SHAPING THE FUTURE OF DENTAL EDUCATION:

THE IMPACT OF NEW TECHNOLOGICAL AND SCIENTIFIC DISCOVERIES ON TRADITIONAL DENTAL EDUCATION

May 8, 2017, 14:00-17:00
Moderators: Lynn Johnson (USA), Abigail Tucker (UK)
Workshop rapporteurs: Irina Dragan (USA), Domenico Dalessandri (Italy)
Session Chair: Damien Walmsley (UK)

What continent are you from?

Connect to WiFi to answer.

ADEA THE VOICE OF DENTAL EDUCATION

ADEA | THE VOICE OF DENTAL EDUCATION

ADEE

Impact of New Technologies

Lynn Johnson, PhD
Professor & Associate Dean for Faculty Affairs and Institutional Effectiveness
University of Michigan

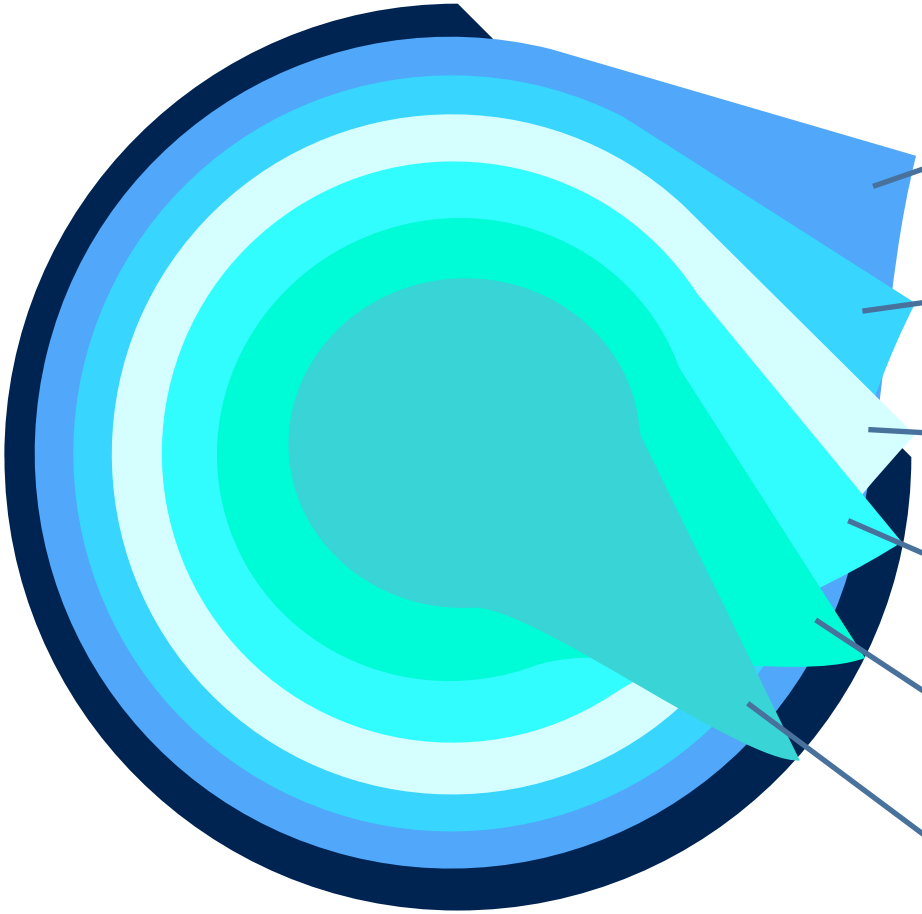
Irina Dragan, DDS, MS
Assistant Professor
Tufts University School of Dental Medicine

DISCLOSURES

Lynn Johnson, PhD is the chair of the Advisory Board for the Collaboration 4 Health IT. ICE Health Systems is a Collaboration member.

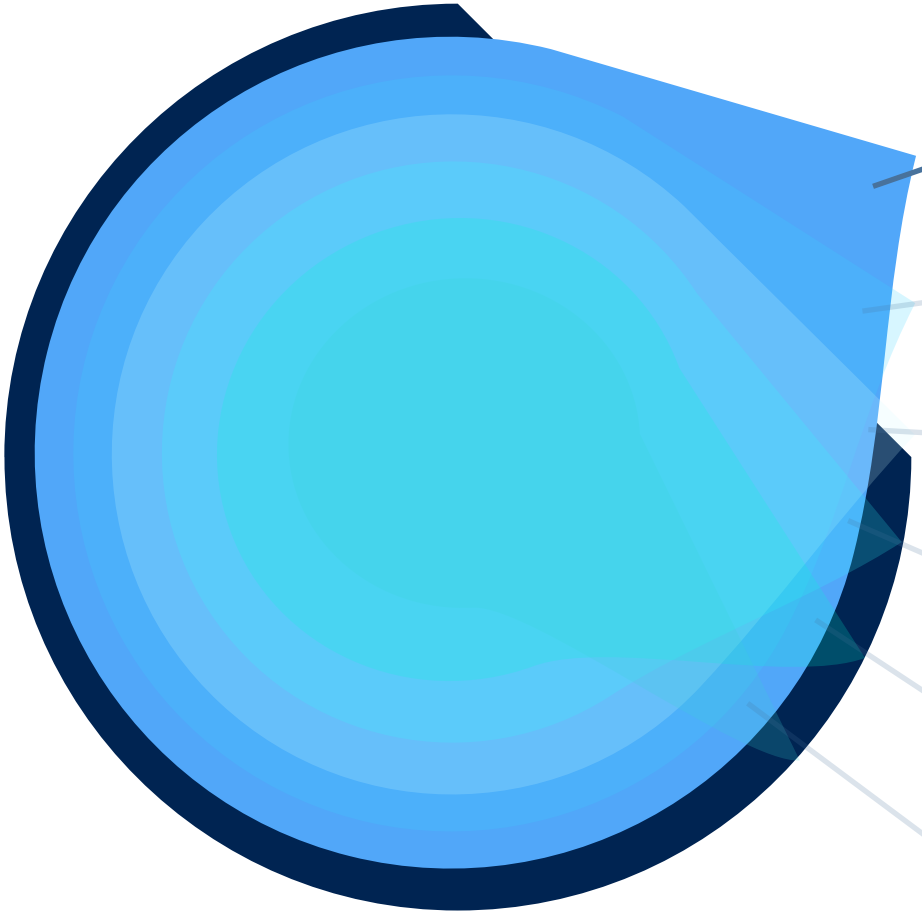
Lynn Johnson is participating in a research study wit FollowApp.Care.

OUTLINE



- Review participants' expectations
- Updates in academic environment
- Patient care
- Telehealth: between academia and private practice
- Lessons learned
- Conclusions: global perspective

OUTLINE



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BULGARIA

CANADA

FRANCE

FINLAND

GREECE

HUNGARY

IRELAND

ITALY

LITHUANIA

NORWAY

NETHERLANDS

ROMANIA

SLOVAKIA

SPAIN

SWEDEN

SWITZERLAND

UK

USA

TURKEY

EGYPT

KUWAIT

PAKISTAN

CHINA

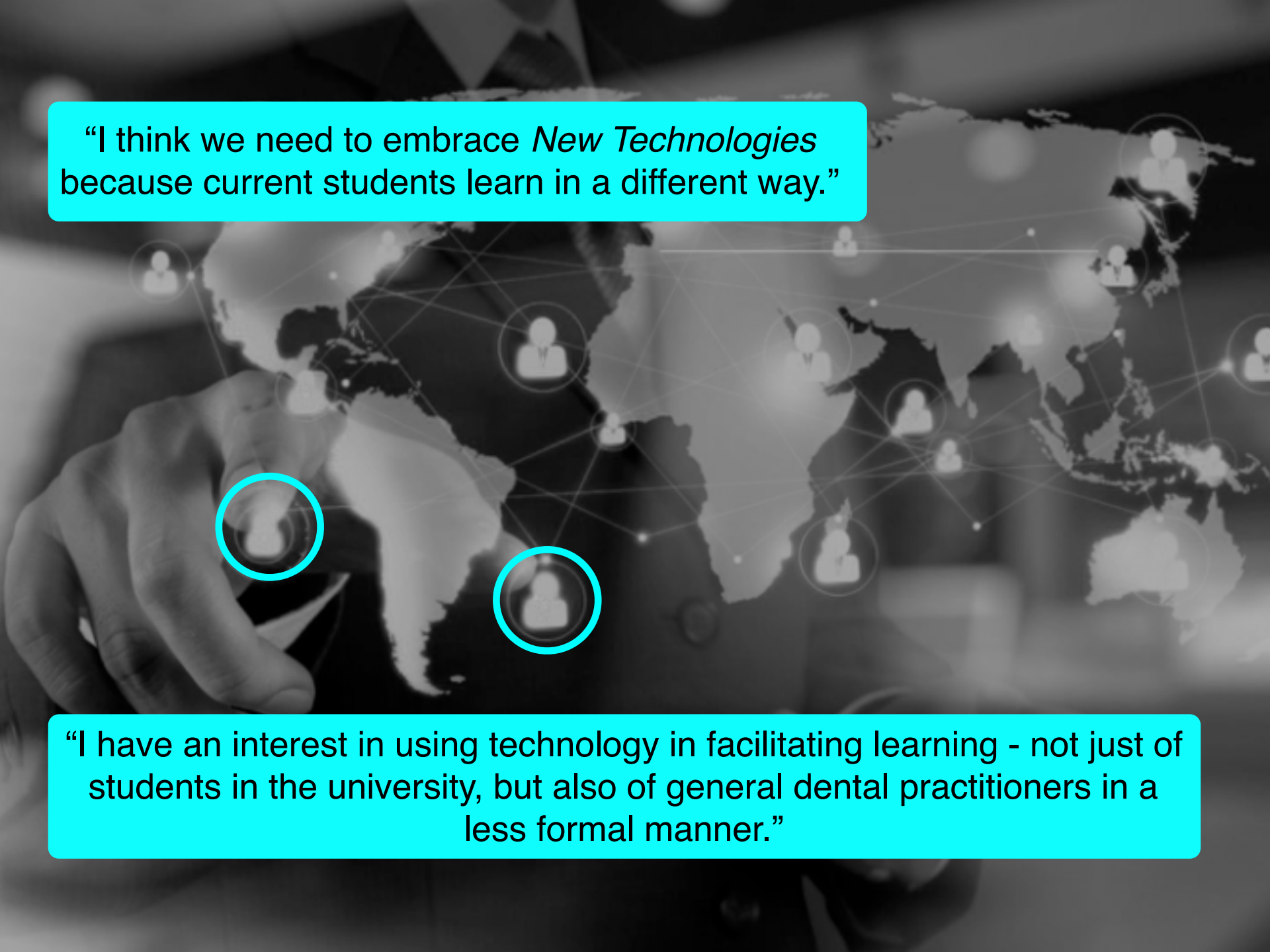
INDIA

ISRAEL

JAPAN

SAUDI ARABIA

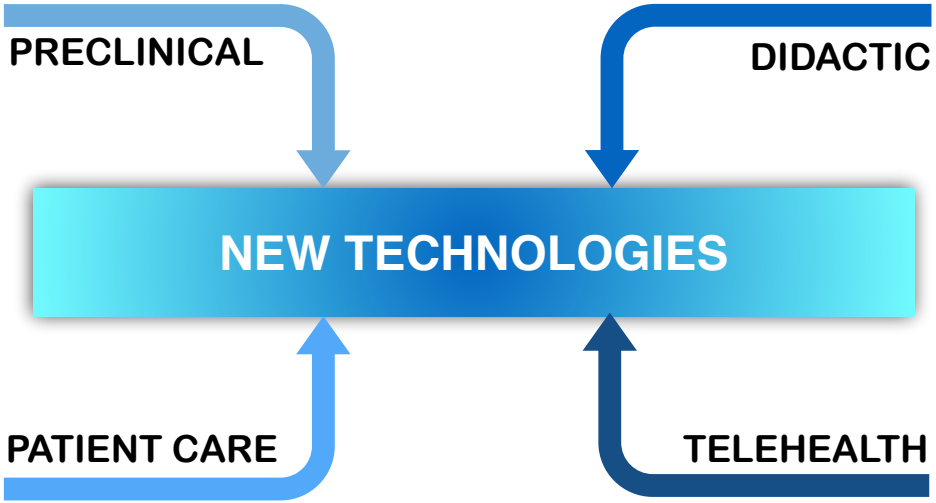
Global Representation



"I think we need to embrace *New Technologies* because current students learn in a different way."

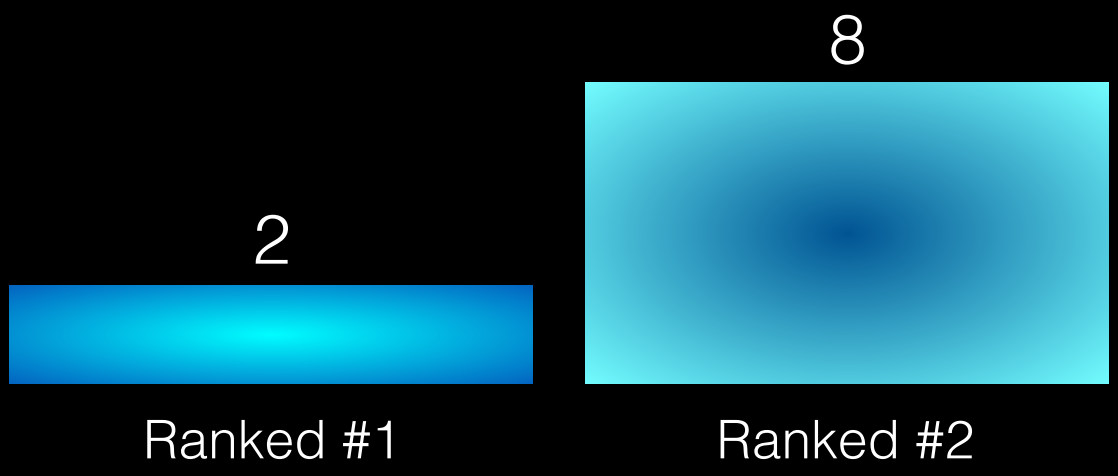
"I have an interest in using technology in facilitating learning - not just of students in the university, but also of general dental practitioners in a less formal manner."

ALL


PRECLINICAL
DIDACTIC
NEW TECHNOLOGIES
PATIENT CARE
TELEHEALTH

NONE

Literature Review



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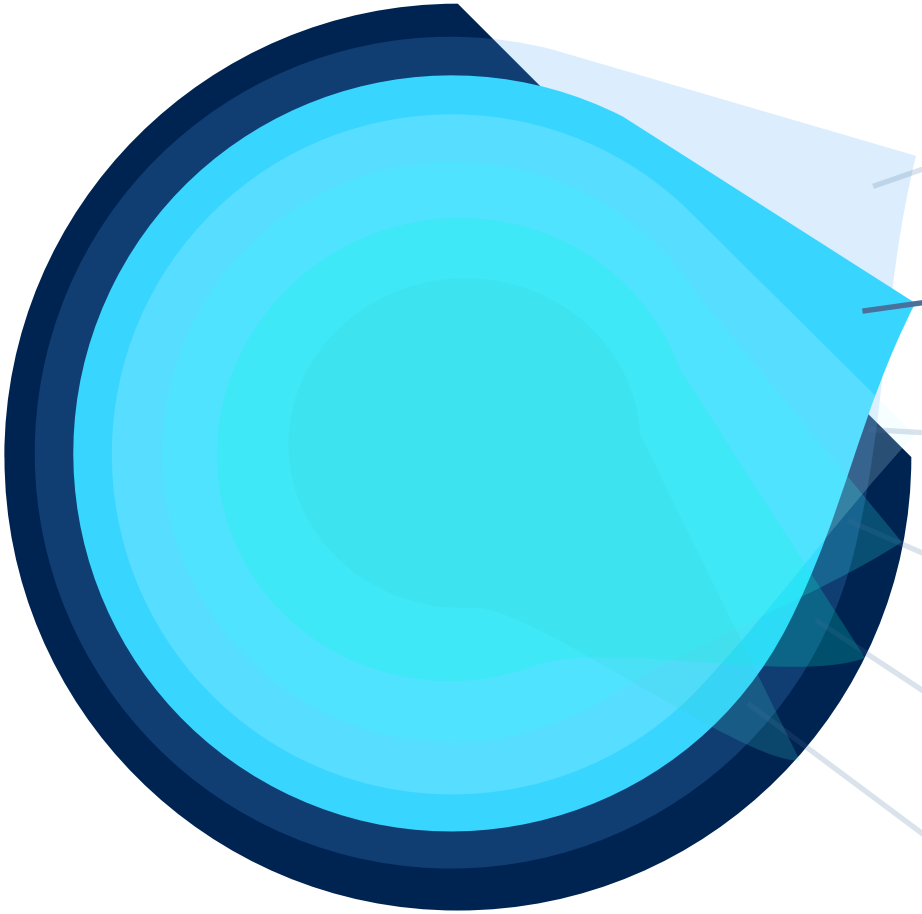

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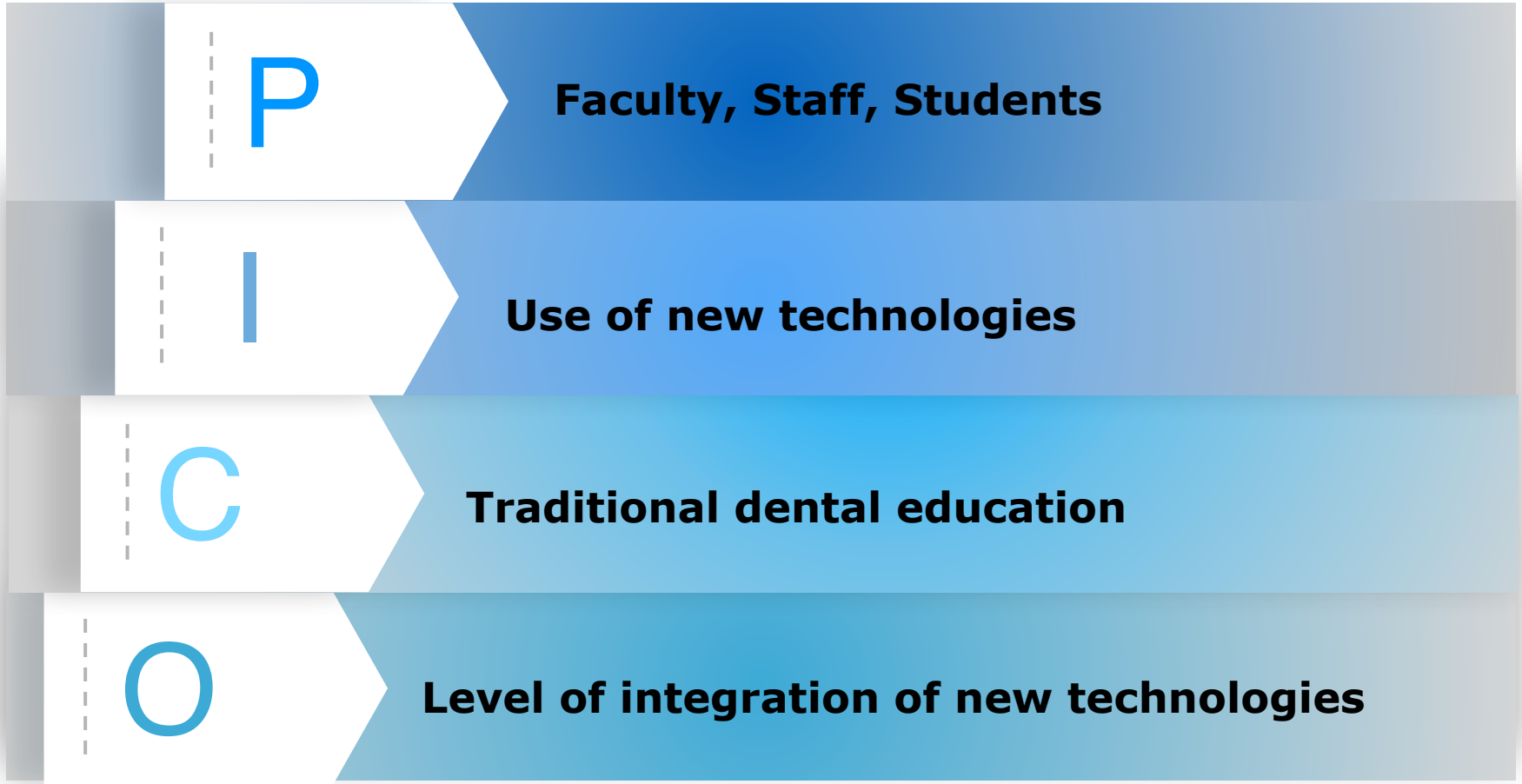
The Level of Using **New Technologies** in the **Dental Academic Environment**: Systematic Review And Meta-Analysis



Dragan I, Bassir SH, Nevius A, Bensreti H, Karimbux N.

A Survey of Information Technology Management at U.S. Dental Schools

Mariusz Wrzosek; Gary Warner; R. Bruce Donoff, D.M.D., M.D.; Thomas H. Howell, D.D.S., M.M.Sc.; Nadeem Karimbux, D.M.D., M.M.Sc.

2003

The majority of schools report using software to:

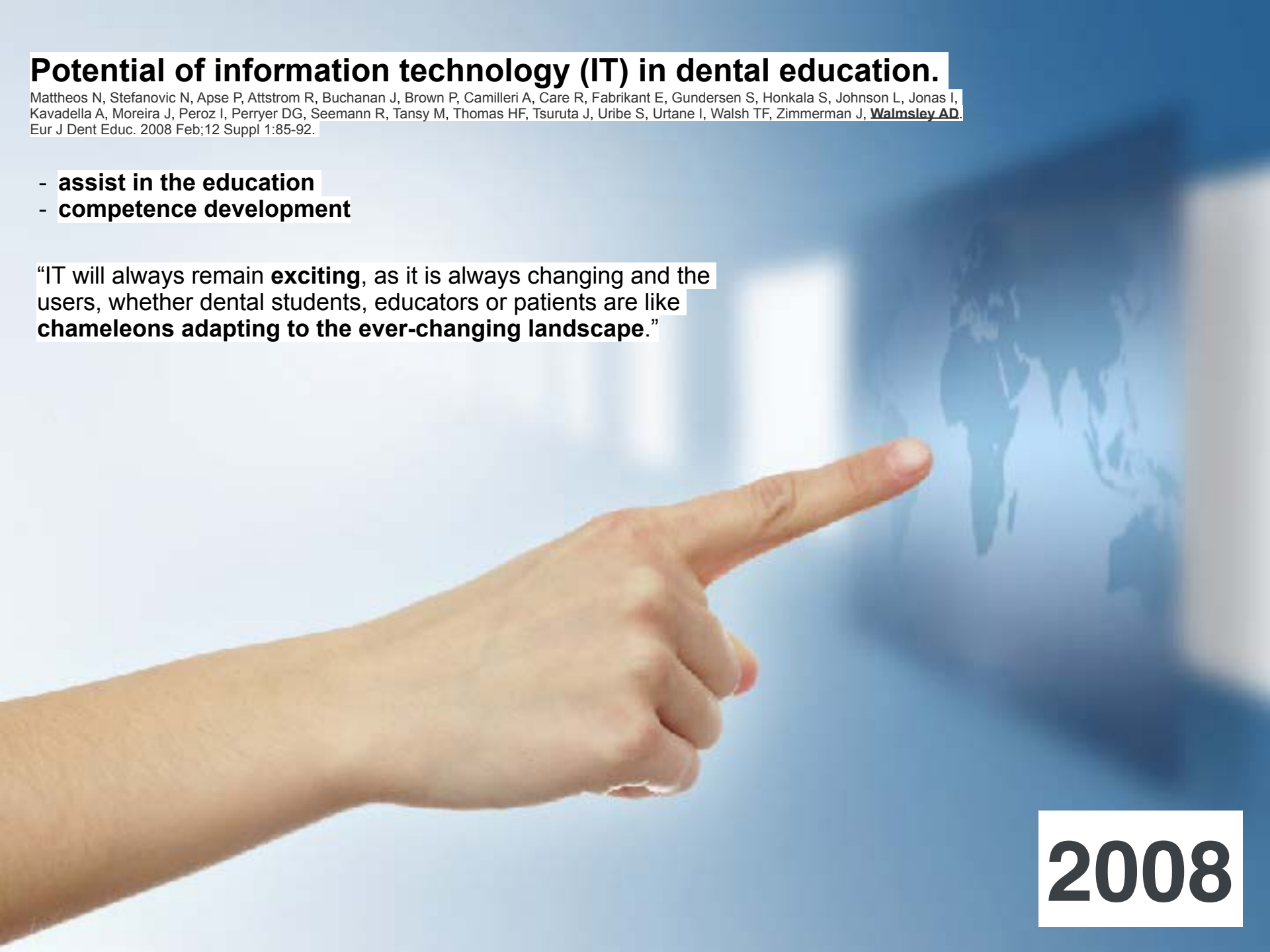
- manage admissions process
- curriculum analysis
- delivery of curriculum content
- manage student clinics and faculty practices.

Potential of information technology (IT) in dental education.

Mattheos N, Stefanovic N, Apse P, Attstrom R, Buchanan J, Brown P, Camilleri A, Care R, Fabrikant E, Gundersen S, Honkala S, Johnson L, Jonas I, Kavadella A, Moreira J, Peroz I, Perryer DG, Seemann R, Tansy M, Thomas HF, Tsuruta J, Uribe S, Urtane I, Walsh TF, Zimmerman J, **Walmsley AD**. Eur J Dent Educ. 2008 Feb;12 Suppl 1:85-92.

- **assist in the education**
- **competence development**

"IT will always remain **exciting**, as it is always changing and the users, whether dental students, educators or patients are like **chameleons adapting to the ever-changing landscape**."

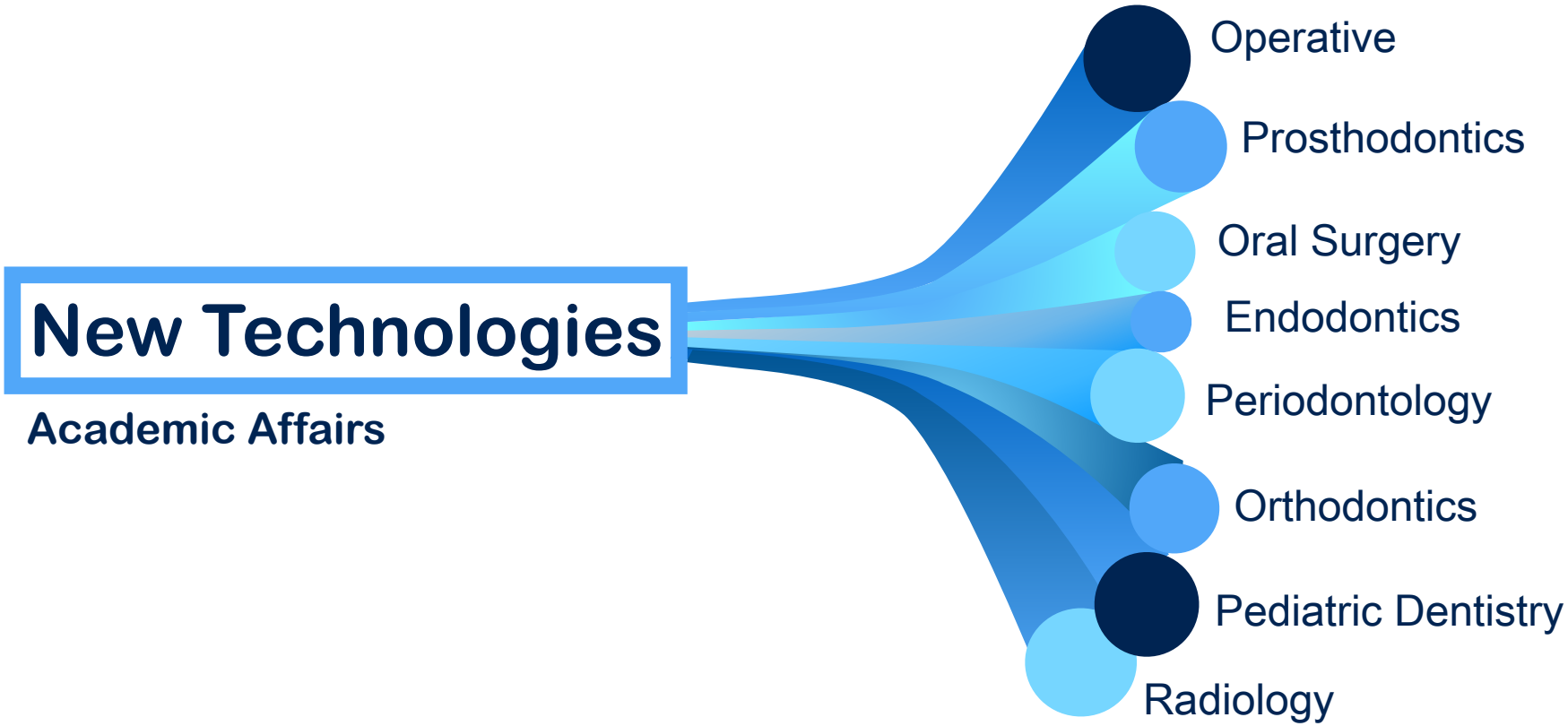


2008

ADEA Emerging Leaders Class of 2017

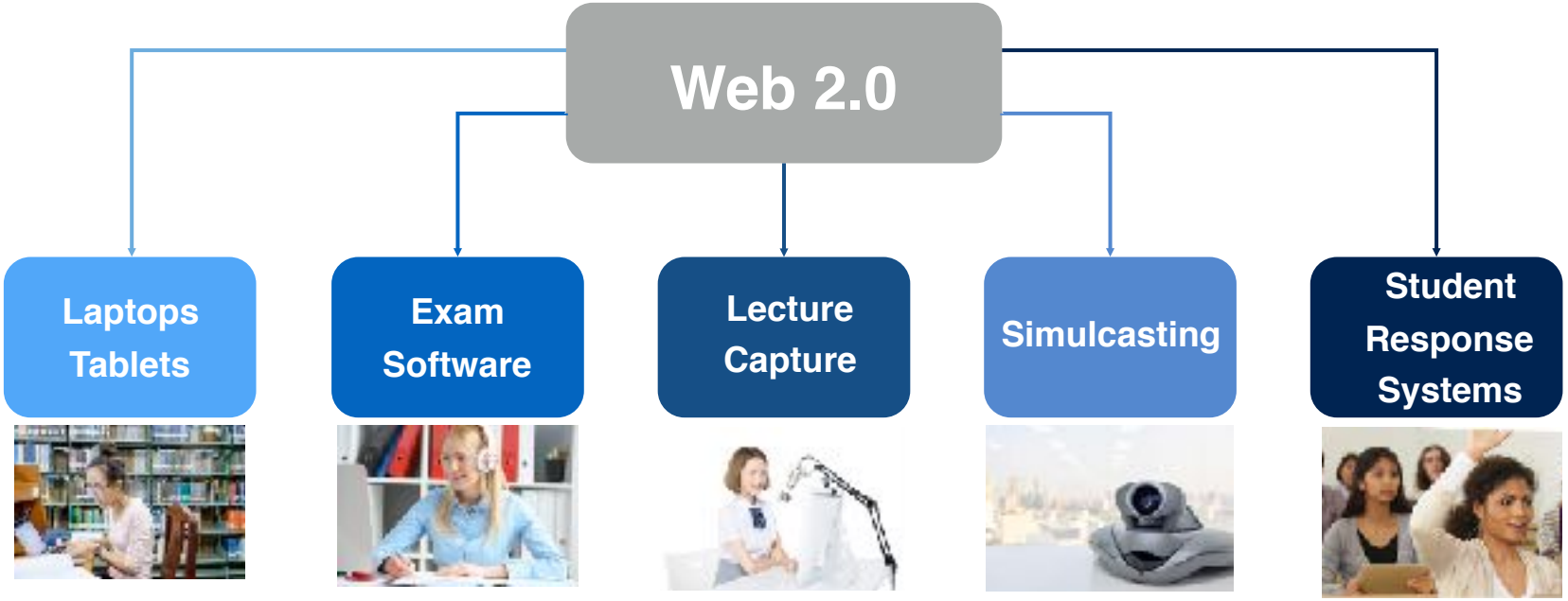
Variations of teaching, diagnostic and treatment technological applications among seven dental curricula

Antonellou E. et. al, 2017


New Technologies
Academic Affairs
Operative
Prosthodontics
Oral Surgery
Endodontics
Periodontology
Orthodontics
Pediatric Dentistry
Radiology

Didactic

Technologies in Dental Academic Institutions



Spallek H, von Bergmann H. Should laptops be allowed in the classroom? Two viewpoints: viewpoint 1: laptops in classrooms facilitate curricular advancement and promote student learning and viewpoint 2: deconstructing and rethinking the use of laptops in the classroom. J Dent Educ. 2014 Dec;78(12):1580-8; Kramer GA, Neumann LM. Confirming the validity of Part II of the National Board Dental Examinations: a practice analysis. J Dent Educ. 2003 Dec;67(12):1286-98; Azab E, Saksena Y, Alghanem T, Midle JB, Molgaard K, Albright S, Karimbux N. Relationship Among Dental Students' Class Lecture Attendance, Use of Online Resources, and Performance.J Dent Educ. 2016 Apr;80(4):452-8; Spallek H, Turner SP, Donate-Bartfield E, Chambers D, McAndrew M, Zarkowski P, Karimbux N. Social Media in the Dental School Environment, Part A: Benefits, Challenges, and Recommendations for Use. J Dent Educ. 2015 Oct;79(10):1140-52.

Poster

Gamification: A Tool to Enhance Knowledge Application and Lifelong Learning

Michelle Robinson DMD, MA[1] and James Willig MD[2]
University of Alabama at Birmingham Schools of Dentistry[1] and Medicine[2]

AIM

The volume of information required for students to learn can be overwhelming. In order to be able to apply new knowledge into practice, students must be familiar with a plethora of facts that may be challenging to learn and retain. This work examines gamification as an innovative pedagogical technique to engage students in learning.

RESULTS

Implementation was simplified by a calendar feature allowing test questions to be scheduled for delivery. Scoring was set up ahead of time, permitting points to be assigned for correct answers and pre-determined milestones. Customized badges were motivating in keeping students engaged. Areas of strength and weakness were able to be identified. Participation rate was 100%

CONCLUSIONS

The gamification format was well-received in this educational setting. It provided a novel method of interaction with material and shows promise as a means of improving test scores and retention of knowledge needed to facilitate research and clinical practice.

METHODS

An online game called Kaizen ("continuous improvement") was developed to aid student and resident learning. Periodontology residents participated in the game to assist them with preparation for a national in-service exam that assesses their learning over time in the program.
The game allowed for both individual and team participation. Four online questions representing different Periodontology topics were given each weekday. Beneficial game features and participation were observed.

Scores are tracked using an online leaderboard and badges used to reward participation and correct answers

How does the game work?

- Instructors assign students to teams
- Instructors post questions and references in Kaizen software
- Students log in using device using their ID and password
- Students answer questions and can receive feedback with known rationale

Level Badges (Awarded According to Points)

Hot streak badges

Marathon badges

REFERENCES

Gamification as a tool for enhancing graduate medical education.
Nevin CR, Westfall AO, Rodriguez JM, Dempsey DM, Cherrington A, Roy B, Patel M, Willig JH.
Postgrad Med J. 2014 Dec;90(1070):685-93.

ACKNOWLEDGEMENTS

This work was supported by the University of Alabama at Birmingham Kaizen project and made possible with assistance from the Kaizen clinical team:
James Willig MD, School of Medicine
Cathy Roche PhD, School of Nursing
Nancy Wingo PhD, School of Nursing

