CURRICULUM VITAE OF ERIC PAUL MATTHEWS

I. PROFESSIONAL AFFILIATION AND CONTACT INFORMATION

Present University Department or Unit:

Associate Professor Doctor of Health Sciences Program Department of Interdisciplinary Health Sciences AT Still University

Office Address:

Arizona School of Health Sciences, AT Still University 5850 East Still Circle Mesa, Arizona 85248

II. EDUCATION

Formal Education:

December 2008 Doctor of Philosophy of Education,

Southern Illinois University Carbondale, Illinois 62901

May 2005 Master of Science, Education

Southern Illinois University Carbondale, Illinois 62901

May 2002 Bachelor of Science, Radiologic Sciences

Southern Illinois University Carbondale, Illinois 62901

August 1996 Associate of Science, