semester one of 2007, the Unit Convener was concerned that the number of students attending face-to-face lectures was low. Hits on the iLecture were also low, with an average of 38% of the class accessing the lecture recordings. The Convener suspected that the low attendance combined with the low hit rate contributed to the unusually high failure rate of 18% at the end of the semester.

Unit information such as outline, exam expectations and results, had been posted in a number of locations. Electronic information was available in different websites, each requiring different usernames and passwords. Physical notice boards were on different floors and in different buildings. Without having one centralized location for information, it was difficult for the students to know if, where, or when the information was posted. To improve this situation, the Convener introduced an online unit using the University's LMS with all information posted on the one site. The site was introduced in Semester 2, July 2007.

This establishment of the unit's online space was determined to be an opportunity to gather data about iLecture utilization and also students' perceptions about lectures, lecture recordings and the effects of these changes on their learning.

It was hypothesized that a central location for information with a singular login would facilitate student visits to iLecture. In addition to measuring the number of visits to iLecture, this study investigated whether or not an introduction of a single online site to

support the unit would affect the students' experience of iLecture.

METHODS: The case study explored in this paper was developmental in nature, focusing on one or more aspect of the use of the technology within a specific context; *investigating the impact of a whole of curriculum approach to integrating WBLT.*

There were three sources of data for this study:

1) The number of hits as indicated on iLecture

2) The percentage of end of term student failures, and

3) Two student surveys

The surveys were based on that used in a wider WBLT study (2), modified to elicit data about student perspectives on the use of iLecture and the impact of the changes to the overall online support for the unit. A survey was administered during the first lecture of Semester 2 to gather data about student experiences in the previous semester. The same survey was administered again at the end of the semester.

RESULTS: Students in this case study appreciated iLecture as a back up when they couldn't attend and also as a study tool. In both surveys, 100% of the respondents indicated that they accessed online resources and materials; however the comments were generally more positive after the addition of the LMS site. In semester 2, fewer student hits were recorded on iLecture and there was a reduced number of students who failed the unit.

DISCUSSION: Although the case study set out to investigate the impact of changes on students' results and their perceptions about the use of iLecture as part of a suite of online tools, the key findings reinforced the complex nature of research into curriculum contexts. In this context, it is difficult to separate out the factors affecting their success.

The results of the case study indicate that students were more positive about the impact of WBLT on their learning and also attended face-to-face lectures. The introduction of a single online site did not increase the visits to WBLT and yet, the students performed better as illustrated by a decrease in failing grades. Possible explanations for this, as suggested by the Convener, were 1) the removal of weaker students from second cohort, 2) increased face-to-face lecture attendance, and 3) centralized information facilitated knowledge of unit expectations.

Setting up the centralized online site is a large task but is worthwhile (4). New computing skills, planning for optimum benefit and daily maintenance are required. One method to manage the work load is to implement in stages (3). This extra work is offset with fewer emails and office visits from students. Student supporting each other was also a benefit:

CONCLUSION: The student appreciation of the convenience of a centralized location for all the online resources and communication tools was evident in the case study findings. In this study, feedback from previous semesters about the dispersed nature of the online support, including WBLT, lead the Unit Convener to establish a single site on the university's LMS. Unit materials, readings, communication tools and lecture recordings were all available from this single site. The survey responses from the students indicated that this was an improvement.

The findings from this individual case study, suggest that while the teaching and learning contexts may vary considerably, there are several features common across all the contexts in which the overall perceptions about the impact of the technologies was positive. These were:

- An appreciation of changing student need;
- A focus on engagement;
- A whole-of-curriculum approach to integrating the technologies; and
- Demonstrated demonstrable critically reflective practice.

*Carrick Institute for Learning and Teaching in Higher Education Ltd. Supported by the Australian Government Department of Education and Employment & Workplace Relations.

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Graphic Technologies, Materials for Instructors, and Innovative Applications

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Introduction

In 1895, Daniel David Palmer first espoused principals of health care that became the foundation for the Chiropractic profession. Just one year later, John Dewey emphasized the educational principal of learning through various activities as opposed to maintaining a teacher-focused curriculum (Conner, M.L. "Andragogy and Pedagogy." Ageless Learner, 1997-2004. http://agelesslearner.com/intros/andragogy.html). In the intervening years as Chiropractic has spread across the globe, some might assess that learning environments have not kept pace with the profession's rate of advancement.

Today our educators face teaching challenges and are expected to provide learning opportunities that did not exist ten years ago. As is the same principle for making any presentation, teachers need to know and understand their target audience in order to provide appropriate objectives and methods that foster learning. The majority of our students in higher-education today, are a part of the "Net Generation" or "Millennials", (1982 -2002). Their life experiences are decidedly different from the environment in which most faculty and administrators were raised. Their aptitudes, attitudes, expectations, and learning styles were shaped by being "connected" with instant messaging, blogs, wikis, RSS feeds, and podcasts (Oblinger & Oblinger, 2003; Oblinger & Oblinger 2005, Oblinger, Howe, 2000) as part of a wide range of technologies. Using technology of which the student may already be conversant can furnish rich opportunities to make learning more effective and meaningful. Today's young adult learners are the Millennial generation. This paper will provide a brief overview of adult learning, an explanation of Millennials as learners, and information on graphic technologies which have the potential to improve Chiropractic education.

Adult Learning

Malcolm Knowles, who labelled his work in adult education andragogy (i.e. learner centeredness for all ages), believed that it was important for educators to care about the actual interests of their learners. Knowles recognized that, unlike the teaching for children ("pedagogy"), adults rely on life's knowledge as a resource and context in which they learn. More mature learners enter educational settings ready to learn. They prefer cooperative, guided interactions, and they bring a wealth of experience to the educational setting. Adults tend to be problem centred in their learning, and are best prompted by inner factors and commitment (Knowles 1980, Blondy, 2007). The motivation for learning provides features that lend themselves to teaching techniques that engage the student's instinctive interests.

Stephen Brookfield built on the principles of effective adult practice to outline ways in which educators can facilitate learning (Brookfield, 1986). He stressed the value educators can bring to the learning encounter; focusing on sensitivity to the learners' concepts of self; past personal experiences to frame educational context; a willingness to share personal experiences with learners; and being open to learners' suggestions. All of these tools can empower the academic experience for the student.

Millennials

Most students in higher education today are both adults and Millennials. Known alternatively as "Gen M", "echo boomers", or the "net generation", these students embrace technology. As learners, they are different than previous generations. Computer savy, they risk the presumption that readily available information; as in preferential use of the Web as a source of information; is equivalent to quality information. Millennials are accustomed to the convenience of twenty-four hour access, seven days per week. They perceive an imperative to be hands-on, collaborative, interactive or experiential (Oblinger & Oblinger, 2003, Jonas-Dwyer & Pospisil, 2005, Tucker, 2006) for an effective learning encounter. Millennials are goal oriented and expect to excel, anticipating individual attention and extra help (Tucker, 2006). Simultaneously, the reliance Millennials have on technology leaves them susceptible to incomplete or incorrect information generally avoidable with the expert guidance afforded by competent teaching mentorship.

Graphic technologies, used in conjunction with Learning Management Systems (LMS) and Web-Based Seminar Products, are valuable tools for faculty striving to leverage effective learning for students today. A few examples of digital technologies that are available as tools for today's educators to assist students outside the classroom and promote interactivity within the classroom are reviewed below. Three basic resources that can be applied in most venues include; the podcast and digital video and the SMART board interactive whiteboard. Both the podcast and video give the instructor the ability to guide exposure to reliable information, yet make it available at the student's convenience in addition to the classroom time and materials. The SMART board technology promotes in-class interactivity as well as capture of a record of ideas and thought flow represented by written word and drawings for later review

Digital Technologies

Podcast:

A podcast is a series of digital-media files, which are distributed over the Internet using syndication feeds and accessible either at a specified time or on-demand by the user. RSS (Really Simple Syndication) is a family of Web feed formats used to publish frequently updated works such as blog entries, news headlines, audio, and video, in a standardized format. (Rowell et. al). These records provide playback on portable media players and computers. The term *podcast*, like *broadcast*, can refer either to the series of content itself

or to the method by which it is syndicated; the latter is also called podcasting. The host or author of a podcast is often called a podcaster (http://en.wikipedia.org/wiki/Podcast) and is the one who organizes or creates material for distribution.

The hardware and software requirements for creating and receiving podcasts are commonly found in educational institutions, businesses and homes and are inexpensive. To create a podcast only requires access to a recording devise (eg. laptop, mini disc recorder, iPod, digital camera) and appropriate software (eg. Audacity). On-line tutorials readily are available that include free downloads of software to assist production. http://podcasting.about.com/od/editing/Editing_Making_Life_a_Little_More_Perfect.htm; http://digitalmedia.oreilly.com/2005/07/20/WhatIsPodcasting.html

Podcasts can be received on a number of media devices: MP3 players; computers; PDA's,and Cellphones equipped with minimal software. To receive a podcast one needs a podcasting client (e.g. ITunes, Windows Media PlayerMicrosoft's Zune, Marketplace, Juice, Podget, Podracer). Downloading is limited only by access and sufficient memory space to accommodate the files (i.e. audio files vary in size from 20-25MB). They can be downloaded for free and retained for future review. Updates often are automatically downloaded, keeping the student abreast and current with academic content for discussions on interpretation and use. Podcasts may contain more than one activity. They can be generated and published quickly at little or no cost.

Podcasts are an ideal learning tool for Millennial learners, allowing students and faculty to share information easily. A primary benefit is that listeners can synchronize content to their media player, learning by repetition at the time and place of their choosing. Because podcasts are typically saved in MP3 format, nearly any computer can serve as a portal for lessons and study. http://www.hms.harvard.edu/coewh/PinnPoint.html.

Institutions of all sizes have begun implementing podcasts to facilitate learning. Harvard Medical School course lectures are available to student via their iPods.

Translated into MP3 studio files for downloading, videos of every course are added daily. http://focus.hms.harvard.edu/2006/012706/med_ed.shtml Students can review previously attended or missed sessions, search for segments of a lecture or they can troll across disciplines for topics of relevance. Repetition of content, at will, maximizes the motivated student's ability to integrate concepts.

Podcasting benefits faculty as well requiring little extra time and effort to prepare and deliver lecture material. They are readily updated, and infinitely retrievable. A podcast

allows faculty to review themselves, reflect on their delivery and ultimately evolve their presentations in both content and style. On a note of caution, care to the context of comments is important as the podcast is enduring and easily shared. Similarly, safeguards

against misuse or misappropriation of lecture material in the form of institutional ethics policies and enforcement may be necessary.

Sample Podcasts:

Listen in as University of Central Florida Vice Provost Joel L. Hartman, student Gregory Roberts and a host of attendees share their thoughts and comments. See the following link for detailed information about the session "What Does the Net Generation Expect From Us?"

http://connect.educause.edu/blog/mpasiewicz/sacpodcastonwhatthenetgen/1222

http://www.nih.gov/news/radio/nihpodcast.htm

Digital Video:

Digital video converts analog visual and auiditory information to a stored format for playback. They come in two different image capture formats: interlaced and progressive scan. Progressive scan is generally more desirable because of its similarities with film. An advantage over earlier media, however, is that digital signals can be stored and copied with no degradation in quality. They may be edited on an non-linear editing station (NLE) built exclusively to edit video and audio or on a properly configured personal computers. Software for editing digital video can be found from many sources (i.e. Avid's, Apple's Final Cut Pro, Adobe Premiere, Sony Vegas). The hardware and software requirements to produce or view a digital video are neither difficult to procure nor particularly expensive. Digital cameras capture real-time events and dialogue and can display the image on the camera's screen immediately after recording. With modern memory capacities, they are able to take thousands of images on a single small memory device, allow downloading, editing and deletion of images for re-use of the storage space. Digital cameras commonly are incorporated into many devices including PDAs and mobile phones with increasing clarity and resolution.

Digital video is a particularly useful tool for facilitating clinical competence. Students can view themselves, real interactions with patients, or simulations set to emphasize specific details or interactions. Emphasis can be placed on exemplars that demonstrate appropriate and inappropriate clinical behaviour. Images may be paused to facilitate discussion or observations on body language, word choice or tone of voice elaborating on the full Dr. / Patient interaction. Films can be used to initiate class discussion.

(http://www.jmir.org/2003/2/e13) Recording of Student / Patient interactions allow student self-critiques, seeing themselves at work and perhaps comparing their performance to that of experienced professionals.

Digital video technology has been used to enhance teaching of the basic sciences such as anatomy, histology and pathology. A digital camcorder mounted on a microscope can image, for example, glass slide-mounted living tissue secretions and the unedited movies can be transferred to a computer. Editing of the file can be performed using software; a time counter and voice-over narrative (Melin-Alanda & Gasiltionis, (2008) p. 820). Such movies have been considered a practical and affordable method for documentation of entire tissue samples (Ibid).

"As anatomy course hours have decreased, it has become increasingly important to provide tools that facilitate laboratory tasks efficiency. Digital video clips were created to present dissection guidance to medical students. The video clips communicated the challenging aspects of the dissection process with succinct visual demonstrations easily access via an online course site." Students reported videos enhanced course and individual performance (DiLulio, et al,).

In a study of preclinical dental students, video was used to provide information. "Students preferred video with sound over video with subtitles and preferred short video clips embedded in the text over compilation videos". These results demonstrate that it is possible to develop and implement web-enhanced and interactive dental education in a preclinical course on restorative technique and successfully deliver information from a broader perspective than using traditional texts (Broderick, 2004).

Again, the technology savvy Millennial generation rapidly engages learning with digital video and its uses are limited only by imagination. For example, it can be used to provide students with a comprehensive experience at their convenience without the need for expensive lab equipment; it can provide direction that is personal and continuous and it allows students to view both professionals and themselves in clinical or learning context interacting with patients.

Sample Resource:

http://www.uvm.edu/pt3/VIP/video/

SMART Board interactive whiteboard:

The SMART Board interactive whiteboard is a touch-sensitive display that downloads to a

computer. Information written to the board can be displayed by digital projector for group or class activities. Components are connected wirelessly, or via USB or serial cables. Using a finger or pen, you can control computer applications, write notes, pull up charts and images, search the Internet, play videos and save your work. SMART Board interactive whiteboards are available as front-projection, rear-projection and flat-panel display models. The SMART Board software consists of Notebook whiteboarding software and SMART Board Tools. Versions are available for Windows, Mac and Linux operating systems. This hardware and software is not overly expensive but is generally found in classrooms and not private use.

A key advantage of the SMART Board interactive whiteboard is its flexibility and ability to simultaneously engage all learning styles.

a. Visual learners can easily see colorful, movable images and diagrams even from the back of the classroom.
b. Kinesthetic learners can interact and explore by manipulating the information content - moving letters, numbers, words and pictures with the touch of a finger – and getting immediate feedback from the instructor and/or peers.
c. Auditory learners can be immersed in a complete multimedia experience using optional USB speakers/headsets or SMART Audio

http://education.smarttech.com/ste/en-S/Classroom+solutions/Product+news+and+resources/SMART+Board+interactive+whiteboard/

SMART Board interactive whiteboards allow faculty the satisfaction of teaching in the traditional sense, exchanging dynamically with the class, prompting and assessing response in real time. The SMART Board interactive whiteboard extends their ability to involve the student through the use of diagrams, concepts and complex problems prepared before class and shown during class. During class faculty can write over top of the projected applications, just as one would add to a diagram on a blackboard. Notes can be edited using a pen or a system of pointing and verbal ques. Students can also participate, edit, add to diagrams, and solve problems. The original courseware and all changes made can then be saved and replayed by students for review. These methods boost faculty efficiency, saving valuable class time and focusing on facilitating learning.

Research using this technology has been focused primarily on the public and high school learner, in part due to funding priorities and to available class sizes to enhance research outcomes. “Researchers at the University of Virginia have concluded that SMART Board™ interactive whiteboards, when used with appropriate pedagogy and digital resources, can lead to improved student learning outcomes and teachers’ quality of life.” Teachers reported having more class time to focus on instruction, clearer lesson presentations, better organization, an ability to incorporate a wide variety of resources into lessons and subsequently modify them with ease

https://source.smarttech.com/media/source/sales/whitepapers/UofVFactSheet.pdf.

SMART Board interactive whiteboards encourage interactive and collaborative learning. They provide an opportunity for faculty to retain student attention and have potential value in Chiropractic education, particularly in the sciences.

Relevant Sites:

http://www.nlm.nih.gov/changingthefaceofmedicine/activities/

http://education.smarttech.com/NR/rdonlyres/C5A45D3F-A0A6-49EC-ACF2-E17D231F55E1/0/UNBResearchBriefFINAL.pdf

Conclusion:

Teaching and learning continually evolve. With each new generation of students, educators are challenged to create effective and meaningful learning experiences. Today's generation, the Millennials bring many things to the classroom including an understanding of and belief in technology is a tool. A learner-centred approach demonstrates an understanding of and respect for the student and takes advantage of their individual learning styles and life experience to leverage learning outcomes. Faculty interested in incorporating the use of technology into their classrooms should look carefully for products that will enhance the curriculum they wish to deliver, that integrate effectively with other technologies being used at their institution and that can be implemented without overwhelming the faculty member. Graphic technologies provide a simple and cost effective way for faculty to begin this journey to foster educational advancement in keeping with the progress of the Chiropractic profession.

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Simulation Technology – Innovation in Clinical Learning and Teaching

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Developments in simulation technology to include more realistic and complex clinical scenarios have progressed significantly over the past decade. It is in rapidly growing demand as part of directed and self-directed learning through electronic media and as part of curriculum development, postgraduate education and professional development. The trend is very much student led by a generation of users brought up with new technology and electronic gadgets but issues such as staff and financial resources as well as time constraints also play a significant role in the institutional context. In the beginning, with the early technology and often limited clinical scenarios, inflexible, poorly integrated systems and less realistic user inter-actions, more focus is now on developing a variety of specific and targeted pedagogical and other teaching related scenarios and research.

This state of the art technology can be used not only to enhance student experiences across a range of integrated subjects (e.g., clinical, basic and social science, doctor-patient interactions, simulation of serious or life-threatening situations in a safe but realistic environment) but also to introduce a cost and time effective method of teaching and learning. The technology can be tailored to individual clinical scenarios, are consistently repeatable and can be used for a variety of physical examination methods more objectively than current examination techniques in order to assess whether students have met their learning outcomes.

This has implications in terms of institutional budget restraints and availability of qualified staff, especially with larger student cohorts and repeated procedures, workshops, etc. Additionally, it is likely to affect student pass rates and motivation in allowing them to study specific subjects and their practical elements in more ways than one (e.g., special needs, auditory, audiovisual, visual, tactile). The greater choice is much more likely to accommodate the different learning styles of individual students in any large cohort rather than the teacher-led, lecture-based approach.

The software is integrated with the METI (Medical Education Technologies, Inc.) simulation suite located within the Faculty of Health, Sport and Science at the University of Glamorgan and can be further developed to form a significant complementary part of the teaching in the chiropractic undergraduate modules across all years of the programme including the basic sciences and clinical science subjects. This presentation will demonstrate examples from the simulated clinical environment and draw on parallel examples where this technology is used.

Technology Applications in Online Learning at NWHSU

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The lecture component of the Cervical and Thoracic Manual Therapies course was presented for the first time in an online format using the Moodle course management system during the summer term of 2008 at Northwestern Health Sciences University. The lab component remains in the traditional format. This hybrid asynchronous course emphasizes active learning principles and utilizes a rich variety of multimedia and software applications. During this presentation, we will describe some of these applications and will demonstrate how they can be used in chiropractic education.

The Moodle course management system serves as the platform for learning and allows faculty to incorporate a wide variety of activities including blogs, wikis, quizzes, lessons, forums, chats and assignment uploading into their course. Outside software applications were also used to develop the online modules including StudyMate, Camtasia and SoftChalk.

Lecture content is presented primarily in the format of narrated PowerPoint slides developed using the Camtasia screen recording software. Camtasia is a cost-effective way for individual faculty to record, edit and enhance, and share material in multiple formats. The faculty member simply organizes their PowerPoint slides and sits at their computer to narrate the content using a microphone and the Camtasia software. Upon completion of narration, they have the opportunity to edit their presentation if desired and can publish the final result in the format of their choice including those compatible with course management systems, ipods, and blogs. At NWHSU students access the narrated PowerPoint slides online by simply clicking on a link in the Moodle course management system. Students may also access a PDF document of the PowerPoint slides as an additional study aid.

StudyMate Author 2.0 is an authoring tool that allows you to create 10 Flash-based activities and games using four simple templates. No knowledge of Flash programming or HTML is required to use StudyMate. An instructor types in a series of questions and answers and the program presents this material in the format chosen by the student- from flash cards to crossword puzzles to word searches. These flash activities can be published directly to the Blackboard, WebCT, or ANGEL course management systems but are currently not compatible with Moodle. Although this prevents us from grading students on their performance with these activities, we still find that this is a valuable tool in active learning and students appreciate the opportunity to test their knowledge in a no-stress manner.

The SoftChalk LessonBuilder is the newest software application that we are currently testing. This user-friendly program allows faculty to quickly and easily create interactive Moodle compatible web pages using professional appearing templates. Content is developed in a familiar format that is very similar in appearance to Microsoft Word. SoftChalk was specifically designed for teachers and content experts who don't have the time or desire to learn complex software. SoftChalk supports the use of pop-up text annotations, quizzes, crossword puzzles and other interactive learning games. Audio clips, graphics, videos, and other multimedia are easily imported into the content. When the faculty member has completed designing the lesson, he/she simply clicks on "package lesson" and a zipped file is produced that can then be uploaded easily into most course management systems including Moodle. The quizzes and other interactive exercises can be graded and the scores can be submitted in a format compatible with the course management system or the instructor can choose to have scores emailed or certificates printed out. Should you have issues, the SoftChalk User Guide is actually user friendly and the company support is outstanding.

A wide variety of affordable software applications are available for use with a course management system. Described here are those that we have found valuable as NWHSU ventures into the new territory of technology enhanced learning.

Incorporating Electronic Wireless Transmitters in Interactive Lecture Presentations

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Background and Introduction:

Students always compliant about how rigid and boring some lectures could sometimes be (1). Students' attention span is getting progressively shorter (2). Most modern campus facilities incorporate wireless environment for students with lab top computers to use (3). There is increasing complaints from lecturers about how such technologies makes distractions during lecture time easy (4). This study is an attempt to utilize recent development in communication technologies to create innovative methods to motivate students to actively participate in critical thinking during lectures. It aims at cutting down the chances for using computers for activities not related to the lecture presentations and to focus the students' attention on key points needed to develop diagnostic skills.

Method

"I-Clicker"(5) provides simple transmitters that send signals with students' responses to one port attached to a master computer. The supportive program record students' responses to questions projected on a screen during the class room presentation.

To study the effects of utilizing this technology on students' performance the lectures presentations of an entire module have been revised and modified to incorporate questions that are projected in between the slides of the power point presentations. To prepare the students to accept utilizing this technology each student is issued an "I-Clicker" transmitter to participate and is instructed on how to use it to select and send his/her answers for the questions. The study is conducted over six weeks and it covers material related to two of the three course modules. A total of 39 students participated in the study.

Results

A comparison between two classes performances (39 students that used the technology) against the previous class (44 Students that did not use of the technology) using the same set of questions in both classes summative examinations. A comparison was performed utilizing the students' scores in these selected questions (40 questions) that were repeated in both exams.

A survey to collect students' impressions about how effective is this new method in motivating them to actively participate during the lectures was conducted.

Discussion

Although the evaluations of students responses to the questions in the summative examinations (40 questions) revealed almost no difference in students overall scores. The students' survey revealed high level of satisfaction among students in regards to motivating them to participate during lectures and to keep their interest in the subject presented. The program also was very efficient in helping the course director in the records keeping of attendance and of how frequent each student logged in and participated in answering the questions. This was very valuable to the course director ability to monitor the students' activities during lectures, their level of understanding of the points presented and also to point out any student in need of tutoring during the course.

Conclusion:

The utilization of new technologies like the "I-clicker" transmitters during class time could be an effective tool in helping the faculty in keeping the students' interest and attention in the material presented. It may also help the faculty to enforce and monitor students' participations during lectures. It may be helpful for students' retention of the information and may improve their scores in the summative exams.

Web Based Seminar Products and Experience - Intra-Institutional

Donald Petersen

President, MPA Media

1. Technology Creates Choices That Create Change
    a. The Beginning of Television
        i. CBS, NBC, ABC – National Networks, national choices
        ii. KTLA, KHJ, KTTV, KCOP – local programming for local preferences. (Need to show an old TV with the stations added as I speak.)
        iii. "Stop Pay TV" ads in the 1960's try to hold back cable

(Eventually cable came into our homes, but as Bruce Springsteen lamented, he had "57 Channels and Nothin' On" oddly enough, the song was featured on his 1990 album "Human Touch")

        iv. Fortunately, the VCR and ultimately the DVD player and TiVo came along for those of us who want to watch something but usually don't have the time.

    b. The same holds true for other aspects of our lives. As I was preparing this presentation, I passed by a family of four driving together apparently on their way to drop the children off to school. When I looked closely I couldn't help but notice that rather than spend the time talking about the day ahead, they we all talking on their cell phones to people obviously not in the car. Clearly, they had the time to spend with each other, but not the interest.

    c. The Internet holds the same story. Technology creates choices that can change everything. Let's take a quick review of the last 15 years on the Internet:
        i. Initially designed to include a classroom system to teach web building, the 1994 geocities website (originally launched as Beverly Hills Internet) became one of the largest community websites on the Internet signing up literally thousands of "homesteaders" a day. The hosting site was one of the first to allow users to put up their own html pages on the web in various "neighborhoods". By 1997, it was the fifth most popular site on the web, signing up its one millionth homesteader. It went public in the beginning of 1998 and was purchased by Yahoo in 1999 for an unheard of $3.57 billion in stock. While still functioning, a great many of its sites are now abandoned.

        ii. Just a few years later in 2003, eUniverse launched Myspace. Within a year both were purchased for a measly $580 million. Two years later in

2006, the 100 millionth account was created. Today it provides social networking in 15 languages.

iii. YouTube was officially launched in 2005, just a year before MySpace signed up their 100 millionth account. During the next year, YouTube was ranked the 5th most popular website (nine years after geocities claimed the same honor), far out pacing even MySpace's rate of growth. In that same year, over 100 million video clips were viewed daily on YouTube, with an additional 65,000 new videos uploaded every 24 hours. The website averages nearly 20 million visitors per month, where around 44% are female, 56% male, and the 12- to 17-year-old age group is dominant. Later in 2006, YouTube was purchased by Google in a stock offer of $1.65 billion, less than half the amount paid for Geocities just seven years before.

d. In short, there is no "21st-Century technology." Right now we have Q4 2008 technology that is sure to be refined continually until it is replaced in a few years with numerous new alternatives that are barely on our radar screen.

2. Web Technologies Create Opportunities, But At a Cost

a. The first level of "costs" is the elimination of various groups of potential participants:
   i. Those without computers/Internet access
   ii. Unsophisticated and inexperienced web users unwilling to try something new – some new technology may be confined to early adopters
   iii. Do You Twitter (or something similar)? Been in existence for over 2 ½ years. A running random conversation of sorts.

b. Another level of costs is the elimination of those who expect a richer experience. This is offset in many ways by those who are willing to make the trade for convenience:
   i. Each participant in a live conference or event participates because they possess the following: Interest + Time + A Desire for Human Interaction (Human Touch)
   ii. "Live" Webinars and Webcasts eliminate the expense and the advantages of human interaction and thus appeal to a larger audience: Interest + Time – Human Interaction
   iii. Recorded Webinars and Webcasts eliminate the time/scheduling component that reduces attendance. This is why they usually enjoy three times as many viewers (we actually get almost 5 times as many) Interest – Set Time – Human Interaction

c. Still another trade off comes in the form of content quality. Regardless of convenience, content is still king. People want value for their time.

Unfortunately, but not unexpectedly, new technologies are routinely exploited by those who see them as infomercial opportunities. This has several repercussions:

i. Some initiates will come to believe that most if not all webinars/webcasts are infomercials in disguise
ii. Once an organization's web presentations have lost their credibility, they are likely to lose most of their audience making the endeavor a waste of time.

d. Ultimately, one faces the ever-present challenge of keeping up with the latest releases and the latest technology. The web products discussed today will certainly lead us towards tomorrow, but will be discarded along the way like an old pair of shoes that is neither comfortable or in style. Should you jump on the latest technology right away or wait to insure it is both reliable and accepted by your audience?

3. Our Experience Producing Effective Webinars

a. Background: Managing Motion Palpation Institute seminars:
   i. Over 20 years experience in marketing and managing live seminars
   ii. Over 1,400 live seminars
   iii. At one time over 25% of US DCs had attended an MPI seminar

b. Promotion for Web Events
   i. Promotion should be broad, consistent and worldwide
   ii. A combination of marketing approaches should be used to solicit registrants
   iii. Multiple e-mail invitations beginning 4 weeks prior to from event
   iv. Follow-up event reminders to registrants beginning 1 week prior to event – expect only about 50% for free events
   v. Reminders the day of the event

c. Production
   i. Respect your audience
   ii. Communicate from 15 minutes before the event to after the event
   iii. Use quality software
   iv. Must have a Producer who really knows the program
   v. Production should be high quality and well rehearsed
   vi. Content must have immediate value to the attendees
   vii. No infomercials
   viii. Q & A, Poll Questions and Surveys
   ix. Get recorded event online quickly

4. Four Things You Must Have to Make Money

a. The talent – software, producer, speaker(s), customer help staff
b. Develop a loyal audience by delivering **value**
c. Cautiously enter new technological territory – Study carefully before you leap.
d. An understanding of how "Free" works on the Web. For this I direct your attention to an online article published earlier this year entitled "Free! Why $0.00 Is the Future of Business" authored by Chris Anderson, the editor in chief of *Wired* and author of *The Long Tail*." (http://www.wired.com/techbiz/it/magazine/16-03/ff_free?currentPage=1) Web economics are different than retail economics. Without this understanding, you will be constantly frustrated.

Introducing Web-Based Resources to the Anglo-European College of Chiropractic

Peter J Miller, DC
Anglo-European College of Chiropractic

Introducing in-house designed web-based resources to AECC

RATIONALE:

There are many inherent advantages to placing learning resources on a web server in electronic format, not least of which are the reduced environmental impact in terms of decreased paper use and the fiscal savings to the institution over time. The ability to make electronic resources interactive and the inclusion of video resources along with textual and photographic resources is also highly desirable.

Over a number of years AECC has developed low-tech web based resources, but no organised approach to convert from paper to electronic resources had been adopted or encouraged. This paper presents the problems encountered and overcome in the initial stages of such an organised approach to placing tailor-made electronic resources on the AECC intranet servers.

PROCESS:

In the summer of 2007 the student resources for the second and third year technique and myofascial courses at AECC were converted to web-based resources. This was done for two purposes, firstly to bring these resources up to date and secondly as a feasibility trial of converting all paper based resources to electronic resources. The project also included an informal assessment of student acceptance to changing from paper based to electronic resources based on verbal and written feedback.

The author considered three main potential obstacles in completing this task; these are outlined in figure 1. The first of these was investigating the rationale for changing and assessing on balance if the arguments for change outweighed the arguments for maintaining the status quo. Secondly the cost of change had to be balanced with the money available and the estimates of how much money the move to electronic resources could save over time. The final obstacle was obtaining the skills required to design and publish the resources, including in house designed illustrations to avoid copyright costs and potential infringement.

This paper will discuss the obstacles outlined above and how much they affected the process. The lessons learned can be applied when continuing this project at AECC or developing in-house electronic resources at other institutions. These "lessons" fell into the following categories and are summarised in figure 2:

1. Pre-planning issues
2. Time issues
3. Skills based issues

Pre-planning issues

The amount of time spent in planning the electronic resources and deciding on layout and navigation for the web pages is a large component of the time spent developing the resource. Reviewing other sites aimed at students and trying to ensure ease of navigation for both the experienced and novice web user is important and not easy to achieve. Obtaining peer review of planned web layout was an important and time-consuming step at this stage.

Time issues

This project took place during the summer break and took up a large amount of time and required a lot of organisation to arrange for models and room use. The areas of time expenditure are not immediately obvious at the outset of a project of this nature but could stall or even abort similar projects and must be considered. The actual time expended in writing the resource is the most obvious time factor to consider, but appropriate planning can dramatically reduce this time.

Skills based issues

A number of software skills had to be developed from scratch for this project. This took time and consisted of learning from trial and error, help pages, web based tutorials etc. Anyone considering converting their resources as with this project has to be aware of the time taken to learn these new skills and may wish to embark on some professional training to help orientate themselves and cut down on potential errors.

OUTCOME:

The web-based resources went online on time and were generally considered to be a success by both staff and students at AECC. Some early teething problems were encountered regarding students' attitudes towards purely electronic resources rather than textbooks that may require a cultural change to fully overcome. Resource issues of lecturer time, arranging for models and appropriate rooms for photography / filming need careful consideration to continue this project in the most efficient way.

CONCLUSION:

The development of in house web based resources has a lot of potential for the AECC and possibly other chiropractic institutions. The cultural change required for students and tutors to adapt to these types of resources needs further investigation to ensure a smooth transfer.

FIGURE 1: POTENTIAL OBSTACLES CONSIDERED IN CONVERTING TO ELECTRONIC RESOURCES

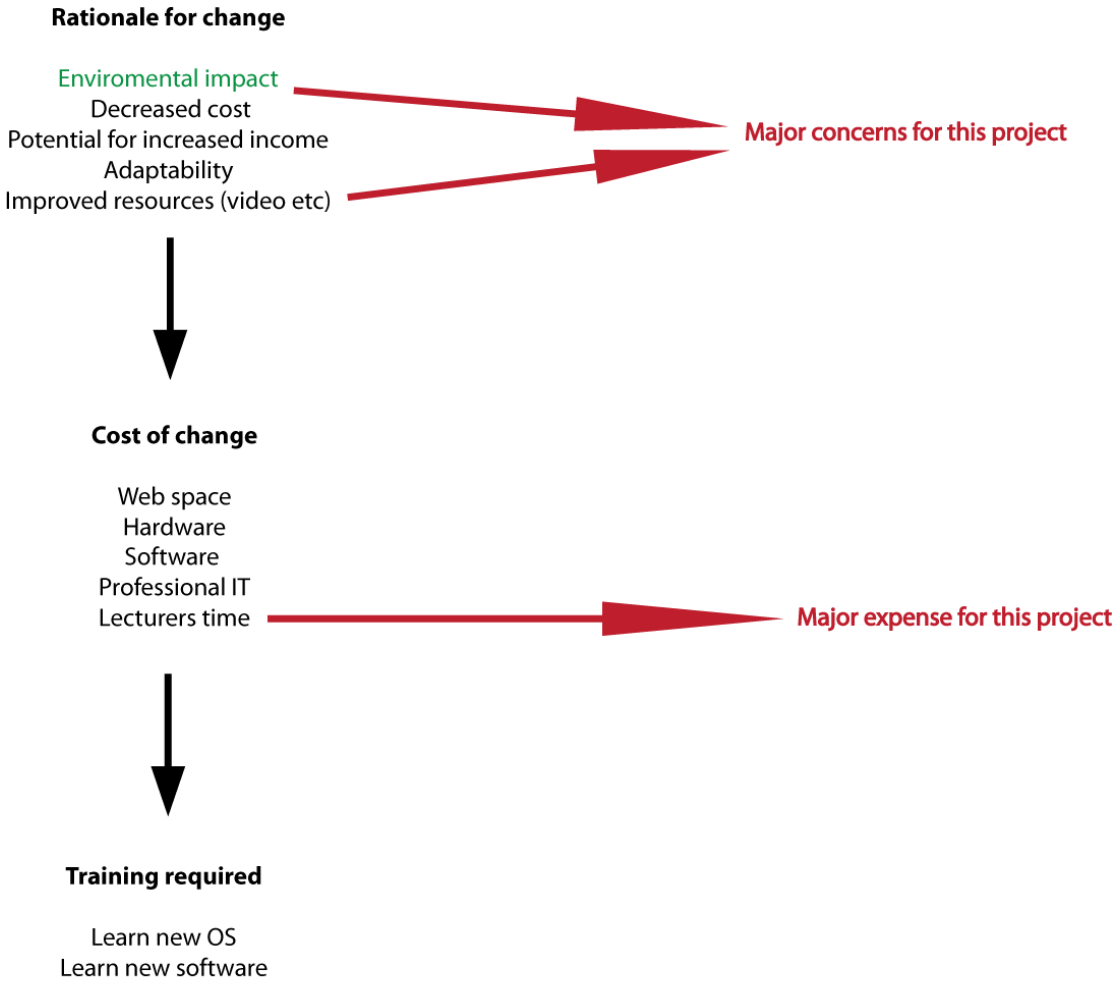
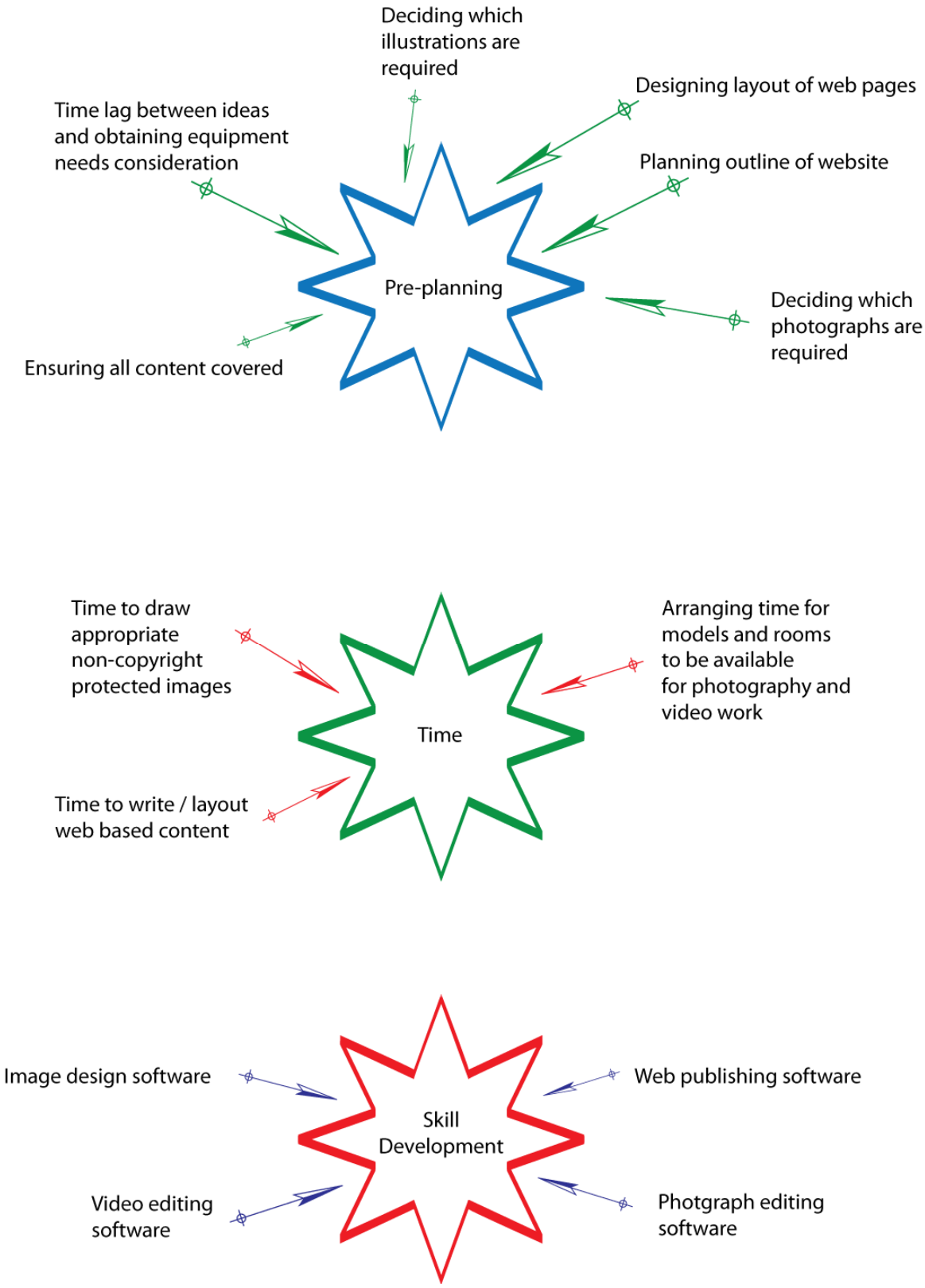


FIGURE 2: SUMMARY OF LESSONS LEARNED



Translation of Clinical Practice Guidelines in a Teaching Clinic Using Adobe Connect

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Introduction

Over the last two decades, the development of clinical practice guidelines (CPGs) has been driven by the need to implement the most current developments in evidence-based care. While the methods of CPG development and dissemination vary considerably, the greatest challenge to face health care remains the implementation (translation) into practice.

The positive outcomes of guideline development vary greatly. While the poorest implementation results from dissemination in print and the expectation that the guideline only be read (Arroll et al, 1995), successful implementation increases with the number of strategies used to enhance the process. For example, educational strategies involving two or more interventions have a much greater impact on implementation (Davis and Taylor-Vaisey, 1997).

Although a variety of practitioner behaviours (habit, customs, beliefs etc.) may influence the outcome (Conroy and Shannon, 1995), one of the most effective methods of successful guideline implementation is the adoption of the guideline as a practice standard by a governing regulatory body (Borowitz and Sheldon, 1993).

Other factors that appear to influence guideline adoption are simplicity, multiple interventions and an introduction prior to guideline dissemination (pre-intervention). The keys to successful CPG implementation are therefore simplicity and repeated education. Although the growth of electronic media has resulted in an enormous increase in its utilization for education, its impact on knowledge retention is equivocal (Bell et al., 2000). However, the use of interactive programs such as SAGE (Self-Study Acceleration with Graphic Evidence) has been demonstrated to increase learning efficiency and satisfaction (Bell et al., 2000).

Purpose

The purpose of this project is to deliver an evidence-based practice guideline to chiropractic interns in a format that can be translated into clinical practice. Understanding and retention of this material is evaluated and assessed through an interactive questionnaire and testing on subsequent clinical examination. It is proposed that the success of implementation into practice can only be assessed through a patient file audit.

Methods

Clinical practice guidelines (CPGs) are currently in development in Canada in a number of important areas. For example, a neck pain guideline was recently disseminated in Canada through journal publication (CCA/CFCRB-CPG, 2005). Although implementation of this guideline was encouraged through an assessment of practitioner understanding developed by the Canadian Chiropractic Protective Association, the actual degree of implementation remains unknown.

The direction chosen for this project is to adopt a DIER (dissemination, implementation, evaluation, review) approach to the incorporation of a headache guideline into the patient management by interns in a teaching clinic. The dissemination of this guideline occurs in two stages: a pre-intervention phase which was accomplished through a brief publication on the evidence-based management of headaches which appeared in the CCA Report (Winter 2008) and secondly through an electronic dissemination of a practitioner version of the practice guideline available to the interns at the teaching clinics. The practitioner version of this guideline is a PowerPoint presentation with a text voice-over which is interspersed with short video clips demonstrating typical patient presentations and interactions with a clinician. This electronic guideline is available to individual interns but has also been incorporated into the clinical curriculum as a compulsory component in small group rounds. This teaching instrument highlights key points that are intended to be “take-home” points implemented into clinical practice.

This version concludes with an interactive questionnaire that, when an incorrect response to a question occurs, refers the student back to the text or video portion of the guideline to reaffirm the correct response. An understanding and retention of the headache guideline will be assessed (evaluated) through similar questions appearing on the written portion of subsequent clinical examinations. As a learning resource, the electronic version of the guideline remains accessible to the student. It is proposed that evidence of implementation will be evaluated through an audit of headache patient files for the application of current, evidence-based diagnosis and treatment of headache.

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The Strategic Use of Technology for Installing Wellness Programs in Australian Chiropractic Colleges

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Chiropractors Association of Australia (National)

Aim

To leverage web-based technology to influence university curricula to produce chiropractic graduates versed in wellness issues capable of dealing with lifestyle diseases.

Overview and Background

The face of healthcare in Australia is changing. Federal Government is pushing to breakdown existing professional silos to deliver a model of healthcare centered on more accountable, safer health practitioners. The aim is to diversify the professions to take pressure off a failing public health system. This puts the identity and relevance of the Chiropractic profession at risk, as competing professions have, arguably, already made inroads into Chiropractic's traditional areas of strength (such as manipulation and spinal care). What is needed is a change in how the profession operates, including an emphasis on Chiropractic's unique points of differentiation, and how they provide solutions to the Australian healthcare crisis. The Chiropractors' Association of Australia (National)'s (CAA) answer is through its recently developed Wellness Initiative.

Wellness has been described by the CAA as: "an active, lifelong process of assuming personal responsibility that empowers the individual to exercise choice, make informed decisions and take action towards a more balanced, dynamically sustainable and fulfilling existence".

With this in mind, the CAA has embarked on a strategy to illustrate to Government how chiropractors implement this in practice, and how the chiropractic profession is uniquelypositioned to provide an alternate model for health, which overcomes the current system's reliance on drugs and surgery.

The initial part of this strategy is to educate the profession on how better to deal with lifestyle diseases such as stroke, diabetes, cancer and heart disease. In many ways, this is already occurring in the profession - albeit on an ad hoc basis. Many chiropractors would already find themselves advising the public on areas of their health other than the spine, including nutrition (through diet and supplementation) and exercise (either cardiovascular exercise or stretch/strengthening exercise).

However, a formalised approach to wellness care is required to ensure uniformity and quality, and to demonstrate effectiveness to Government. This means that chiropractors already in the www.chiropractors.asn.au field may require education and up skilling in this area. This part of the strategy is facilitated through the CAA's program Chiropractic Plus - a scientifically, evidence-based seminar series that provides chiropractors with the latest knowledge on how to advise and monitor lifestyle changes to affect a healthy life. The program also empowers Chiropractic Assistants to aid the process through patient assessment and data gathering. This allows the chiropractor to continue in their core purposes (i.e. adjusting) without having to compromise clinic efficiency through additional wellness counselling.

However, this only addresses part of the profession. The author asserts that the most important part of the profession to address is its future - chiropractic students.It is essential that chiropractic courses in the Australian region teach wellness skills as part of the training for the up and coming members of the profession. In the Australian region, a change in university curricula is necessary and the aid and involvement of the Chiropractic institutions is essential.

In order to achieve curricula changes to ensure wellness-based programs at Australian universities, several different approaches are required. These approaches are described below as fronts on which this issue needs to be addressed:

Front 1

Foster relationships and show the importance to University departments as to why this is necessary.

Front 2

Influence the accrediting bodies so that wellness education is mandatory in the University programs.

Front 3

Inspire, educate and empower academics to want to teach and be role models in wellness issues

Front 4

Inspire chiropractic students to want to know and deal in Wellness issues.

Front 5

Inspire, inform and train chiropractors in the field to take and practice “wellness”. This will encourage a culture in students and new graduates to pursue knowledge regarding wellness and lifestyle issues, and in turn be more attractive prospects to future employers.

With these 5 fronts in mind, we can move to the main thrust of this paper.

Introduction

This paper examines the use of technology, namely a web-based survey program, Survey Monkey, to achieve change in Fronts 1, 3 and 4. It is suggested the use of this technology will:

1. Gain student and academic-perspective baseline information about the state of the

current universities courses (Front 1);

2. Foster communication lines with universities, student and academics (fronts 3 and 4);

3. Instil wellness ideals (Fronts 1, 3 and 4).

How this will occur will be partly covered in this portion of the paper. The remainder will be part of the discussion.

It is important to outline the technology being used in this instance and how the abovementioned goals will be achieved.

Survey Monkey is a well-established web-based survey tool that allows the user to design surveys, collect responses, analyse results and create reports. The CAA has used this technology previously in surveying its membership on wellness issues. It was found to be effective in several areas, including increasing avenues for membership communication, and strategic planning input. Firstly, the composition of the survey was a simple matter of deciding which questions were to be asked and then transposing those questions to Survey Monkey.

Secondly, the distribution to the membership was a cost effective email blast to all registered members referring them to the CAA website and survey.

Thirdly, membership found completing the survey easy. As testament to that the CAA received over 250 responses, compared with a previous survey, (that required either postal of fax return), of 60.

It is suggested that the ease of use of this technology makes Survey Monkey a good choice in

achieving the desired outcome of this paper.

The gaining of student and academic-perspective baseline information regarding the state of the current universities courses and fostering communication lines with universities, student and academics as outlined previously, will be an inherent part of the survey itself. The specific targeting of universities, academics and students should achieve these first two goals.

The third goal, instilling wellness ideals, is dependent on the design and creation of the survey questions. It is envisaged this will be achieved via the Socratic Method.

The Socratic Method is defined by the Oxford Dictionary of Philosophy as " The method of teaching in which the teacher imparts no information but asks a sequence of questions, through answering which the pupil eventually comes to the desired knowledge. Socratic irony is the pose of ignorance on the part of the master, who may in fact know more about the matter than he lets on."

It is suggested that through this method of questioning, the survey will begin to shift the desire of the universities, academics and students to embrace the CAA's Wellness Initiative.

A Case for Learning Chiropractic Technique Assisted by a Web-Based Lecture Series; Standardizing Technique Principles and Practice Aspects

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The case for learning chiropractic technique assisted by a web-based demonstration series is based on the assumption a common, core, manipulation curriculum would result in the standardization of the teaching and practice of Chiropractic. One of the major criticisms of chiropractic practice is the lack of standardization. Practitioners range from the ridiculous to the sublime, in the level of manipulation skills.

At www.chiropracticmentor.com, core manipulation courses are available in ten, one hour videos. Instructors can be assigned a section or sections for use in the classroom, while lab demonstrations would be reinforced by internet access for the students. Instructors come and go, but the semester content would remain the same for the next instructor. A core minimum standard would be set.

The basic fundamentals of learning a psycho motor skill will be discussed. Although they are fundamentals known by coaches world wide, most chiropractic students are not trained or psychologically prepared for the large task at hand. The level of "Conscious Competency" should be the minimum level of achievement for spinal, pelvic and extremity joint manipulation. (Note: The terms Adjusting and Manipulation are used interchangeably). Learning complex psychomotor skills is very difficult, frustrating and time consuming. Programs need to be followed that can be graded and the early skills developed should continue to be practiced, with each new semester. The present programs that teach systems, don't allow the students to develop a basic set of skills, such as the various types of dynamic, high velocity, low amplitude thrusts that should continue from semester to semester.

A historical perspective will be presented from Dr. Faye's personal experience, dating from 1956 when he entered CMCC up to the present time. In Canada, in the fifties, chiropractic students had over 1200 hours of technique labs, over a four year period. Today, the average world wide is less than half that amount. This deficiency needs to be supplemented, by students being able to watch demonstrations on the internet, at home or in a study hall. The lack of time spent learning technique has reduced the average skill level of our practitioners and many can't produce the response to the neurobiological mechanisms in their patients. Influencing these mechanisms is what prevents us from gravitating to the self-limiting sprain/strain symptoms of injured joints. This ultimately results in a very narrow scope of practice.

Over the years, since Dr. Faye started teaching in 1967, at the Anglo European Chiropractic College, Dr. Faye has taught seminars at colleges or in college towns, all around the world. One, Scandinavian college has adopted his web-based program as their Core Manipulation Program. Each hour of the ten hours of video demonstrations is the content of one semester, taught by a skilled instructor. For a small college, on a limited budget, it assures continuity of presentations from semester to semester. The clinicians are very happy, because they know the skills the student clinicians have mastered, to a conscious, competent level. No gap between the classroom and the clinic. A student experiences a smooth transition to the clinic and gains confidence in what was learned in the classroom. "I know this is one of the main reasons we became skillful" a recent graduate wrote. An instructor said "the program became stabilized when they went to the web-based, core program. The instructor deficiencies and biases were eliminated. Everyone knew what everyone else was teaching. The students were not getting conflicting and confusing information." The techniques are generic (no cook-book systems) and cover the classic chiropractic adjustments every Chiropractor should be able to perform in practice.

The manipulations are related to restoring the biomechanical function of joints. Every manipulation is a rotation in a negative or positive theta direction, or in translation along the three orthogonal axes. This approach is consistent with the basic science information students study in anatomy, physiology of joints and biomechanics. The old model of listing the position of a vertebra or extremity was contrary to what students learned in the basic science program. The result was the student needed to "believe" in a technique system and its' co-relating dogma, often called "Chiropractic Philosophy". The more than three hundred systems to pick from, has made the standardization of chiropractic technique and the clinical application, impossible. Especially, since many chiropractors graduated with poor skills, they took private post graduate courses that were some of the three hundred available.

The achievable goal of the web-based assistance to a college technique department is to have graduating doctors that can provide chiropractic adjustments to the spinal, pelvic and extremity joints, with the end-result of restoring joint mobility, reversing the inflammatory process and the neurobiological mechanisms that allow a patient to regain their health.

The web-based video presentations will be demonstrated in real time; just the way an instructor would learn the content and the students would be able to review the instructors' lab presentations.

The method has one, proven successful, college integration, that has been going on for three years. When I was visiting as a guest lecturer, I saw the clinic students all at a conscious, competent level. Male and female alike were confident in their skills. I personally had never seen this before or anywhere else, since.

Psychomotor skills need to be seen repeated and practiced. Students that are notified, as to what will be demonstrated on any given day, can watch the night before the class and have some idea, as to what will be demonstrated the next day. The drawback for introducing this core program into an existing college program is the inabilities of instructors to willingly learn the content of the tapes. It also requires a very confident instructor, to have a video source that the students can judge, whether or not, their instructor is highly skilled. Technique departments in some colleges are like fiefdoms and not easily changed by deans and administrators. For example, if the technique head is steeped in Gonstead's, static-listing, oriented adjustments, it is very difficult to get his or her department teaching

manipulation based on restoring inter-segmental, dysfunctional, ranges of motion around the three axes.

Demo: www.chiropracticmentor.com

Let's unite our technique core programs, world-wide and achieve standardization of chiropractic, clinical procedures. De-standardization occurred, when it became necessary to increase the basic science and diagnostic content of the college programs, without having to increase the students' college program to five years.

I leave with this question in your mind. What is a chiropractor who can't adjust at a professional level of skill? Is it like graduating dentists that can't drill out a decayed tooth and then fill it?

Web-based assistance to a technique program is a big part of the solution. However, the college heads must decide that reversing this decline in the average chiropractors adjusting skill level, by graduation day, is critical. The development of our profession depends on our mastery of the clinical application of manipulation.

If Socrates asked 100 different chiropractors "What is an adjustment?" he should not get 100 different answers, as he would today.

College programs should not be isolated and fundamentally different. The advent of web-based support programs can solve this standardization problem in our profession.

The Utilization of Web 2.0 Technologies to Facilitate Change and Promote a Research Culture within the Chiropractic Profession

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In 1997 the Chiropractors' Association of Australia (CAA) sought from the profession in Australia guidance on its future direction and activities via a series of facilitated consensus processes. One of the outcomes was a Vision Statement for the Association.[1]The CAA Board has developed successive strategic plans aimed at the realisation of this Vision Statement. Executing this strategy in the policy, political and public domains will require supporting evidence of effectiveness, hence Strategy Two, which is to develop that via credible scientific research.[2] The aim of this paper is to introduce the use of a set of Web 2.0 collaborative technologies that will facilitate the implementation of a proposed strategic framework for research in order to facilitate a change of research culture within the profession.

The chiropractic profession is a small compared with other mainstream health professions. Accordingly, it requires full utilization of available resources including supporting and encouraging members of the profession to undertake research, to exchange ideas, and to seek to ultimately bridge the gap between the profession and academia. We hope to promote this change by encouraging a change in vision for the future of the chiropractic profession. In order to achieve this, a research framework needs to be developed housing an infrastructure that will act as a resource for knowledge and knowledge sharing as well as a facilitator for improved image and recognition from other health professions. This framework could be utilized not only on a national level but also on an international level via the World Federation of Chiropractic.

The implementation strategies within this framework that is targeted at members of the profession will be facilitated by this set of collaborative tools, with the intent of providing the medium for interaction and knowledge sharing. Web 2.0 is one of these tools, and is more than a toolset. It is a descriptor of a series of information sharing and communication enabling tools, frameworks, patterns strategies and uses of tools within the World Wide Web to facilitate social networking and creativity. These technological components will provide an infrastructure for dynamic user participation, social interaction and collaboration.

The proposed research framework includes strategies incorporating: establishing

terms of reference and policies for a central research committee, a structured program to support and encourage members of the profession in writing skills (including grant writing), raising awareness of resources in order to conduct research, gathering information, developing mentoring programs involving writing circles and journal clubs, and lastly developing collaborative research groups. It is essential that the practising chiropractor sees the value of this activity of conducting research vis-à-vis their current daily routines, to critically think and act as a researcher. With this in mind, the framework is designed to promote the inclusion of research as an incremental change in their routines.

We are interested in facilitating the creation of a research culture, disseminating research knowledge and creating forums to an open exchange of ideas on topics of interest to the chiropractic community. Therefore, we are adopting a subset of tools from Web 2.0 such as the wiki and the creation of blogs. At Macquarie University, we are in the process of creating the Chiroblog, where CAA staff, practitioners and researchers alike, will be able to post a very short article (a blog) on any number of topics of interest to chiropractic. Chiropractic community members could then comment at will on its content. We are also creating the Chirowiki website, as a forum where readers from the chiropractic community can exchange ideas freely, edit existing content or post new content about specific documented in the history of the site. The intent is to facilitate the exchange of ideas using a web browser to foster communication and reach a consensus. The creation of virtual communities of Practice will be actively supported in these efforts[3].

The adoption and implementation of these Web 2.0 technologies will be advanced following diffusion and infusion strategies for effective transfer of complex technologies in organisations[4]. We have made the diffusion and infusion processes as two distinct sub-strategies within our strategic framework. The diffusion process facilitates the implementation of the research strategies as aligned with the mission and vision of the educational institution or professional association. The diffusion process is affected by mainly four determinant factors, as empirically determined: the organizational structure and culture, management/technical support, users' views on the complexity of the technology, perceived usefulness of the technology for its intended use. At the infusion stage, technology implementation and knowledge sharing occurs in order to maximize collaboration and reflective thinking. This process is affected by the following set of determinant factors: institutional effects, expected benefits from the use of the new technology, management/technical support, adopters views on the usefulness of the technology for its intended purpose, earliness of adoption. Determinants of the infusion and diffusion processes will be discussed in detail.

Although cultural change can be viewed as a long term strategic goal when talking about research and development and short term gains, we are developing a working framework which we expect to put in place to encourage practitioners to see the multitude of opportunities to include research and a research vision in what they face daily. The utilisation of the Web 2.0 Chirowiki and the Chiroblog will assist with the development of this framework, by developing a dynamic interactive medium that is flexible, adaptable, and linked to measured outcomes.

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Facilitating a Change in the Approach to Health: The Utilization of Technologies to Promote 'Chiropractic Plus,' a part of CAA's Wellness Initiative

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Along with many advanced Western countries, Australia faces increasing fiscal challenges in funding its 'health care system'. Much of the cause of this problem lies in the fact that what is called 'the health care system' is actually a disease treatment approach, focused largely on attempting to 'fight' disease and palliation of its symptoms, many of which are the results of unhealthy lifestyles.

In contrast, the focus of chiropractic is not on fighting disease, but on working with nature to facilitate health. This different philosophical approach may mean that there is a role for chiropractic in addressing these fiscal threats. Indeed, one government investigation has suggested that, to tackle these challenges, 'new models of health care will be required.'[i]

This requirement fits well with the Vision Statement and Strategic Plan of the Chiropractors' Association of Australia. Accordingly, it has developed a 'Wellness Initiative', which seeks to position chiropractic as one of these models by adding 'Chiropractic Plus' to the traditional chiropractic approach of detection and correction of spinal and other subluxation complexes. Chiropractic Plus involves a series of continuing professional development seminars to assist practitioners and their staff to learn and utilise simple and effective procedures to assess their patients for the major risk factors to health, such as obesity and lack of exercise, and to advise them on how to minimise these risks via low cost, low intervention self care strategies.[ii] CAA is also working to have Chiropractic Plus incorporated into pre-professional chiropractic programs.

This paper introduces 'Chiropractic Plus' and describes the utilisation of technologies to facilitate this change in approach from disease treatment to prevention and wellness.

Within this framework, two technologies are presented, with the expectation that the following will be utilised for this initiative: 1) a set of interactive online and CE-ROM tutorials and assessment media on Wellness and healthy lifestyle both for chiropractors and their clients 2) a Wiki on Wellness, whole body health, and its impact on healthcare and the healthcare costs. It is proposed that CPD points will be provided to chiropractors who complete a specific set of relevant tutorials.

It is hoped that the use of these technologies will facilitate a widespread adoption of 'Chiropractic Plus' by the profession. This would not only help improve the health of Australians, but also contribute to lessening the financial challenges mentioned above and to positioning chiropractic as a true wellness profession. [iii]

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[i] http://www.pc.gov.au/study/healthworkforce/docs/finalreport

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Translating Research into Practice – FCER's DC Consult Website

Reed B. Phillips, D.C., Ph.D

Since FCER was first conceived and organized in the 1940's, its' mission has been to bring the practicing chiropractic clinician and research into a closer working relationship. Several research projects were funded by the Foundation in its early years. As the name implies, Foundation for Chiropractic Education and Research, our emphasis is on both Education and Research.

> Education without research is like confession without sin. The former lacks meaning without the latter. (from Al Adams – original source unknown)

During the decades of the 50s and 60s, chiropractic education was struggling for its very existence and fighting the battle of recognition and accreditation in the eyes of the US Office of Education. The Council on Chiropractic Education (CCE) was a birth child of this process and an offspring of the original FCER.

In the decade of the 70s, and ever since, FCER, with the sustaining influence of other benefactors, re-ignited its support for research projects, primarily through grants to various chiropractic colleges. It was during this period the FCER Fellowship support program was also started with Scott, Jay, and myself as some of the early recipients. FCER continues its support for research grants and fellowships as part of our primary mission.

In the last two years, after undergoing an in-depth analysis of current programs, FCER determined there were additional services we should be providing the chiropractic profession beyond funding grants and fellowships. This added dimension is what I am here to share with you today.

Evidence Based Resource Center (EBRC)/DCConsult.com

In this digital age, the transfer and repository of information is key and critical. FCER has launched the formation of an international repository of all information related to chiropractic. The window into this EBRC is through our new web site www.dcconsult.com. The initial platform for the EBRC is the MANTIS data base originally constructed by Dr. Ron Rupert.

I should like to demonstrate (live on-line) the many features of DCConsult. The following is a list of the web pages to be viewed:

www.DCConsult.com

Opening page and registration procedures

MANTIS and MEDLINE searches

Introduction to navigation on the web site

Articles and updates available upon log in.

Clinical Condition list

Evidence Based Reviews

- Prevention
- Diagnosis
- Treatment

Patient Education Materials

Additional resources

Important links

The potential for this web site is astounding. Currently it is designed for rapid access and easy use by the busy practicing clinician. As the EBRC grows, we see an expansion of the material contained in the database to be useful for the following:

Chiropractic education

Nutrition and health

Accreditation and regulation

Legal

Business

Public Education

Finally, if this platform can serve chiropractic in a functional and meaningful way there is no reason why this same framework could not also serve the other CAM professions as their need to become more evidence based emerges.

Remember, the mission of FCER is to Translate Research into Practice.

Searching the Scientific Literature

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There has been a profound change in methods of searching the scientific literature during the last few decades. In addition, there are trends that signal significant future changes. Indexes were developed when, as the number of published journals grew, the ability to manually locate specific work became too difficult. In 1879, the Library of the Surgeon General of the Army developed *Index Medicus, A Monthly Classified Record of the Current Medical Literature of the World, Series* 1.[1] The *Index Medicus*, the largest of medical indexes, is considered a good yardstick for the growth of biomedical literature. For the first 60 years it weighed 2 kg each year. The size doubled between 1946 and 1955 and increased sevenfold by 1978, when it weighed approximately 30 kg. Hard copy indexes became unmanageable and prompted the National Library of Medicine (NLM) to create the Medical Literature Analysis Retrieval System (Medlars) in the United States in 1964, at about the same time databases were being developed in Europe and Canada.[2] This digital recordkeeping system was made possible by the development of computer technology, and with the computer platform came a totally new way of indexing and searching the literature.

With today's growing emphasis on evidence based practice and patient centered care there is a need for all health providers and educators to develop competent literature search skills. Literature searching is no longer limited to librarians and researchers. Studies indicate that a physician's knowledge declines over time and requires exposure to new information to minimize loss of clinical competence.[3] As the late Joe Keating once noted "Doctors of chiropractic, no less than other health professionals, can expect to be held legally responsible for their knowledge ability and performance (or lack thereof) within the informational base provided by the scientific literature." [4] Haldeman went on to say "Determining which profession(s) will be allowed to practice manipulation in the future will depend on the scientific knowledge and the clinical skills of its practitioners. This, in turn, is dependent on the ability of clinicians in each group to keep up-to-date with changes taking place in the field." [5] Evidence based medicine, which considers the patient's desires and needs, the doctor's experience along with the scientific evidence, elevates the emphasis and importance of using current scientific evidence relative to past eras in healthcare. Literature search skills are fundamental to evidence based medicine.

The Three Primary Needs for Effective Searching:

There are three primary pieces of information needed to effectively search the scientific literature. At first glance these may appear to be simple, but in reality developing a high

level of competency is quite complex. The first requirement is to identify the source or sources of the information needed. Which databases should be targeted that contain the information that is needed? Medline is the largest database of biomedical scientific literature, but it only indexes approximately eighteen percent of the biomedical literature. For this reason, over thirty other health related databases have been created. The Cumulative Index of Nursing and Allied Health (CINAHL) is an excellent index for nursing information. Biosis is a strong biological science database and there are many others. Having knowledge of the array of databases along with the strengths and weaknesses of each will provide a strong basis to address the first primary need to search effectively.

The second skill involves formulating the proper question and being able to ask that question of the database. This often requires skill at using multiple software interfaces. These interfaces vary with some of the database distributors like the National Library of Medicine, OVID, DCConsult, Dialog, Ebsco and Datastar. One fairly recent method of formulating questions for searching the literature is PICO. PICO is designed to help the clinician formulate a better focused query of the patient's problem/needs for subsequent searching of biomedical databases. It is also designed to assist with the patient centered evidence based medicine movement. Although most find PICO very helpful, the superiority of PICO has not been clearly demonstrated. A recent study concluded "Searches performed on a PICO-formatted screen retrieved a higher percentage of relevant citations than searches performed on the standard PubMed search interface. However, due to the small number of searches for each arm, this pilot study could not demonstrate a statistically significant difference between the search protocols. There was a suggestion of a trend towards higher precision that needs to be investigated in a larger study to determine if PICO can improve the relevancy of search results." [6] No matter what method is used, the skills described here are needed to take advantage of any search strategy.

Successful literature searching also requires knowing and understanding the structure of the database, the indexing terms used and the software limitations for formulating Boolean arguments. Text searching or "keyword" searching is the most common as reflected by studies of medical providers, but they are the least productive and the least accurate. To compose an effective search of biomedical databases it is essential to have a basic command of Medical Subject Headings (MeSH), subheadings, check tags and other operators. Using the proper words or terms to ask the question is therefore the third component of an effective search strategy.

Choosing the correct database(s) is crucial and that takes a little time to review them. For a general overview of just about any health related topic, the National Library if Medicine (NLM) is usually the best place to begin. If the topic is specific to a clinical problem or a discipline, then there are often specialized databases that prove to be superior. Table 1 provides a brief comparison of the content of the most important databases related to chiropractic. NLM despite the enormous size with 17 million records only has about 4,400 citations related to chiropractic. The Index to Chiropractic Literature only has 9,600 citations (as of September 2008) and only about half of those are from peer reviewed journals. The Manual, Alternative, Natural Therapy Index System (MANTIS) has over 300,000 records of which most are peer reviewed with abstracts.

Numerous comparisons have been made and published in the scientific literature comparing MANTIS, Pubmed and ICL, as well as other databases, relative to their usefulness in retrieving chiropractic related content. All previous studies point out the superiority of MANTIS. [7-9]

What is confusing is that the Index to Chiropractic Literature is not the index to chiropractic literature. That is to say it only indexes the few publications, mostly magazines, supported or published by the chiropractic profession. Therefore, many of the most significant contributions to research published in Spine and similar high quality biomedical journals are not included in the ICL. These publications are included in MANTIS and Pubmed. The only strength of ICL lies in the fact that it is the only index that includes non-scientific non peer-reviewed magazine articles. Two magazines alone represent approximately 50% of the content of ICL (1,856 from the American Chiropractor and 2,734 from Today's Chiropractor).

Databases and relative sizes:	# of Articles	Peer Reviewed
Pubmed (NLM):…… 18 million citations		>17 million
MANTIS:……300,000 citations		> 290,000
Index to Chiropractic Literature:….9,600 citations		< 4,000

Examples of relative value of indexes for retrieving chiropractic research literature:			
	MANTIS	**ICL**	**Pubmed**
Chiropractic	17,867 citations	6,900 citations	4,402 citations
+ headache	242	44	126
+ child	376	53	175
+ whiplash	126	25	43

TABLE 1

Learning how to effectively search the chosen database(s) can be a complex task and requires some time to explain. This can only be addressed superficially here. The most important concept to understand is what indexing is, how it is done, and what words/terms are used. There is a specific and rather lengthy indexing policy that is used by the National Library of Medicine. Indexes like MANTIS and CINAHL use the same indexing strategy. Simply put, indexing employs a restricted set of words (approximately 35,000) to describe the major content of a research article. This is necessary because there are so many ways and synonyms in English as well as other languages to describe clinical material. Is it lumbago, lumbalgia, low back pain, backache or some other set of words? Using the restricted vocabulary of MeSH, the indexer would add the index term "low back pain" regardless of what words the author of the article used. In this way, if you search using MeSH terms you will theoretically get all of the articles related to the subject you want. Creating Boolean arguments with "AND", "OR", "NOT" statements will help target the proper content and exclude unwanted articles. Tutorials for both Pubmed from NLM and MANTIS through DCConsult can be found online at www.pubmed.gov and www.DCConsult.com respectively.

Current Trends in Information Dissemination:

The ability to search from databases will always be a skill necessary to retrieve the most current information. However the process can be both time consuming and expensive for the average chiropractor. During the last couple of decades others have recognized that many clinicians will not or can't develop the necessary skills to effectively use biomedical databases. The process involves more than just retrieving the most current information. That information must be subsequently critically read and weighed with other information on the same subject. Several organizations have developed review processes to help the clinician and educator by providing online reviews of specific health care topics. The Cochrane Collaboration, founded by the British epidemiologist Archie Cochrane in 1993, is one such review group. It is primarily a volunteer not for profit group and provides reviews based upon clinical trials. The Cochrane website and more information can be found here at www.cochrane.org. Bandolier is another British initiative www.medicine.ox.ac.uk/bandolier. This group conducts periodic literature searches through Pubmed and the Cochrane site to create reviews on varied health topics. "The impetus behind Bandolier was to find information about evidence of effectiveness (or lack of it), and put the results forward as simple bullet points of those things that worked and those that did not: a bandolier with bullets. Information comes from systematic reviews, meta-analyses, randomized trials, and from high quality observational studies." [10]

A recent initiative developed for the chiropractic profession and lead by the Foundation for Chiropractic Education and Research (FCER), has created unique reviews that cover the evidence for prevention, diagnosis as well as treatment of commonly seen conditions. This strategy of reviewing the literature was created by the staff of the Research Institute at Parker College of Chiropractic. These reviews along with MANTIS are available through the FCER website www.DCConsult.com. The Council on Chiropractic Guidelines and Practice Parameters (CCGPP) has also created a series of reviews using volunteers from primarily the

chiropractic research community. These reviews are focuses primarily on treatment with manual procedures. They are very thorough and complement well the work of FCER with DCConsult.

The trend in producing reviews eases the burden to a degree on clinicians and educators. There are problems thought to include the fact that many important subjects have not been reviewed and some reviews are not current and often exclude very critical new research. In addition, some reviews are not done well and either reflects a strong bias or incompetence on the part of the reviewers. Perhaps the safest strategy is to use a current review in concert with current literature retrieval on the subject. This is one of the strategies used with DCConsult.

The Future of Information Searching:

There are many future changes that will favorably impact the ability to search the literature. The hardware and software technology used in computer systems are permitting more complex searches of larger data sets. These searches can be conducted in far less time than ever before. Access to full text journal articles in digital and searchable forms is expanding. The U.S. Government has recently required that published research created as a result federally funded grants be made available at no cost within a specific window of time. The availability of full digital full text creates an opportunity for sophisticated data mining software coding and unique information retrieval. An ontology related to chiropractic information is being planned that would also have a positive impact on literature searching.

In summary, effective searching involves formulating the correct question, asking that question is the proper way i.e. using MeSH terms and Boolean arguments, and finally asking the question of the appropriate database(s) where the subject content exists. Future technology and strategies will continue to enhance the ability of educators, researchers and clinicians to access current clinical information and improve patient care.

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Library Online Supports University Research Activity

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Logan University

Introduction: Searching and reviewing the literature are required for students to complete a senior research project in most chiropractic colleges and medical schools. It is also the prerequisite to student and faculty research projects. In many cases, this step determines the direction, methods of the research and whether or not the study will continue. This initial work was so important that it often set the tone for the research project and often resulted in termination of a research project due to inefficient research information and publications. In other cases, the lack of information prompted the researchers to conduct innovative projects to fill in the void of literatures.

Despite the importance of this initial research step, many students and faculty members had difficulty to get sufficient information for their research projects. It could be true of lack of publications in those areas but most often it was due to incorrect search strategy and did not know where to look for the information. The most commonly seen mistake in literature search in a study was to search narrowly to a condition such as laser therapy on hypertension. The researcher would suggest that there were no such studies or there were one or two such studies. These authors believe only similar studies published are important to their study. In fact, the search should not be limited to laser on hypertension only. The search should include laser therapy and a separate search on hypertension. The wide view of literature search is not only provided more information for the study but also provided a good learning opportunity for the researcher to gain understanding of related studies.

Since search and review the literature have become an important part of chiropractic education and research, the authors explored the facets of searching and reviewing the literature with three typical studies in recent research publications.

Methods: This report summarized three research projects that presented similarities and challenges in terms of searching strategies and subject mater that related to the success of the research project.

Project 1. Randomized clinical trials of chiropractic adjustment on heart rate variability and low back pain. This study was published in JMPT.

Project 2. Age and gender on heart rate variability. A literature review with pooled research data. This study was published in JMPT.

Project 3. Effect of Proadjuster on urinary incontinence. A case series study. This study was published in the Journal of Chiropractic Medicine.

Results:

Similarities in search strategies for all three projects.

1. Searching the literature to determine if this subject has been studied and reported before. If there were similar reports, what was the extensiveness of the previous studies? The first data base to search was the Pubmed and than followed by searching the chiropractic and alterative medicine data base Mantis. In all three projects, it was concluded that the studies had not been reported before.
2. The key search strategy in all three studies were to use the combination of key words and the advanced online searches from our university website to quickly get relevant research papers directly to the researcher's computers. This has been proved to be the most efficient way to use our library resources.
3. Another key search point was to work closely with our library staff members to order papers from neighboring universities. If this was not enough, out of state universities and libraries would be contacted.
4. Collect all relevant references and use computer software such as Reference Manager and Endnote to organize the information. Examples will be presented in the conference.
5. Once information was gathered, it was critical to review research methods, subject population, and new technology that have been used in those published studies. It was important to incooperate those finding in the current studies.

The challenges for the three projects:

Project 1 faced the challenge of research funding to support a large scale randomized clinical trial. It was noted that there were very few chiropractic studies using heart rate variability. This prompted the authors to search HRV related literatures outside chiropractic. The literature search helped the research proposal to secure the research funding.

The main challenge of project 2 was pooling data from several studies to create a large data base to determine the impact of age and gender on HRV. A search of literature did not find many studies like this. However, by looking back, it was noted that some studies published regarding age and gender on HRV were not included in the paper. This oversight reminded the importance of thorough search of literatures and reviewing all relevant articles in the areas of study.

When the search was done on the project 3, we could not find any similar studies. There were no peer-reviewed publications on Proadjuster. The authors had to provide detailed information about the Proadjuster system and mainly using the urinary incontinence literatures in chiropractic and medicine.

Conclusions: Searching and reviewing literature are integral part of chiropractic research. Best results were achieved by fully utilization of university library resources and databases. Learning from other peer reviewed studies and publications could minimize study mistakes and improve the quality of current research projects.

Talislist – An Online Reading List at the University of Glamorgan to Facilitate Learning

Rachael Morgan
David Byfield

University of Glamorgan

Online reading lists (ORLs) are a relatively new addition to the group of tools used to assist teaching and learning online at the University of Glamorgan. They allow users to locate and access readings and resources directly from their reading list, bypassing the need to search for them using the details of the citation.

As part of a blended learning strategy, an ORL project has been developed at the University of Glamorgan's library since 2005. The ORL system used is Talislist, from the Talis company, which also provides the University's Library Management System. The ORLs are embedded into their corresponding modules within the University's Virtual Learning Environment, Blackboard.

ORLs provide direct access either to the details of resources or to the resources themselves. At the most basic level, ORLs are simply dynamic replicas of paper-based reading lists. However, they may also be described as *resource management systems* reflecting the fact that they can be used to provide access to many types of resources and materials, other than those that might normally be found in a paper-based reading list.

Students at Glamorgan will open their ORL from within their online designated programme module database, and then by clicking on the individual resource titles, they can either open details of how to find the resource (e.g. realtime library catalogue records), or the resource itself (e.g. a full-text e-journal article, e-book, or website).

There are benefits to using this type of system for both lecturers and students. For lecturers it means that the library can check the availability of the required resources; new resources can be added very quickly or unwanted resources can be removed, without having to disseminate the information to students; there is the potential to use a wider range of materials than would normally be contained in a paper-based list; the library can assist with discovering alternatives to unavailable materials, and deal with issues such as copyright.