UAB SCHOOL OF DENTISTRY

Preclinical

Technologies in Dental Academic Institutions

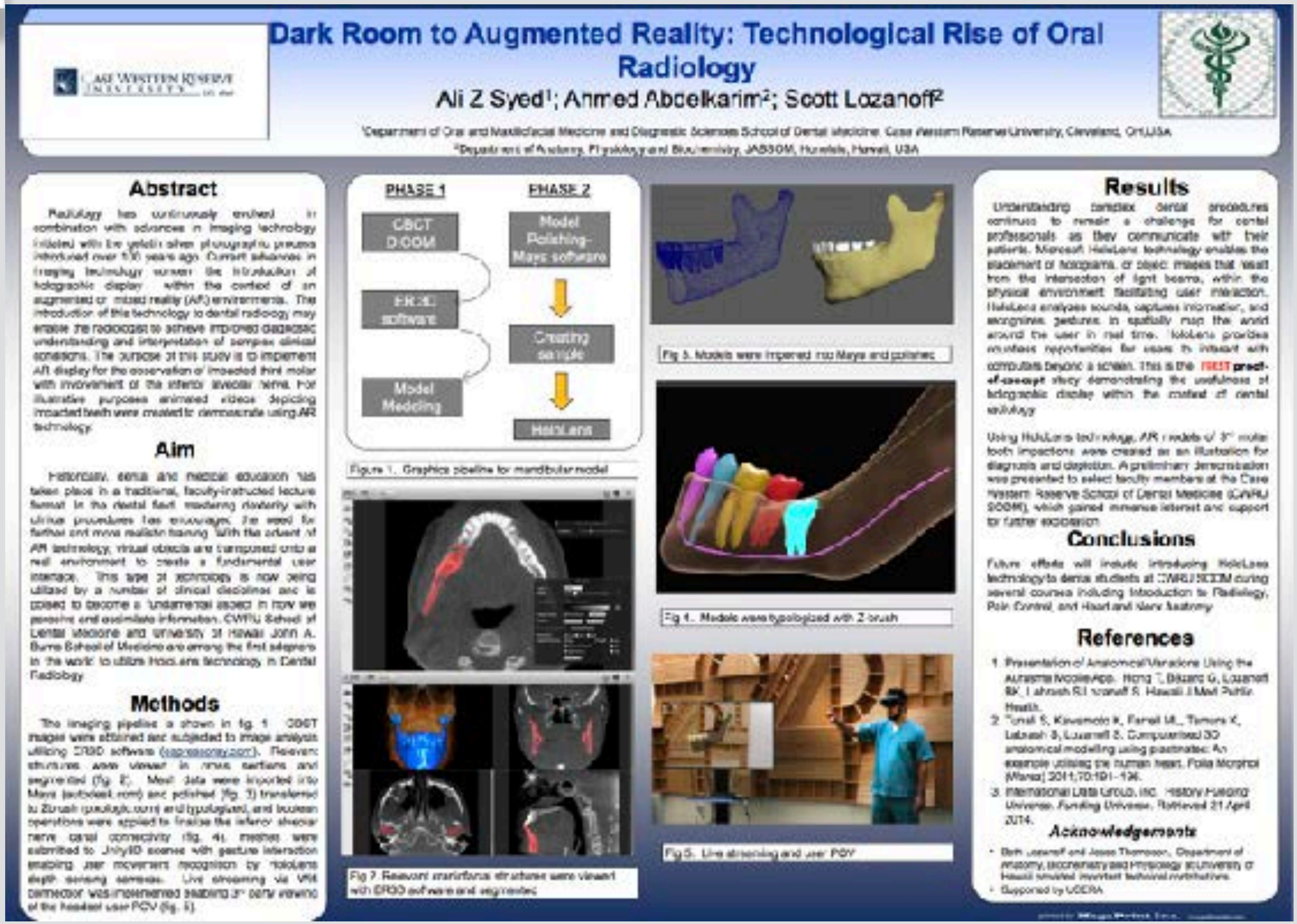
Simulation Models

Haptic Technology

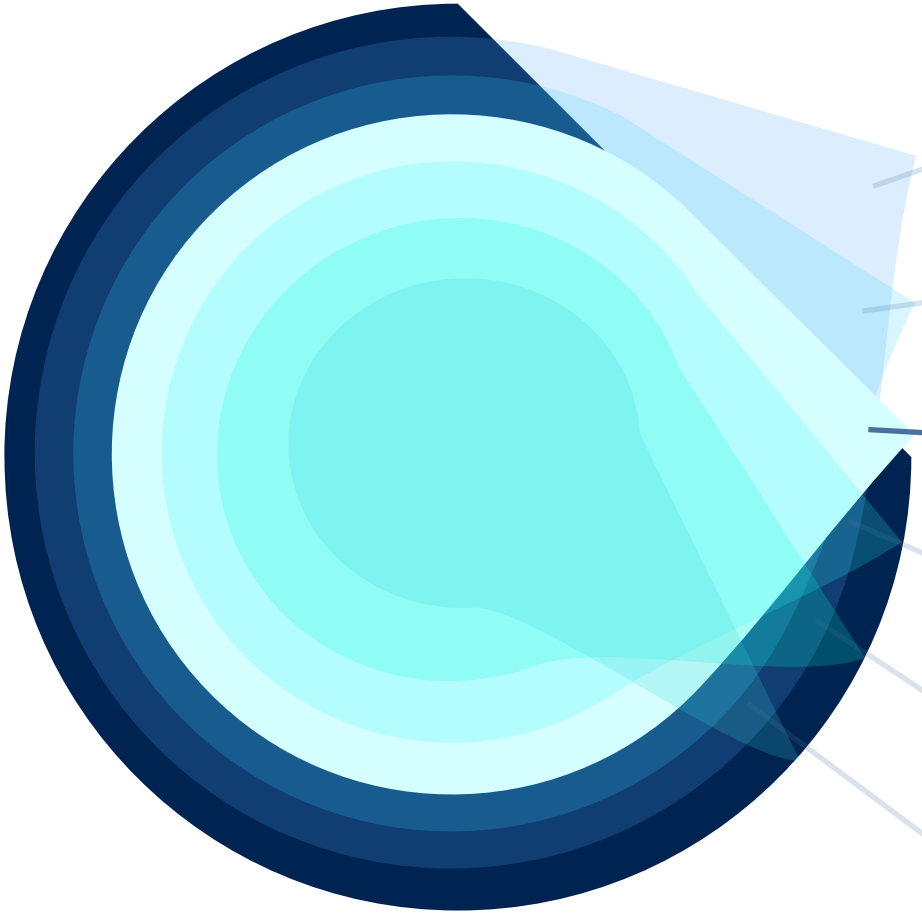
Virtual Patients

Koo S, Kim A, Donoff RB, Karimbux NY. An initial assessment of haptics in preclinical operative dentistry training. J Investig Clin Dent. 2015 Feb;6(1):69-76.
Cederberg RA, Bentley DA, Halpin R, Valenza JA. Use of virtual patients in dental education: a survey of U.S. and Canadian dental schools. J Dent Educ. 2012 Oct;76 (10):1358-64.
Lie T, Hoff I, Gjerdet NR. Computerized evaluation of the effectiveness of subgingival scaling in jaw models. An introduction to the program developed at the School of Dentistry, University of Bergen. J Clin Periodontol. 1987 Mar;14(3):149-55.

Poster


Dark Room to Augmented Reality: Technological Rise of Oral Radiology
Ali Z Syed[1]; Ahmed Abdelkarim[2]; Scott Lozanoff[2]
Abstract
Aim
Methods
PHASE 1
PHASE 2
CBCT DICOM
Model Polishing- Maya software
Creating sample
Model Modeling
HoloLens
Figure 1. Graphics pipeline for mandibular model
Fig 3. Models were imported into Maya and polished
Fig 4. Models were typologized with Z brush
Fig 5. Live streaming and user POV
Results
Conclusions
References
Acknowledgements

OUTLINE



Review participants' expectations

Updates in academic environment

Patient care

Telehealth: between academia and private practice

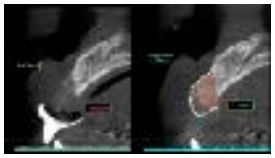
Lessons learned

Conclusions: global perspective

Patient Care

Technologies in Dental Academic Institutions

CAD CAM
Indirect Restorations & Dentures



Digital Radiography/CBCT
3D Printer

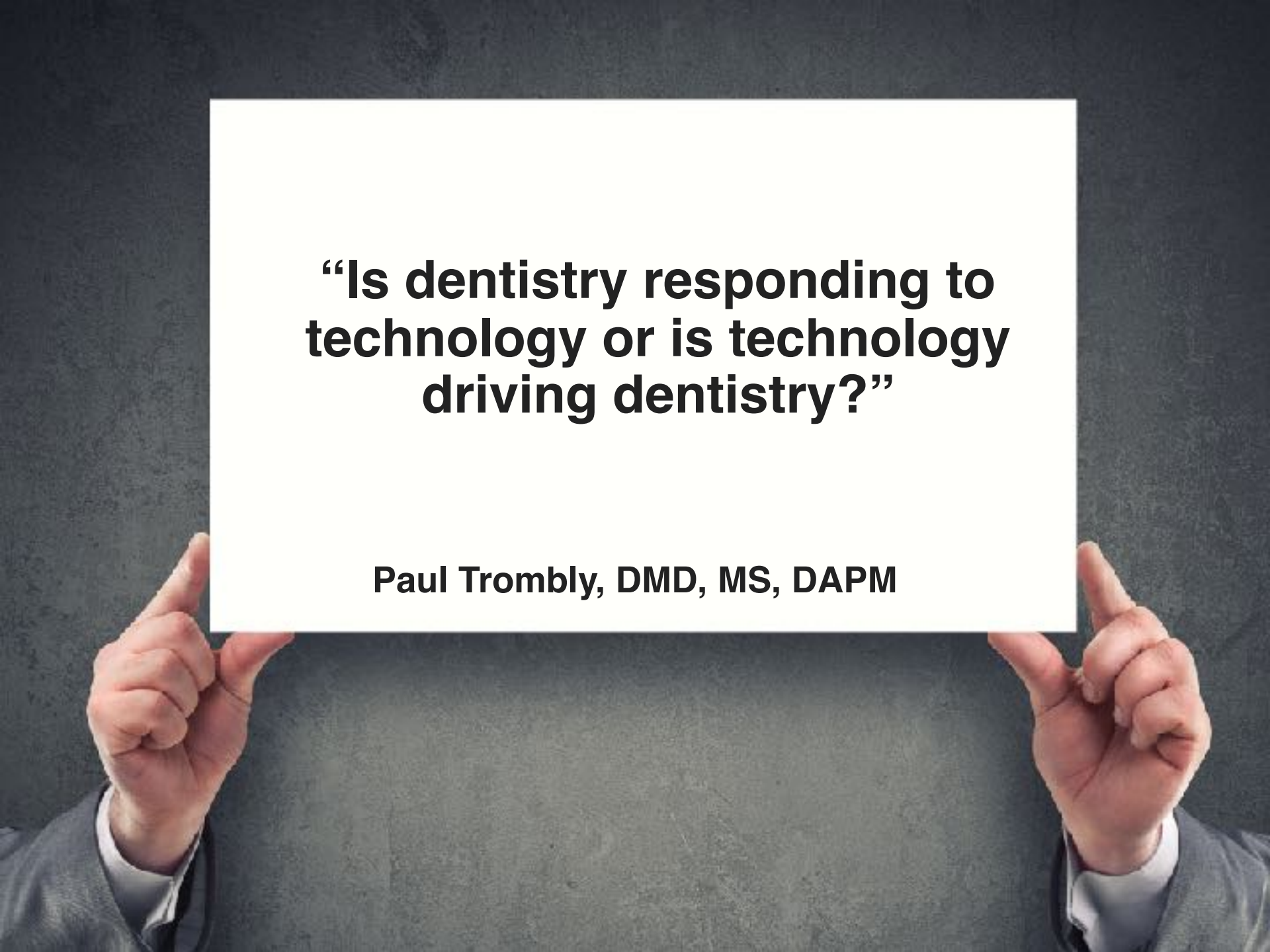
Rotary Endodontics

Caries Detection

Digital Orthodontics

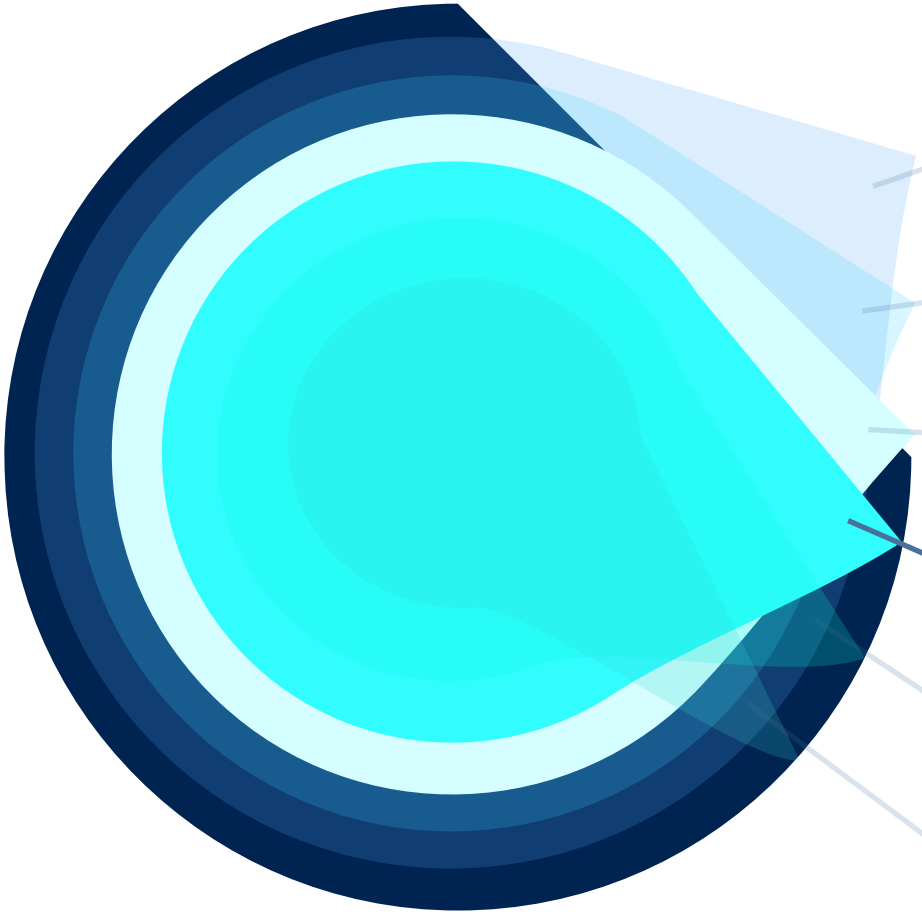
Lasers
Soft and Hard Tissues

Brownstein SA, Murad A, Hunt RJ. Implementation of new technologies in U.S. dental school curricula.J Dent Educ. 2015 Mar;79(3):259-64.


“Is dentistry responding to technology or is technology driving dentistry?”
Paul Trombly, DMD, MS, DAPM

video courtesy of Dr. Yeganegi (Canada)

OUTLINE



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ELECTRONIC HEALTH RECORD (EHR)

Client-Server EHR

School responsibilities:

- Servers
- Data Centers
- Backups
- Security
- System administrators
- Network
- Legal

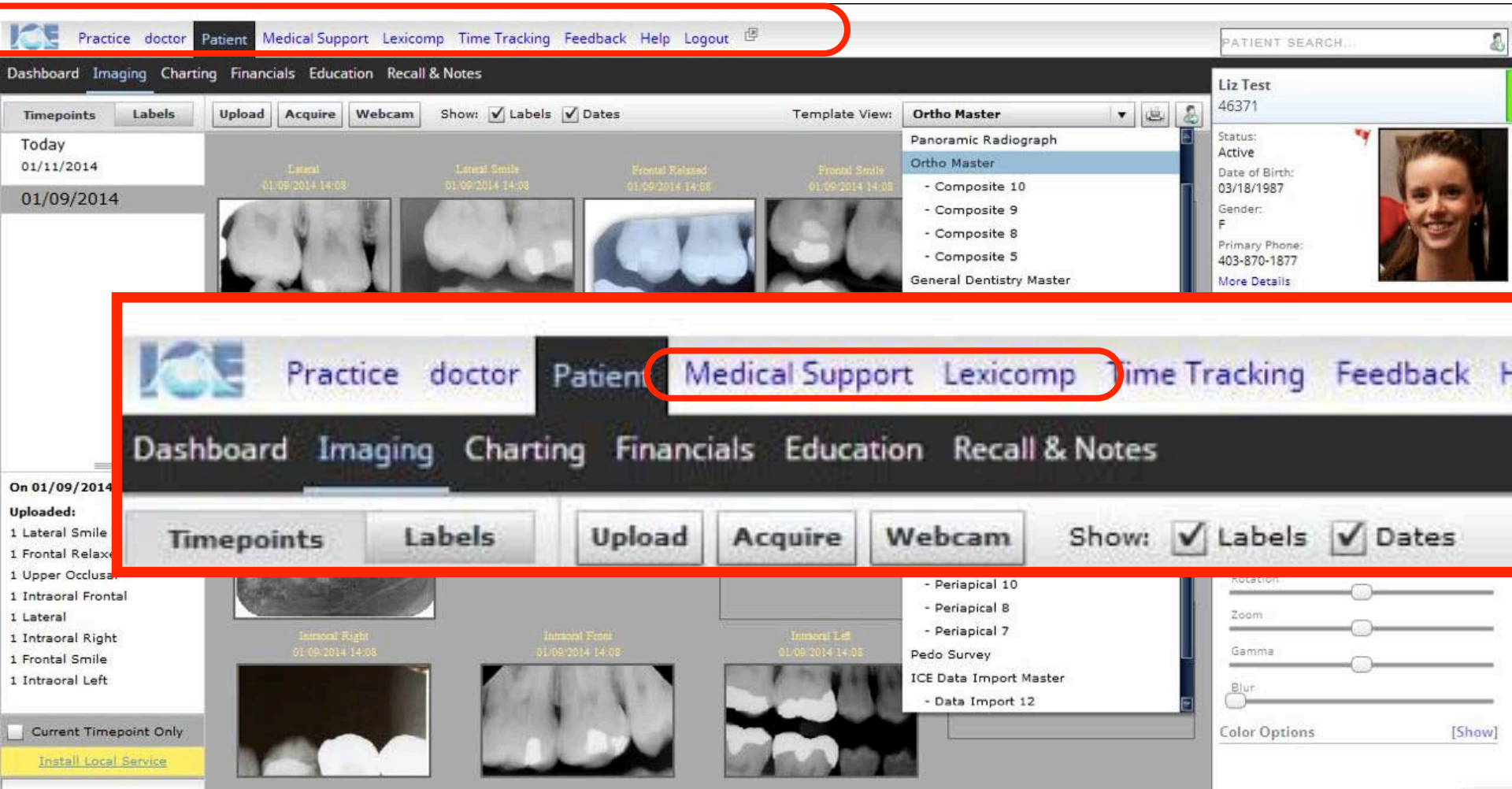
Cloud/Web EHR

School responsibilities:

- Legal
- Network

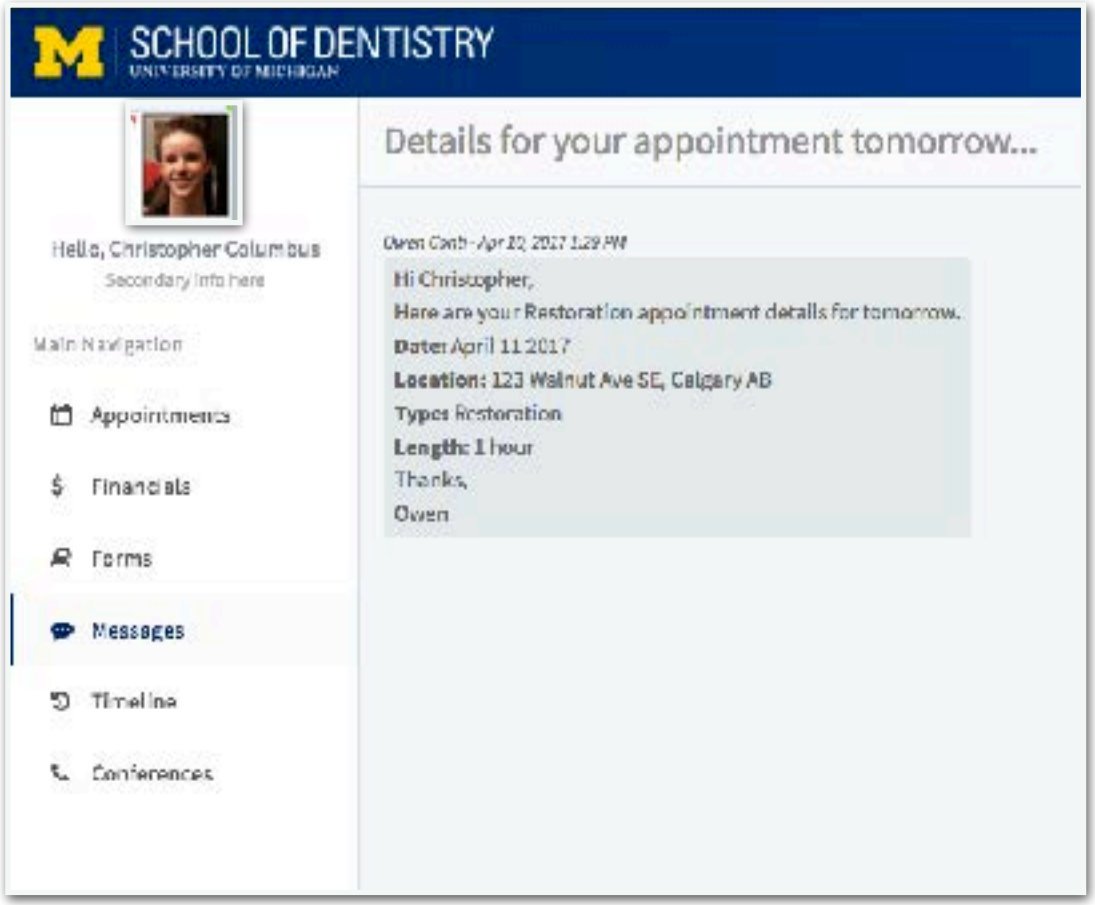
ELECTRONIC HEALTH RECORD (EHR)

Integration with other Cloud/Web Systems



ELECTRONIC HEALTH RECORD (EHR)