For students, they have seamless access from their Blackboard module to the resources they will need. They will have direct access to their essential resources without having to plough through the huge amounts of information now available to them. There are plans across the University to include ORLs as a standard tool across all modules, thereby creating consistency for students and they will be able to precisely target what they will need when accessing their reading lists.

The ORLs are structured according to the wishes of the academic, and so in this respect, will not look dissimilar to the paper version. The resources can be listed under one heading, (e.g. 'Concise Indicative Reading List), or under a number of headings and subheadings (e.g. by week or by topic).

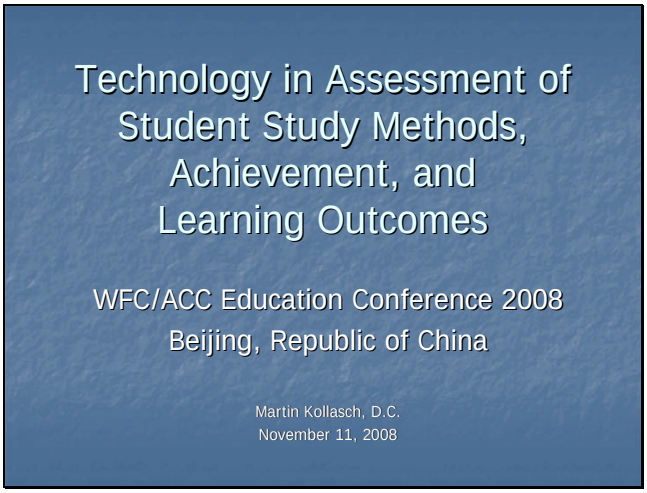
Annotations can be added to the individual resources and to the list headings. In addition, alternative sources can be added to items so, for example, if there are two editions of a book available, the older edition can be added as an alternative source to the newer one.

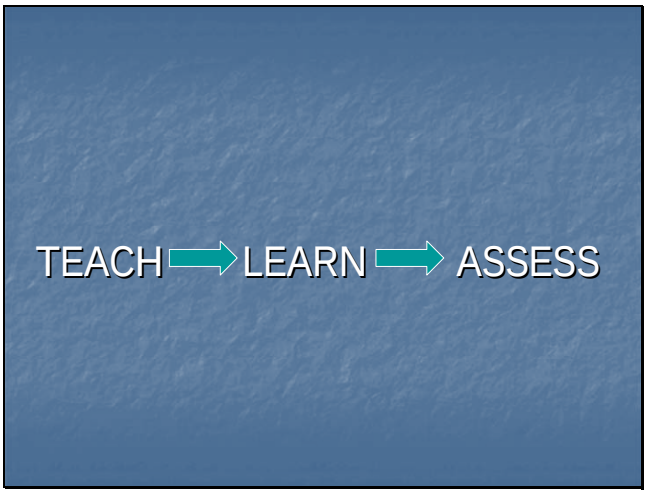
Currently the most common links that are made within the ORLs are to library catalogue records but in theory, it is possible to provide a link to anything that has a URL. Therefore, links have been made to e-journals, e-journal articles, e-databases, e-newspapers, e-newspaper articles, e-books, and websites. Under the University's CLA Scanning Licence, we have provided links to scanned book chapters, journal articles, and diagrams, easing problems related to students not being able to access core texts due to insufficient stock.

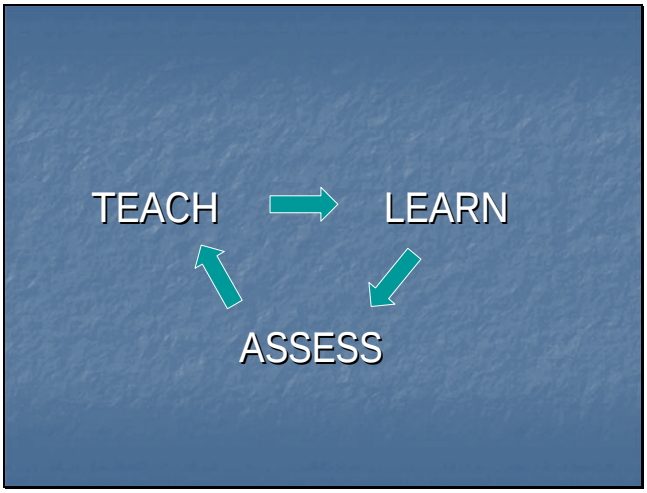
In the future, additional links will be created to provide connections to, among other materials, podcasts, TV programmes, films, radio programmes, and more. This presentation will give an overview of this facility and outline the student experience.

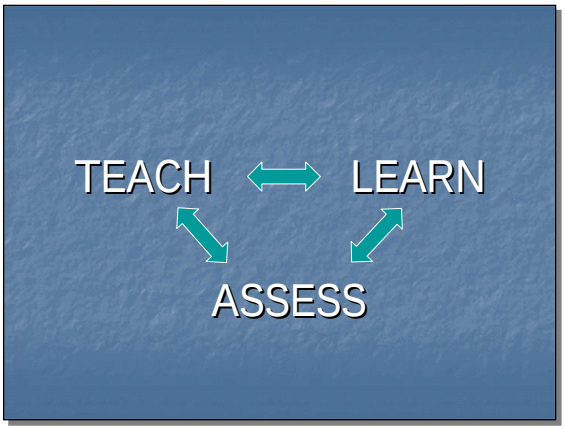
Technology in Assessment of Student Study Methods, Achievement, and Learning Outcomes

Martin Kollasch, D.C.







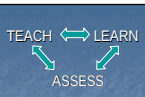


Begin With The End In Mind

"Students prepare for what they expect to be the performance requirements" (Fransson, 1977, p. 245).

For students, assessments are the operational definition of the curriculum.

E.g. Miller (1961); Becker, Geer, & Hughes (1968); Snyder (1971); Miller & Parlett (1974); Rowntree (1987); Ramsden (1992); Boud (1995); Brown (1997); Brown & Knight (1994); Pangaro & McGaghie, (2005); Watkins, Dahlin, & Ekholm (2005); Kirkwood & Price (2008).

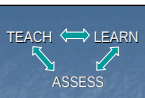


"It is hard to tell which component is prior to the others. It seems that the way that teachers teach, students learn, exams are constructed, assignments are developed, feedback is given, and textbooks are written are all interrelated." (Havnes, 2004, p. 170)

Begin With The End In Mind

Do you consider (when you are planning) the influence that your choice of assessment will have on ***what*** your students will pay attention to, and learn, during the formal learning experience and independent study; and on ***how*** they will study and learn?

E.g. Tang (1992); Scouller (1998); Kirkwood & Price (2008) .



- Teaching Styles
  - Taxonomy
  - Pedagogy
- Learning and Study Styles
- Assessment Methods

Assessment Methods

Formative	Summative
Descriptive Evaluations by Teachers	Formal Examinations (internal and external)
Evaluations of Clinical Encounters and Records	Checklists, Rating Scales, Portfolios
Simulations Standardized Patients, Mannequins, Virtual Reality	Simulations Standardized Patients, OSCE, Mannequins

Technology and the Assessment of Student Achievement and Learning Outcomes

Dr. Mark Christensen, Ph.D.

National Board of Chiropractic Examiners

The National Board is using several technologies in the assessment of student achievement and learning outcomes. They are as follows: Item Response Theory (IRT), Extended Matching for the Part III examination, and new technologies used for assessing health conditions in the Part IV exam.

IRT:

There is a revolution in the testing industry. Classical measurement approaches have given way to Item Response Theory. What is IRT? It is a group of related test models that have been demonstrated to be useful in the design, construction, and evaluation of tests. What are the benefits of using IRT? IRT allows accurate measurement with the use of shorter examinations. It also allows the production of measurement traits pertaining to individual test questions for an entire bank which may consist of thousands of test questions.

The NBCE has calibrated all of its test questions in the Parts I, II, and III exams using IRT. This use of IRT allows the production of multiple equivalent forms of the exam and the use of shorter forms of exams and the use of computer adaptive testing as appropriate, for examinations.

Extended Matching for the Part III examination:

The National Board has used extended matching items along with traditional multiple choice in the Part III Pilot Exam on several chiropractic college campuses. Results are extremely promising. Extended matching questions are doing an excellent job of measuring and giving a look and feel of actual clinical practice. More information concerning extended matching questions will be given at the conference and to all chiropractic colleges and students preparing to take the Part III exam using extended matching items projected for 2009.

New technologies assessing health conditions are being considered in the Part IV examination:

The National Board is exploring modifications to the Part IV using new imaging technologies and other approaches now becoming common in chiropractic practice. More information will be provided at the conference and will also be provided to chiropractic college academic officers and to individual students pertaining to the Part IV assessment.

Technology and Psychomotor Skill Assessment and Progression

David Byfield, DC,MPhil

University of Glamorgan

Chiropractic manipulative procedures are comprised of many complex psychomotor skills performed in a sequential fashion including, among others practitioner posture, hand positioning and delivery of a therapeutic thrust. All of these are performed by chiropractic practitioners on a daily basis when managing a host of musculoskeletal and other conditions. From an educational perspective, learning and teaching such complex manipulative procedures presents a significant challenge for both staff and student alike. The challenge becomes even more demanding during the assessment process when appropriate acquisition and progression to the next level of achievement depends on the student adequately demonstrating curriculum requirements and specific learning outcomes in a transparent process that also has to meet institutional quality requirements. To date most assessment methodologies are subjective in nature and primarily rely upon the assessor's overall 'view' of a student's performance of a particular set of skills depending on their level of study within the undergraduate programme. An element of objectivity is clearly absent under these situations which may disadvantage student in terms of accurately grading their performance during a practical skill examination and providing meaningful post-assessment feedback to enable the student to move forward. There have been attempts to incorporate some technology into manipulative skills training and a few studies have investigated various strategies to enhance skill acquisition. However, there is very little in terms of student assessment and progression through undergraduate training to ensure competency at the exit point of the programme. At the Welsh Institute of Chiropractic we are in the process of trailing video analysis and related software as both an assessment methodology and feedback tool for students, in the next academic year. We are also planning to incorporate portable force plate technology and associated software to provide students with a visual feedback process during manual thrust applications. This presentation will outline the capabilities of video analysis software (Sportscode) and force plate technology (Vernier) as an assessment and feedback tools for manipulative psychomotor skill development and progression. The presentation will also provide details concerning the breakdown of various common manipulative procedures and developing measurable competencies against which to assess successful acquisition.

Assessment of Online Learning in a Chiropractic Technique Course

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Tom Bergmann, BS, DC

Northwestern Health Sciences University

During the summer term of 2008 NWHSU presented their first online course using the Moodle course management system. The lecture component of the Cervical and Thoracic Manual Therapies course took place in an asynchronous hybrid online format. Individual lessons and modules had previously been used in various courses but this was the first course with the bulk of the content presented in an online format. Nine weekly online modules replaced the traditional weekly 1½ hour lectures. To ease the transition to online learning, two lectures were held in the classroom- an introduction to the course and a group case study project where students met on campus but completed the project online. In the future, these sessions will likely also be offered online for a fully online course except for the examinations. The midterm and final examinations are presented in the traditional manner due to security concerns and to limit text anxiety in individual students with limited technical skills.

A variety of software applications were used to develop the online modules including StudyMate, Camtasia and SoftChalk. Lecture content was primarily presented in the format of narrated PowerPoint slides with readings from the textbook, course notes, and journal articles supplementing this material. Online case studies in a variety of formats were an important part of the course.

Large class sizes are a challenge in the implementation of online courses. Typically online courses are limited to 20-30 students or fewer. Northwestern's class sizes vary from 80 to 120 students. This course was specifically designed to overcome this obstacle. Many of the assessments are automatically graded by the course management system. Others are designed to utilize the assistance of secondary instructors or teaching assistants for grading. Discussion forums were utilized on a limited basis due to concerns with time management and students were placed in groups of six to make discussions feasible.

Students currently spend many hours per day sitting in the same classroom. The online asynchronous format allows learning to take place at locations and times that are more convenient to the student. Currently, if students miss a lecture they are not able to recreate this experience. The same applies if they do not understand the material upon initial presentation. The online multimedia format allows students to revisit information as many times as they choose, potentially leading to greater retention of material. This format also supports the use of active learning. Modules are designed to require active student participation and learning assessments are embedded in many modules.

A study was designed to compare the effectiveness of this online learning format to the previous traditional lecture format and to determine specific areas in which the online format could be improved. We hypothesized that overall online learning would be similar to the traditional lecture setting but anticipated areas in which this format would need to be adapted to improve student learning.

The specific purpose of this study was to evaluate whether test scores obtained using an online format are equivalent to test scores obtained with the previous lecture format. An additional purpose was to determine specific areas in which test scores might be deficient compared to the traditional format so that these areas could be addressed in the future content. The basic content taught in the online format is the same as previously taught in the lecture format and written examinations equivalant to those administered in previous terms were used.

Average midterm and final examination test scores obtained by the Summer 2008 class taught in the online format will be compared to overall average test scores for midterm and final examinations obtained by previous classes taught in the lecture format over the past 3 years. The individual test question results are still available for the Summer and Fall 2007 exams. An item analysis will be done comparing this data to the Summer 2008 results.

Preliminary midterm results find the traditional format to be slightly superior to the online format. Average midterm scores from Summer 2008 (74%) were 2 percentage points lower than the Fall 2007 scores (76%) and 5 points percentage points lower than the average midterm scores over the past three years (79%). Although we had hoped that the online format would result in equivalent test scores, we are still pleased with these results on this first attempt. Several factors likely contributed to the lower scores. The instructor was new to the content as well as to online course delivery and this was the first online course in the history of NWHSU. Although the content was similar to the previous lecture format, there were still significant differences in presentation and delivery. The midterm examination did not reflect these differences as the the previous lecture examination was used in order to facilitate this study. An additional reason for decreased performance is hypothesized. With the online format 200 points are added to the course in the form of active learning assignments. These points decrease the weighting of the exam scores from 50% of the overall course grade to 33%. When the exam has less weight, students have a tendency to direct less time toward this assessment and towards higher stakes examinations in their other courses.

Several steps will be taken to improve learning outcomes in the online learning format. Areas identified as deficient on item analysis will be addressed with added content and/or active learning activities. Examination points will be increased from 100 to 150 to return the exams to their previous weighting of 50% of the course grade in an attempt to encourage students to spend more time with the course content. We will likely continue to use the same examination for at least one more term to aid in analysis of the use of online learning. However, consideration will be given to making minor changes in the question design to more clearly reflect the new format. These changes will be made so that they can be studied in the Fall 2008 course.

A Curriculum Mapping Database to Meet the Learning and Teaching Demands of Chiropractic Training

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Aron Downie B.Sc, M.Chir

Macquarie University

It is generally accepted by educators that curriculum is a 'living entity' which, to remain healthy and to function effectively, must adapt to the environment in which it is found. The chiropractic program at Macquarie University, Sydney, Australia is regularly reviewed in order to ensure maintenance of quality and professional relevance.

Curricular changes are currently being proposed for commencement in 2010. Although this is partly a consequence of perceived needs by the department, it has also been catalysed by a major curriculum renewal and academic restructure currently taking place on a university wide level.

The proposed curricular changes focus on integration. This includes the integration of both the content of the chiropractic program, as well as the process by which it is delivered. A curriculum mapping database is being developed to facilitate this process. This database aims to facilitate the learning and teaching process at all levels of interaction from faculty to student. These aims include:

For Faculty

1. The mapping of the Macquarie University concept of *graduate capabilities* to our discipline specific graduate capabilities (ie the 'ideal chiropractic graduate) as determined by the chiropractic accreditation bodies and the profession

2. Providing planning assistance in course design (within unit / across units / across years)

3. Use as a self-assessment tool to realize where lecture content may need to be better aligned to assessment criteria, or where assessment criteria may be outdated.