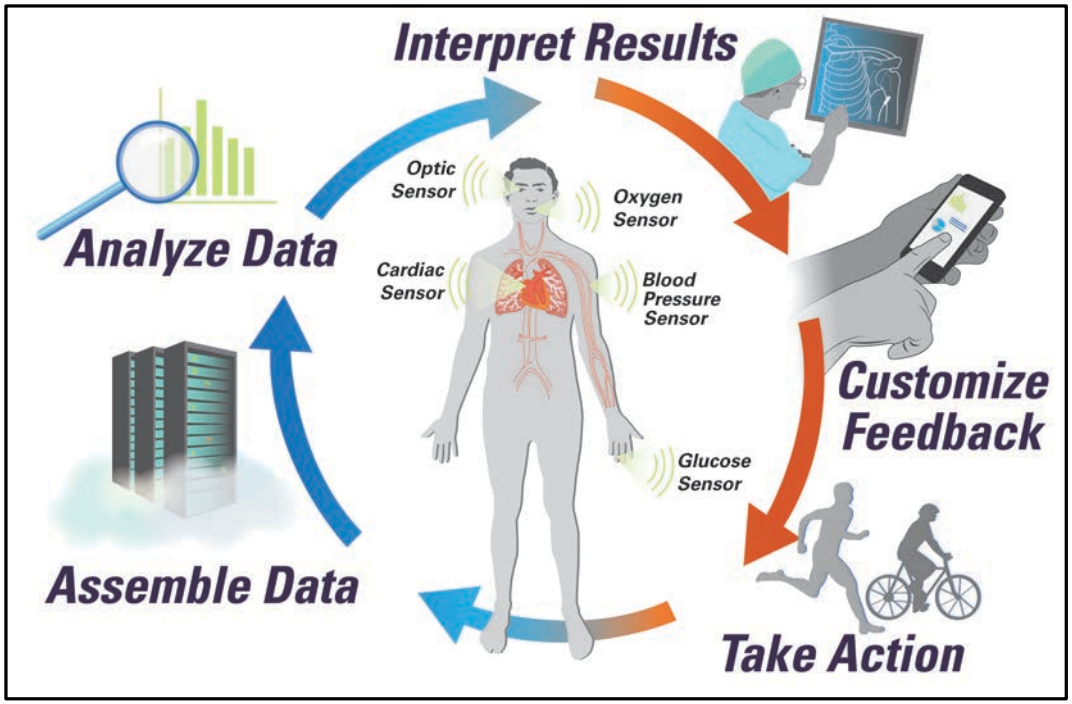
Patient Portal



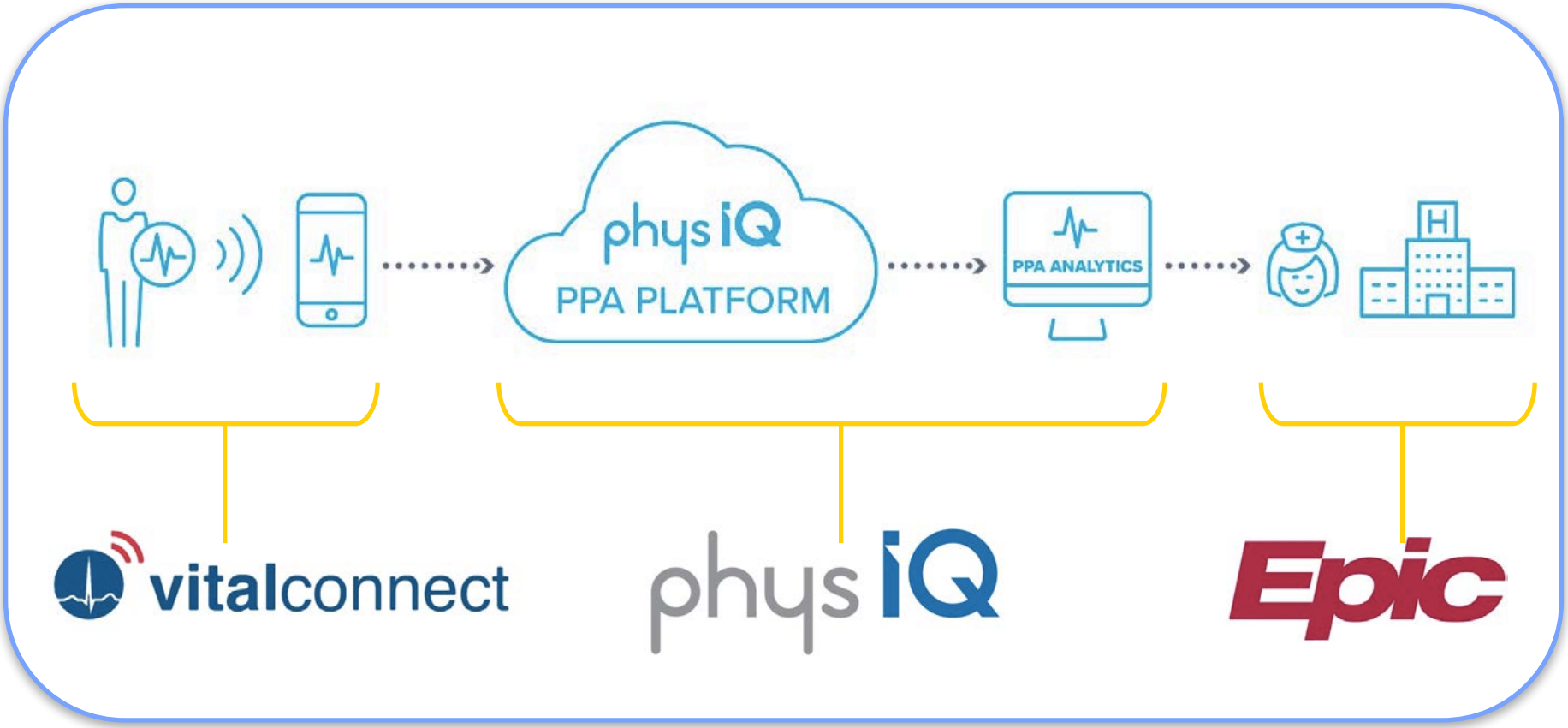
- Web
- Mobile device

2020: LEARNING HEALTH SYSTEM

- Automatically gather data
- Systems analyze data
- Clinician decides action
- Patient receives information
- Treatment provided

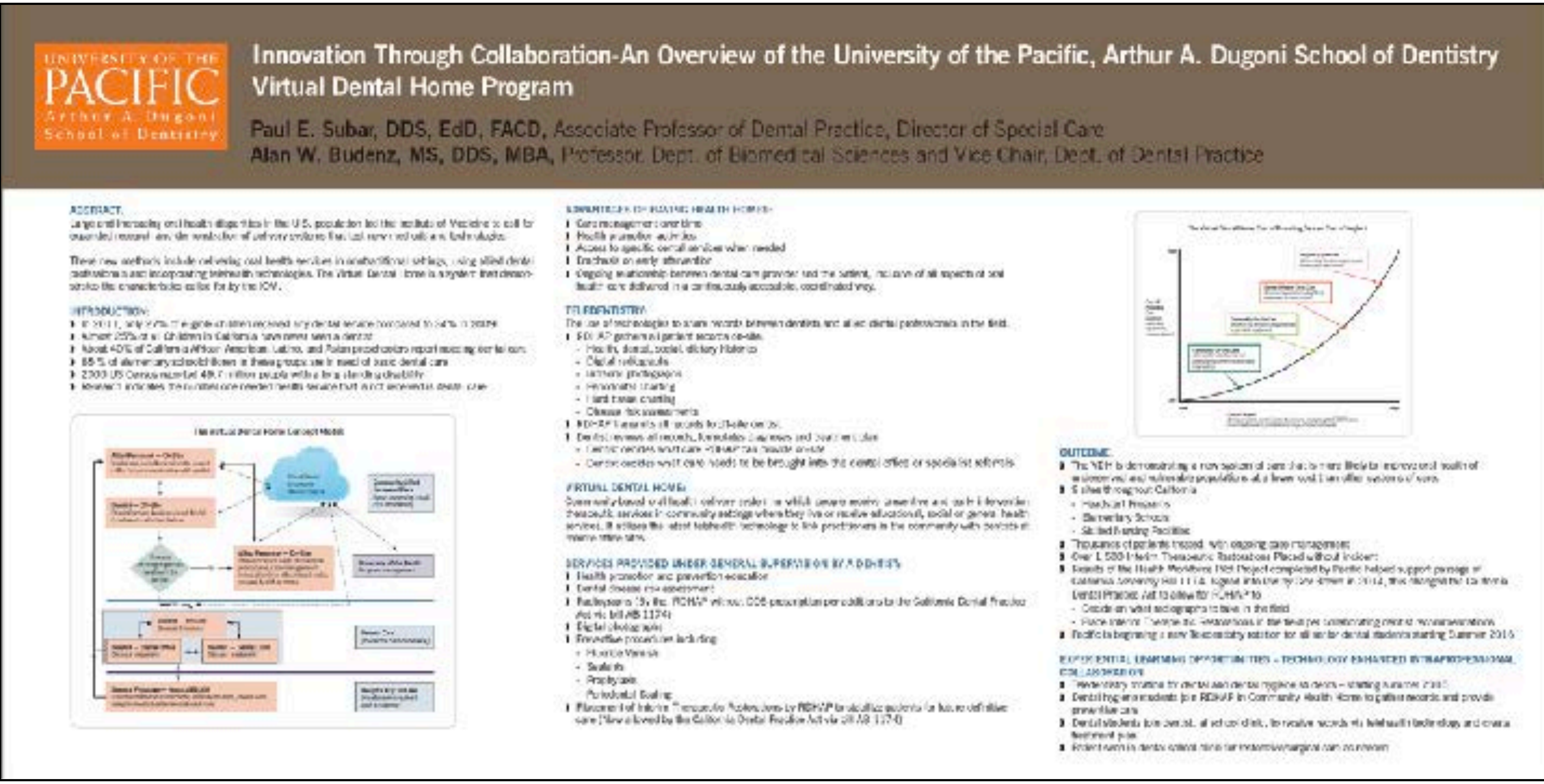


2020: LEARNING HEALTH SYSTEM



TELEHEALTH TECHNOLOGIES

Poster


UNIVERSITY OF THE PACIFIC
Arthur A. Dugoni School of Dentistry
Innovation Through Collaboration-An Overview of the University of the Pacific, Arthur A. Dugoni School of Dentistry Virtual Dental Home Program
Paul E. Subar, DDS, EdD, FACD, Associate Professor of Dental Practice, Director of Special Care
Alan W. Budenz, MS, DDS, MBA, Professor, Dept. of Biomedical Sciences and Vice Chair, Dept. of Dental Practice
ABSTRACT
INTRODUCTION
TELEDENTISTRY
VIRTUAL DENTAL HOME
OUTCOME

Poster

COLLABORATION FOR HEALTH IT

Telehealth and Clinical Mentoring Through a Collaborative Cloud Health Record

Mark Gennis, PhD, ICE Health Systems, Canada; Lynn Johnson, PhD, University of Michigan School of Dentistry, USA

AIM

Health professionals in remote locations struggle to serve patients, as well as to improve their skills. The Collaboration for Health IT, consisting of three US dental schools (Michigan, Pittsburgh and North Carolina), The University of Sydney (Australia), Internet2 (US) and ICE Health Systems (Canada) is addressing these issues through expanding a cloud-based electronic health record (EHR), while incorporating both telehealth and clinical mentoring functions.

Collaboration GOALS

Our vision is to use technology to rapidly advance health, education and research.

In doing so, we are committed to addressing the following problems as priorities for dental education and the dental profession:

1. Continuously investigate and use cutting edge technology.
2. Develop a data warehouse that, with the proper permissions, is continuously updated with patient information.
3. Improve access to patient information so that the needs of dental researchers are met.
4. Increase security through continuous external audits.
5. Ensure interoperability with other systems.
6. Create a system of governance that encourages the schools to determine the future development roadmap.
7. Keep EHR costs at a level that allows the schools to focus their resources on their missions.

METHODS

Connect clinicians to clinicians, researchers and patients efficiently and in real-time or anytime/anywhere

Convenient access to patient information through a web browser

Patients and care providers can all view the record for emergencies and consultations.

Cloud computing enables access to patients and trainees world-wide by eliminating the need for local servers and server support.

cloud security alliance

INTERNET2 GÉANT

Security is ensured through standards set by Internet2, a partner of GÉANT, and continuous external audits. ICE is now in process of seeking ISO 27001 certification.

COLLABORATION

Collaboration members work together to guide the development of their EHR. Innovative applications are now being explored. These include Telehealth, Data Warehousing and Clinical Mentoring.

Collaboration committees meet virtually on an ongoing basis and in-person at least once per year. The Telehealth committee is very active with multiple projects and at least monthly meetings.

Poster

THE UNIVERSITY of TENNESSEE HEALTH SCIENCE CENTER

Patient Mobile Monitoring: A Novel Tool in Dental Education

[redacted]

Aim

Evaluate the effectiveness of mobile monitoring post-dental treatment for early detection of complications and to assist in dental education. Identify and treat complications earlier, reducing patient suffering and in-office visits and facilitating faculty evaluations.

Objectives

1. Early detection of complications.
2. Patient treatment outcome monitoring.
3. Student performance evaluation.
4. Reduction of unnecessary office visits.
5. Reduce costs to facility as well as patients.
6. Determine if the Mobile application is user friendly.

Methods

Patients enrolled in the graduate prosthodontics program received text messages with surveys tailored to specific dental procedures using HIPAA compliant patient monitoring solution. On-time notifications alerts were used to monitor patients. Monthly reports allowed close tracking of patient treatment outcomes and satisfaction.

Monthly Report

Reports are generated for students and faculty.

Dashboard displays the outcomes and feedback data, enabling faculty and students to proactively analyze and address any concerns during a patient's recovery journey.

Example of mobile application.

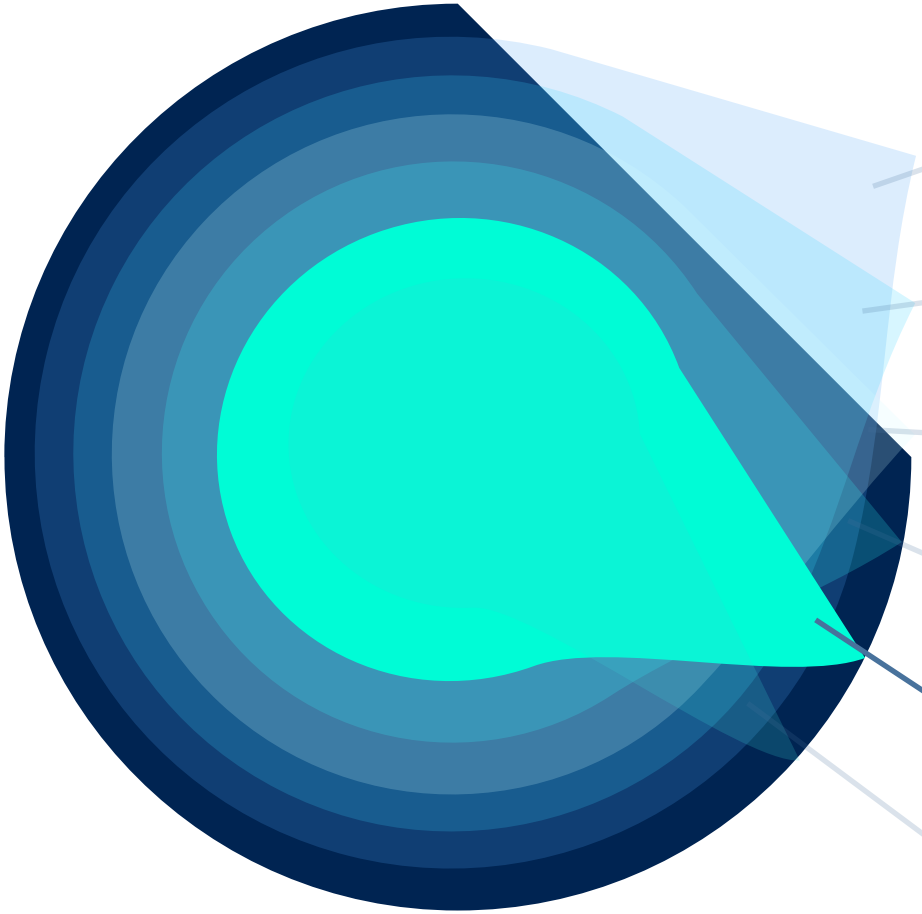
Results

Patient participation was 84%. An algorithm has been created to identify post-treatment complications in order to improve faculty evaluations and student learning. Clinically relevant information guided clinical decision making.

Conclusion

This was the first time that "mobile monitoring" service was applied in an educational institution. This service allowed a reliable and secure collection of patient post-treatment outcomes in a timely fashion. This patient outcome tracking system created learning opportunities for students and facilitated faculty evaluations.

OUTLINE



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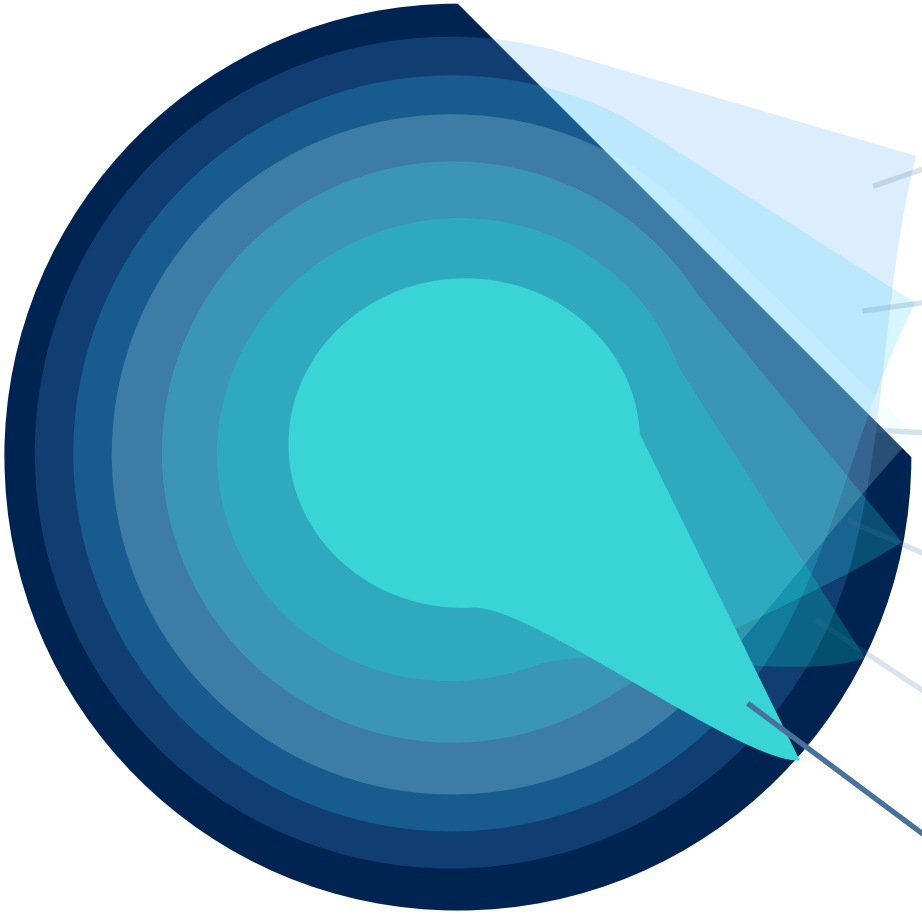
Conclusions: global perspective

LESSONS LEARNED

- Set clear and realistic goals
- Have an end date
- Support for faculty must be provided; include it in a priori cost analysis
- Find a non-IT champion
- Buy before build; its cheaper
- Don't start if you won't be able to finish
- Communicate, communicate, communicate

OUTLINE



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GLOBAL PERSPECTIVE

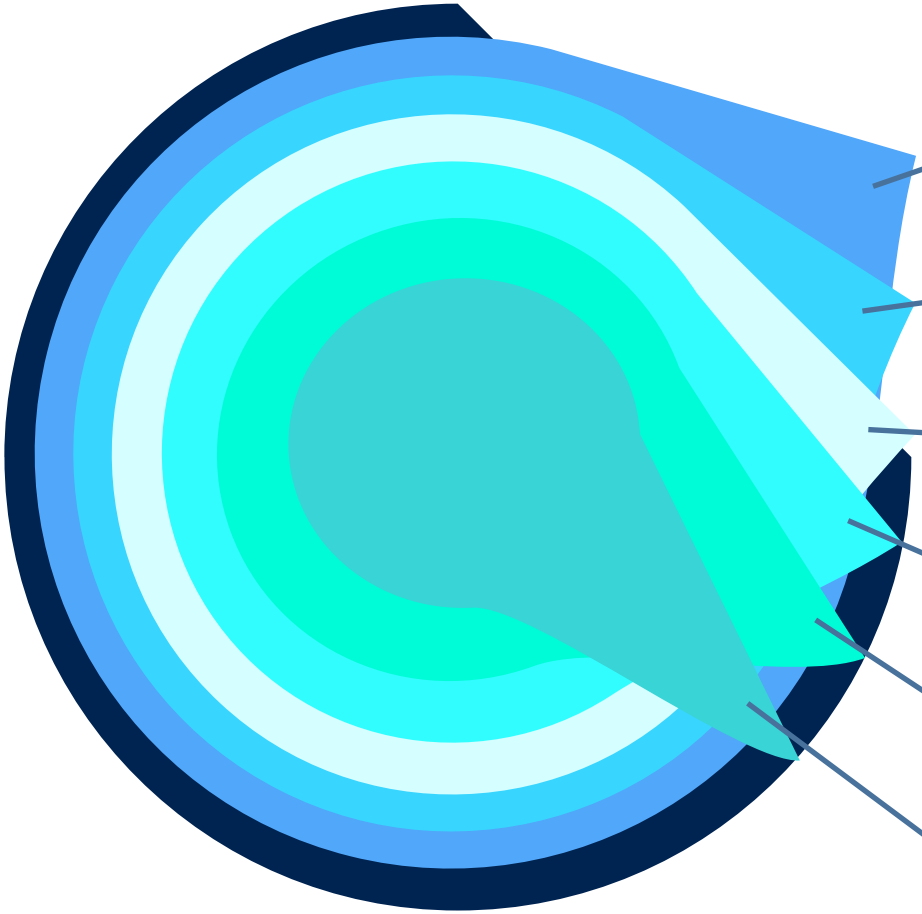
Internet availability

- 2002: 3% of world's population
- 2017: 50% of world's population

Open Access: Free & unlimited access to materials

- Reward faculty for placing teaching materials in open access forums
- Rationalize the copyright process to encourage open access
- IFDEA: Was a leader in collecting quality content and making pit available worldwide

OUTLINE



Review participants' expectations

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Thank you!

Lynn Johnson [lynjohns@umich.edu]
Irina Dragan [irina.dragan@tufts.edu]

GROUP GROUND RULES

- Listen to understand
- Respect each other's thinking
- Stay open to new ideas
- One speaker at a time
- Everyone participates; no one dominates
- Ask "What is possible?"

10-YEAR PROSPECTIVE ACTIVITY

1. Break into groups: Each group has a Recorder and Reporter
2. Answer the following questions: **In 2027, what technologies will be used routinely in dental education and patient care?**
   - Didactic Education Technologies
   - Pre-clinical Education Technologies
   - Patient Care Technologies
   - Telehealth

10-YEAR PROSPECTIVE ACTIVITY

3. Determine the top **2** technologies that are most likely to be used in each technology area.
    - Didactic Education Technologies
    - Pre-clinical Education Technologies
    - Patient Care Technologies
    - Telehealth
4. Why are these **2** technologies important?

Thank you!

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Irina Dragan [irina.dragan@tufts.edu]