4. To improve consistency in outline generation

5. To identify areas of integration across units and the degree program

6. To understand what the student has covered in other parts of the course, and

7. As a tool to help the department rationalize the curriculum

For students:

1. To better understand assessment criteria

2. To better understand course integration

3. To search the database for
   a. Unit outlines and lecture schedules
   b. Identification of where assessment criteria link to graduate capabilities.
   c. Identification of common topic themes across units (horizontal integration)
   d. Identification of common topic themes across the five year course (vertical integration)

4. To encourage students to become critical thinkers

5. To facilitate the use of effective study methods, to best suit individual learning preferences and styles.

6. To facilitate an appreciation of the importance of EBM. (evidence based medicine)

The need for this type of facility has been apparent to our department for some time. The limiting factor has been cost. In a very timely 'synchronicity' event, our submission of a proposal for funding the project in 2007 revealed that a university generated curriculum mapping database was being suggested by the Learning and Teaching Centre of the university. From this point in time, our efforts in developing the database, and those of the university have united, with representatives from the Chiropractic department becoming members of the university working party which is developing the database.

The advantages of the database are obvious. Ideally, it will be able to be used at all levels of student education, from year 1 of the B.Chir Sc, to the end of the M.Chir. It will potentially benefit all stakeholders – not only students and faculty, but the profession itself and most importantly, the patients who will eventually be managed by the students using this facility.

The timetable for the development of the database is largely influenced by the activities of the Graduate Capability and Curriculum Mapping university working party. Proceeding independently of this group is impractical, especially when considering the financial constraints of the chiropractic department. However, much work has already been completed, and much more can still be done in preparation for the launch of the database.

We have recently updated our concept of 'The ideal chiropractic graduate', using input from stakeholders in the university and in the profession. Further review will take place in consideration of the recommendations of the university working party, to produce a set of capabilities which considers the requirements of MQ, the chiropractic accreditation body, the Chiropractic registration board, the needs of both the chiropractic profession and the health care system in general.

We will then consider each graduate capability, and map the curriculum accordingly. Any recommendations for necessary modifications can then be suggested. This may include the need to amend sequencing, course content, resourcing, staff training, modes of delivery or assessment.

In effect, the development of this electronic resource has triggered a series of events in which the entire chiropractic curriculum is being reviewed in a systematic and efficient manner.

Introducing EMR in Chiropractic Education – Impact on the Educational Process:

Larry Stolar, DC, Dean of Clinics

Parker College of Chiropractic

United States of America

Introduction

Chiropractic colleges share three common purposes that would benefit from the implementation of Electronic Medical Record technology. The triad of quality care, education, and publishable research can be more efficient, effective, and enjoyable with EMR. This brief paper offers several points to consider prior to the selection, planning, and investment of an EMR system.

Overcoming Information Overload

Chiropractic clinicians work in a very information intensive environment. It has been said that a clinician would have to read and assimilate over 150 journals per months to stay on top of the information flow. In light of the fact that printed knowledge doubles every five years, confronting information overload is a daunting task for the experienced clinician, not to mention the student intern. One's capacity for knowing is limited by one's capacity for information storage, recall, and comprehension. Even the best students are finding it difficult to retrieve memory based information when it is needed in the clinical setting. Cognitive adaptation to information overload is not possible without effective use of technology. Information must be easily accessible and gotten to quickly. Proximity of data is a required function of any technology embraced. For chiropractic teaching clinics, there may be a need for the use of different scientific information databases that may be filtered, kept separate, or merged to accommodate the needs of patients.

Is it a reasonable expectation that experienced clinicians are able to keep in their minds the necessary information that connects names, codes, symptom manifestations, prevention, best examination tools, and evidence based care plans to a hundred of the most common ailments? Is there a different expectation for the inexperienced student intern? Technology provides the opportunity to get the right information to the clinician at the right time. Access to a virtual current knowledge manager within controllable circumstances can yield measurable improvement in the delivery of healthcare and outcomes.

EMR Decision Making Support in a Teaching Clinic Model

Decision making advice embedded in the EMR evidence based cart is accessible via the click of a computer mouse. This simple click carries with it the issue of instant access to evidence based information versus challenging the critical thinking skills of the student intern without adversely affecting the deliver of quality care to the patient. Patient care needs come

first and intern education is second. From acute to chronic conditions, passive and active care modalities and procedures, and differential diagnoses, treatment guidelines and algorithm availability, the licensed clinician and student intern have access to a reference point for care plan navigation.

There is a difference between sailing and drifting. Saving time, minimizing errors, and offering patient centered advice and care recommendations linked to the regularly updated best evidence is a worthwhile endeavor. The question of addressing the students' ability to use knowledge effectively and readily in clinic performance with or without access to an EMR based decision making support feature will most likely be answered with time, growth, and research. Evidence based prevention, examination, and treatment information instantly available at the point of care is a key feature of EMR technology and is an essential tool in the current health care marketplace.

Documentation Integrity and Information Crime

Templates for SOAP documentation and the recording of exam findings provide an opportunity for consistency and standardization. Committees made up of the department representatives who are stakeholders in the EMR project create the needed templates.

There is a growing trend of the rejection of records that contain evidence of cloning. Repetition of phrases, sentences, and whole paragraphs discredits the patient record. The *copy forward* feature of previous encounters to the current date to save time is a Medicare vulnerability and is described as *not unique documentation*. Soap note entries must reflect substantial relevant documentation, reasoning, and the necessity of care. The default feature that allows the selection of *all normal findings* to quickly populate exam data fields should be turned off in a teaching institution.

Protective steps are implemented to prevent invalid, non-authentic, fraudulent documentation. The ability to detect the pre-population of SOAP notes and exam findings when the patient is not present is handled by user access rules. Audit trails capturing the user ID number and record access is date-time stamped. The identity of the individual accessing a patient record to document an encounter, amend a note, or enter results of a phone call are authenticated for legal admissibility. The technology must date and time stamp every user including time in and time out of record. The attending licensed clinician's electronic signature indicates that the record is accurate, the diagnosis is supported by exam findings, and the treatment plan has a direct therapeutic relationship to the exam findings.

The patient's right to amend EMR data requires policy creation and enforcement on behalf of the teaching institution. The negligent transmission of patient information is a liability addressed by policy and embedded software prevention thresholds that require multiple actions before records are electronically forwarded.

Classroom Connection

Many EMR systems allow for the creation of templates that can be customized to the needs of the institution. Specific components of the examination or the examination in its entirety are made available for viewing and use in the classroom and labs. This creates familiarity with the EMR program early in the students' chiropractic academic career. As instructors demonstrate various exam procedures from orthopedics to performing range of motion, the

appropriate EMR screens are viewable and accessed for data input. The process of performing a component of the examination and the recording of the results is shown and made clear by example. The demonstration of exam procedures followed by the recording of the results in the class rooms and labs provides opportunity for repetition learning. However, this will not negate the need for student EMR training prior to entering the clinic. Student and faculty training seminars are needed prior to the initial 'go live' date.

Ongoing training for new faculty hires and student classes entering the clinic will likely be a work in progress for calendaring and curriculum consideration.

Research and Applying Evidence Based Information

Justifications for the absence of publishable research from chiropractic teaching clinics include lack of time, the ignorance of the process of performing research, and inefficient data collection. The report writing capabilities in most EMR products can trace and follow virtually any piece of quantifiable information and data field in the system.

Collecting and comparing the average case mix per student and doctor, tracking the incidences of various diagnoses, correlation of the relationships of different techniques, modalities and procedures utilized in care plans and measuring the outcomes provide the opportunity for frequent research publication production.

The biggest barrier to applying evidenced based chiropractic is the lack of health information technology tools to support it. EMR technology can enable chiropractic care recommendations to be, whenever possible, consistent with evidence of effectiveness and benefit. As healthcare information grows and becomes more sophisticated and complicated, it is becoming more unlikely that teaching clinicians are able to grasp all that is needed to know without mechanisms that can filter, sort out, and align information, pointing to the best solution for a patient's situation.

There is an unmet need for evidence stewardship. A review of what we know, setting priorities for what needs answered next, and more effective deployment of healthcare knowledge through chiropractic practice guidelines all come together in the decision support capability that EMR technology has to offer. With the support and guidance of our research and IT departments, the challenge of building a learning chiropractic healthcare system in which evidence is applied and developed as an intrinsic product of patient care will be a big step in the direction of meeting the need for evidence stewardship. We are a long way from routinely applying best evidence in the field practitioners' offices and in teaching clinics. Electronic medical record technology is the tool to close this gap.

Post payment Audits and Current Market Pressures

Today, healthcare providers are experiencing financial and operational stagnation that is eroding productivity and profitability. This includes declining cash flow, losses from inappropriate coding and billing, claims rejections and growth of accounts receivable. We are seeing new trends in the healthcare market such as pay-for-performance (P4P) and post payment audits.

On the surface, the implementation of a Pay for Performance (P4P) program in a teaching clinic is justifiable. It can be argued that production equals education. The more new patients, the greater the student's opportunity for patient encounters via more examinations, reports of findings, creation of treatment plans, use of outcome measures, and the application of adjusting skills. Measures enable doctors to establish goals, spot failures, and learn from results. As students shadow their clinic doctors, they will benefit from the fact that production is directly and indirectly related to learning opportunities. However, production by itself will fail to meet the needs of any P4P program. The combination of production and outcomes of care represent the answer and the challenge of implementing a pay-for performance program in a teaching clinic environment.

Quality care and business value measures are even more important in organizations where production measurement is not understood or accepted. Such organizations will need to operate according to new principles. Pep talks and mission statement reviews won't communicate this shift in operating principles as clearly as the introduction of quality care, value, and production measures linked to incentives and consequences. Cash flow, reimbursement, and profit are a consequence of quality care. Patients will commit their time, loyalty, and funds when they see a return of quality, competence, and results. Third party payers may do so if the documentation, diagnoses, CPT code selection, and number of visits required to achieve relevant goals are reasonable.

Receiving payment by a carrier does not constitute compliance to carrier policy bulletins or adherence to published coding rules. Are the funds received without strings or merely rented for a few months or years and recoverable with interest in a post payment audit six years later? The addition of a certified professional coder to the clinic staff is a good start, however, EMR technology with E/M coding scrubbers and diagnosis to CPT code matching provides additional protection in resolving claims issues prior to transmittal to payers.

Insurance carrier policy bulletins list modalities, procedures, and specific chiropractic techniques that are considered to be experimental and investigational. Few chiropractors educate themselves on these payer rules prior to patient examination and claims submittal. The practice management component of the electronic medical record is the tool that provides the clinician instant access to the rules associated with the contractual obligation they have agreed to comply with by their participation in the payer program.

Conclusion

The practice management (PM) component of EMR software allows for better utilization of all resources. The scheduling of patients to the attending licensed clinician or team member, a specific room, with exact equipment requirements, and a particular intern, is a feature that is not necessarily available in "off the shelf" chiropractic specific software products. The teaching clinician's knowledge and control over his or her schedule creates the opportunity for better quality patient care and improved learning interaction with student interns. Tracking student clinical performance for graduation credit and monitoring CCE requirements from a one source solution database would make most everyone in the IT department welcome Monday mornings.

Information overload and access to evidence based decision making support at point of care are issues that all healthcare providers will eventually confront. These issues present themselves without a single solution applicable to every provider's situation. Improving the delivery of quality care while addressing student intern critical thinking skills are not necessarily mutually exclusive when considering point of care evidence based decision making support.

Inadequate documentation and coding errors are responsible for much of the vulnerability the profession has created for itself in the Medicare system. This liability extends itself to other third party carriers. Fee slips generated by cash practices guarantee exposure to, not immunity from, documentation and coding audit failure. As post payment audits become more popular, few practices have implemented compliance programs or adequate claim scrubbing to minimize preventable errors that can cost the practice thousands in lost revenue and legal fees.

Much can be gained by implementation of Electronic Medical Record technology. It does come at a price in financial, personnel, and time resources. The results of the investment may not be immediate in terms of return on investment. Full implementation and customization to the unique needs of the user may take months if not years. The time is definitely here for implementation of Electronic Medical Record technology in our classrooms and teaching clinics.

Introducing Digital X-ray Systems in Chiropractic Education -Impact on the Educational Process

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Overview: The affordability and availability of computed radiography (CR) in chiropractic education was achieved in the early 2000s. The advent of digital radiography (DR) in chiropractic education followed in 2004. By 2005 online storage of images in web-based environments became a reality. Since the first installation of CR technology by Life Chiropractic College West there has been a rapid and widespread adoption of this technology in chiropractic education throughout the world. In comparison DR technology that also first came to chiropractic education at Life Chiropractic College West has not been as widely adopted.

The end product of each technical approach (CR and DR) is the same. The method of acquisition, the intermediate steps involved and the costs of the two approaches vary considerably. Nonetheless the image ultimately created and the utilities afforded through either process are the same.

Background Evaluation and Analysis: The areas that must be explored in advance of a decision to implement CR or DR technologies include:

a. An analysis of the financial implications of the transition

b. An analysis of the physical facility requirements associated with transition especially in light of maintaining a film-based operation concurrently

c. An analysis of the data support capacities of the institution or program

d. An analysis of the technology infrastructure of the campus in terms or systems available to be used for these functions, broadband capacity, network capacity, storage capacity etc.

e. The demand on technicians and faculty to now function in two environments; film and digital, and the implications this has on course design as well as staff and faculty loads

f. The impact that these technologies on the types of images used for technique specific purposes within the institutions. For example, restraints of CR and DR systems with respect to full spine imaging, limitations of CR and DR systems in terms of obtaining views requiring a tilting bucky etc.

Introduction and Implementation: The change from film based radiology to either CR or DR

technology is clearly a disruptive process. It represents a significant change in procedures, equipment, output and output management. As a result a coordinated approach to the introduction of the concept and the implementation of the technology are required. Unlike many other disruptive processes this transition is cost-effective and results in cost-savings over time.

Most notably patient imaging in the CR and DR environment now involves a significant information technology/data services interface. The physics of x-ray production doesn't change but the acquisition, use and storage of the images created changes radically.

Assuming the necessary parties for the transition to CR or DR are "on board" with the changes involved the next steps require an evaluation of how the change will affect:

1. Clinical procedures, including acquisition, interpretation, storage, retrieval, duplication and security/confidentiality matters
2. Training circumstances to prepare the student, technicians and faculty for the change needed to be carefully considered and "rolled-out" in a logical and non-threatening manner
3. Curricular additions must be considered as these technologies, at the present time and for the foreseeable future, are additions to the curriculum offered with respect to film based imaging as opposed to a replacement for the same
4. Multiple mode evaluations of clinical images must be maintained and supported until the credentialing process reach the level of sophistication being afforded by CR and DR
5. Academic and clinical support materials to assist students, technicians and faculty in the transition are required across the spectrum of clinical issues, training issues, curricular and examination issues

Fortunately the changes in clinical procedures, the training with respect to utilization of exposure factors, processes involved and software capacities and the curricular modifications are all rather finite. Once these matters have been addressed they are relatively static in nature.

The following are key aspects of each content area that should be considered:

1. Clinical procedures, including acquisition, interpretation, storage, retrieval, duplication and security/confidentiality matters
    a. Modification of technique charts to reflect the increased efficiency and capacity of CR and DR systems

b. Management of digital imaging media in the CR environment with great emphasis on the proper handling of expensive materials associated with image capture and the environmental circumstances that will degrade an image

c. Selection and use of software to view, manipulate and store the images acquired in the CR or DR environment

d. Selection and use of more sophisticated utilities such as “stitching” software

e. Establishment of information flow through appropriate consultants and faculty channels

f. Determination of methods of use in the patient setting; online, network storage, CD storage, laptop review, desktop review or specialized display format

g. Establishment and implementation of appropriate policies with respect to copying of images, provision of images to the patient or other parties at the direction of the patient, adequate protections with respect to control of copying and the confidential use of the images

2. Training circumstances to prepare the student, technicians and faculty for the change needed to be carefully considered and “rolled-out” in a logical and non-threatening manner

a. Orientation to the exposure factor reduction capacity provided by CR or DR versus film-based radiography

b. Orientation to use of the digital reader card (CR) or digital camera mechanism (DR) versus traditional film, cassette, bucky processes

c. Step-by-step procedures for image use, enhancement, markings, measurements, copying and storage of the images

3. Curricular additions must be considered as these technologies, at the present time and for the foreseeable future, are additions to the curriculum offered with respect to film based imaging as opposed to a replacement for the same

a. Orientation and detail of image creation in the CR and DR environments

b. Emphasis and x-ray exposure factor reduction in the CR and DR environments

c. Inclusion of software training cycles in the curriculum with emphasis on the measurement and notation capacities of the software

d. Proper procedure to lengthen the life expectancy of the digital reader card, use of the cassette, cleaning and management of cassettes in the CR environment

e. Presentation of scanning technologies for the conversion of film-based images into digital images and the capacities that are subsequently created

4. Multiple mode evaluations of clinical images must be maintained and supported

until the credentialing process reach the level of sophistication being afforded by CR and DR

a. Student exposed to CR and DR technologies will quickly gravitate to the use of these images. This creates an opportunity for them to avoid or neglect training in the film environment. As they will likely be examined in the film environment by national, state, and provincial boards an orientation to film familiarity and comfort must be maintained

5. Academic and clinical support materials to assist students, technicians and faculty in the transition are required across the spectrum of clinical issues, training issues, curricular and examination issues

a. Specific tutorials are needed to acquaint the student, technician and faculty with:

i. A comparisons and contrasting of film-based radiology to computed radiology and then to digital radiology

ii. A step-by-step tutorial regarding the use of the software available to read the images beginning with the basics of image manipulation and moving through measurements and more involved image enhancements

iii. Image enhancement drills to provide the student, technician or faculty member with an appreciation for the depth and breadth of the technology involved to produce derivative images of infinitely greater utility

iv. Development of image banks for student, technician and faculty use throughout the curriculum in general

v. Orientation to online image services, training sites and testing sites to support the student and faculty member with refinement of their interpretation skills and capacities

In contrast the opportunities afforded an institution or program with respect to teaching methods, instructional and clinical support are virtually endless and are limited only by the creativity of the parties involved.

CR and DR technologies provide the faculty member with unparalleled opportunities for real-time testing and extension of patient presentations individually to large groups allowing for dynamic teaching and learning exchanges.

Pitfalls with respect to this technology do exist. A thorough approach to the items and issues outlined above will minimize the potential for problems but they will exist. The following were problems we encountered at various points along the way:

1. CR and DR technology allow for a greater margin of error in terms of radiographic technique. If attention is not brought to this area radiographic technique can deteriorate because the machine can compensate for the sloppiness.

2. Digital reader cards used in CR systems are expensive. A 14 x 17 card can cost upwards of $3,000.00 improper handling can destroy the card or render its life expectancy to be much shorter with the attendant replacement costs.

3. Adequate system redundancy must be in place to insure the availability of the images over time

4. System access in a teaching clinic environment needs to be stratified or otherwise controlled for HIPAA compliance in the U.S. and for general respect of matters of confidentiality

5. Documentation of the issuance of copies of images to patients requires considerable oversight and control

6. The ability to annotate images with narrative comments offers the opportunity for improper or inappropriate comments to be recorded with subsequent copies of images

7. Because digital images offer a dynamic range of contrast and density care must be given to read images through the full range of image possibility

CR and DR technologies are one of the most exciting, cost effective and potential laden technologies to ever be made available to the chiropractic profession and educational community.

Digital Imaging: More Than a Clinical Tool

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Film-based diagnostic imaging has been a pillar of chiropractic education and practice for over a century, but it is only in the last few years that chiropractic educational institutions have had access to digital x-ray imaging within their clinical facilities. The advantages of digital imaging in patient evaluation, intern training, and day-to-day operations of clinical facilities are well established. As the software technology improves, the benefits to pre-clinical chiropractic education are becoming more apparent.

At Murdoch University, our experience with digital imaging is based on the use of an integrated Computed Radiography (CR) (CR25 QS) system with a recently implemented PACS (IMPAX) system [Agfa Healthcare]. The digital nature of CR and DR (Direct Radiography) images allows them to be stored in various formats (eg, DICOM, TIFF, JPEG). Initially (prior to the implementation of a PACS system), all images were transferred to a readily available diagnostic imaging program (Merge E-film), modified to DICOM format, then modified again to JPEG format for downloading into the clinics electronic patient database. This process also provided the access point for introducing images into the pre-clinical classroom environment, although it was tedious, requiring the development of a spreadsheet and subsequent logging of all teaching cases into the database for later retrieval. Retrieval of a particular case then required searching the teaching file database to identify the patient, followed by searching the image database to find the patient's images. Each image within a case had to be opened separately to identify the key images. Next, the patient's personal details had to be removed prior to input into lecture presentations. Since images were saved in JPEG format (to save space, a key issue with digital images of x-rays), only limited modification of image quality is possible, which required additional software or change to be made within the presentation program. Although a multi-step process, the end result was usually worth the effort.

The subsequent implementation of a PACS system substantially improved the efficiency of this process by allowing for the creation of a self-contained teaching file within the system. Potential teaching cases can be saved into the file with a single mouse click, and then labeled according to their point of interest. A single image or whole case can be saved, and this can be done under different headings if a case has multiple teaching points. A basic word search then provides immediate access to all relevant cases. The images for each case are viewed together for easy selection. The system automatically removes all confidential patient details. Images are stored in DICOM format, so more advanced quality and formatting modifications can be performed prior to downloading into a presentation. Images can easily be copied directly into a presentation and automatically compressed in JPEG format. As

more and more imaging facilities move towards digital imaging, images acquired at external facilities can easily be downloaded from CD into the PACS central server and a teaching file created for those images.

In the teaching of radiology, access to large quantities of high quality images is paramount. The time and effort needed to enhance the image quality of digitized images (ie, images created from non-digital formats) can run into the 1000's of hours. Therefore, the implications of digital technology in the teaching environment from a time savings standpoint alone are extremely significant, eliminating several steps that are needed to transform a hard copy x-ray image into a digital format, edited for quality, and transferred into a presentation.

Other benefits in the educational setting include:

- Editing: as image quality can be manipulated from the built-in PACS software, this may eliminate the need for additional expensive image editing software;
- Versatility: with a PACS system, the images are stored centrally and can be accessed from any computer on campus. This allows an additional format for presenting information, as an instructor could access images and use the PACS software to view and manipulate those images without having to create a dedicated presentation;
- Teaching without borders: theoretically, images could be accessed from any site in the world through a laptop with the viewing program included, as access is license-dependant, not location dependant;
- Open access: students can be given direct access to the teaching file. The instructor can pre-select images from the file for students to review from any site on campus that has the viewing software installed [multiple general access licenses are needed to allow for simultaneous access to the system by multiple viewers].

The most significant negative implications to this technology relate to costs and IT implementation issues. As most chiropractic institutions now have CR or DR imaging systems on campus, it is the PACS software and licensing costs that may prevent or delay implementation of these systems. Servicing and housing the server and database storage systems can be an issue, depending on the limitations of the institution. Storage capacity is in the 2-5 Tb range, and integrated backup software can increase the cost of an already expensive system by up to 50%. Access to less costly systems is an option, but some functionality may be lost.

If the cost and IT issues can be overcome, the educational value of this system alone will more than adequately support its implementation. Student learning is enhanced through high quality presentation material of clinical cases, which can be immediately integrated into the pre-clinical setting for "real-life" learning impact. Since images can be prepared in a fraction of the time needed previously, this reduces the draw on resources that otherwise could be focused on further educational developments and teaching opportunities.

Conversion to Computed Radiography at the Welsh Institute of Chiropractic (WIOC) and Integration to a PACS System for Data Storage and Sharing

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Abstract:

We present our experiences of the ongoing conversion of WIOC from a traditional wet processing film based diagnostic imaging suite to a computerized diagnostic imaging suite using computed radiography. The transfer of CR images was initially possible via a direct connection within WIOC. In keeping with the final objective the continuation of integrating technology will allow us to connect to the Carestream/ Cobalt PACS system. This system is also being used by the mobile MRI unit which is onsite two days per week. The radiologists in both institutions then have the capability to compare and share interesting cases as well as integrate the information from both imaging studies into teaching methods and patient management.

Introduction:

There are currently two computer based systems or digital-image capturing systems for producing a diagnostic image comparable to the traditional film based image. With computed radiography (CR) the darkroom component of the process is replaced with a digital reader, the cassettes are replaced with an image plate. The x-ray unit remains unchanged. With digital radiography (DR), on the other hand, the image plate is directly incorporated into the tabletop or upright bucky and the image information is captured and transmitted directly to the computer to generate and save the image. There are many things to consider with both systems which will be addressed.

Background:

In late 2007 the Welsh Institute of Chiropractic at the University of Glamorgan made the decision to convert the traditional wet processing film based diagnostic imaging site to a computerized diagnostic imaging suite by the installation of an AGFA CR30-x Digitizer. The initial stage involved the setup of a dedicated diagnostic suite for use by the onsite Chiropractic Radiologist to interpret all films for WIOC and those studies ordered by outside

referring providers including chiropractors and physiotherapists. The images were transferred via a dedicated connection from the imaging suite to the diagnostic suite. Following this, an additional diagnostic station was installed for use by trained clinic supervising staff to allow them access to quality images in order to discuss radiographs with students and to access images during case presentation tutorials. All studies are transferred to CD for storage and access by the students and when necessary, for the patient to present to other outside health care professionals. Long term storage to an external hard drive is used at this time. During this time, discussion was taking place with Cobalt Appeal, the charitable organization in the UK who manages the onsite MRI scanner and other imaging facilities we have links with. They requested our facility perform the necessary updates and install the necessary technology to allow us to access and utilize the Carestream/ Cobalt PACS. In the future this will allow us to transfer images to a larger, secure storage facility and which can be accessed remotely. This will also give us the ability to access images from their databank for use in comparison, teaching, research and most importantly to access MRI images from their mobile MRI unit which visits WIOC two days per week. Patient plain film CR images taken at WIOC prior to their MRI can be accessed in order to more accurately interpret the MR and to better determine the most appropriate diagnosis and further requirements for imaging or care.

Virtual Microscopy Can Replace Light Microscopy in Chiropractic Education

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Many subjects in the health care professions are taught using the conventional light microscopy methods that have been used for many decades. Courses fundamental to understanding structure at the cellular level, including histology, microbiology, and cellular biology, are foundational to understanding how organisms function and how disease occurs. In chiropractic education, the traditional method of instruction in the laboratories accompanying courses such as histology, pathology, clinical microbiology, and hematology is to use light microscopes. It is feasible that virtual microscopy and other methods of computer-assisted instruction, i.e., can replace most of the conventional light microscopy activities in these laboratories.

Prior to the 1980's, many practitioners used microscopes in their professional practices to analyze blood, urine, tissue samples, and organisms grown on culture media from patient samples. A combination of increasing time demands, decreasing reimbursement, widespread availability of clinical reference laboratories, and stringent regulations governing testing performed in the office setting (1), led to a marked decline in the interest in, and practice of, office microscopy. This eroded the educational rationale for providing lengthy experiences in the practical use of microscopes in the educational setting, but many programs have been reluctant to break from tradition. The increasing access to digital atlases and the relative ease of preparing adequate digital images from existing microscope slide collections has prompted a number of medical educators to adopt technology to replace conventional microscopes.

In the adoption of any form of educational technology, considerations include user familiarity and comfort with technology, physical resources and associated expenses,

instructor time demands, availability of quality instructional resources, and evidence of efficacy in attaining desired student learning outcomes. Over the past decade, analysis of most of these factors now supports the conversion to virtual microscopy.

Current chiropractic students are sophisticated users of computer technology, and many institutions include informatics competencies in their graduation requirements. Chiropractic programs often use a virtual learning environment, such as Blackboard™ or Moodle™, to support much of the curriculum. As is often the case in education, space is at a premium and the expense of maintenance and equipping of dedicated microscopy laboratories is high. Conversion of these "wet" laboratories to computer laboratories would allow for better space utilization due to the ability to teach multiple subjects in the same room and also provide general computer use when laboratory classes are not in session. Many of the digital resources can also be made available from any computer with satisfactory download speeds, thereby increasing access to students.

Extensive teaching collections now exist in the digital format and are available on the Internet, commercial CD-ROMs, and individual school intranets. Instructors familiar with developing materials for learning management systems are able to design course-specific laboratory exercises containing links to digital resources, including their own collections. Most basic sciences laboratory instructors are familiar with using photomicroscopes to take pictures of interesting findings on a microscope slide, and the digital imaging of these resources for virtual microscopy is a natural extension of this process. Harris (2) published a detailed description of the process used for creating digital images used in providing a web-based pathology course.

Implementation of virtual microscopy or other types of computer-assisted instruction must be based on achieving satisfactory learning outcomes. Several authors have reported on the benefits of converting to virtual microscopy. Kripendorf and Lough (3) implemented the change because of the expense of maintaining a large glass slide collection and found that not only was time on task more efficient, but collaborative learning was made possible, student satisfaction was high, and learning outcomes were excellent. Other studies have reported similar results with student and educator satisfaction and comparable or improved learning outcomes with virtual microscopy (4, 5). Because of the desire of

many medical education programs to continue to provide experience in microscope slide scanning and search techniques needed to gain proficiency in the clinical pathology laboratory, some schools have implemented use of expensive slide digitization equipment designed to preserve the entire slide digitally rather than just selected sections (6). This type of extensive collection demands huge server space and many programs have opted to either use web-based materials made available by some universities (7) or less expensive and simpler technologies (8).

Disadvantages of virtual microscopy include the initial cost of conversion of the teaching materials and the laboratory, demands on the information technology infrastructure, limited ability to learn slide searching techniques, and greater difficulty in enforcing active learning. Advantages include easier laboratory set up, elimination of maintenance needs of traditional microscopes, easier standardization of learning materials, elimination of slide breakage, and greater access to learning resources (9, 10).

With widespread availability of digital resources, decreased costs of ongoing maintenance of the collections, excellent user satisfaction, unlimited student access to the learning materials, more efficient use of instructional time, increased opportunities for collaborative learning, and excellent learning outcomes, transition to virtual microscopy in chiropractic education is reasonable and provides effective learning options that were unavailable in the past.

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Appendix A

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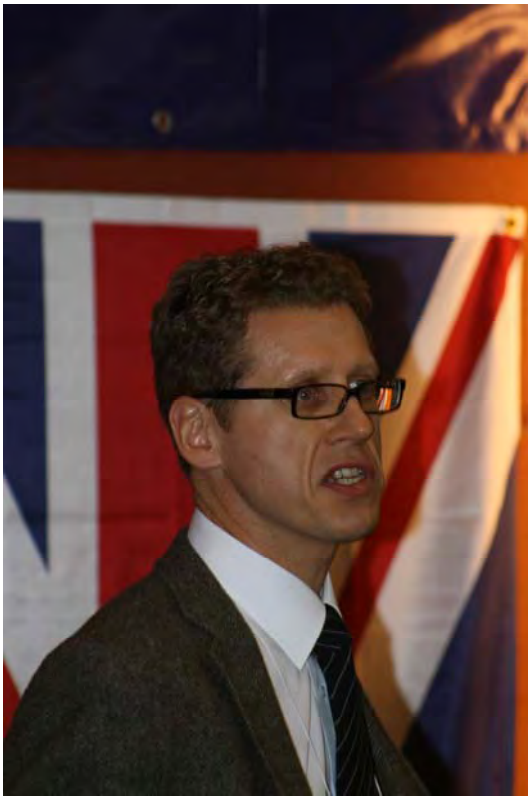

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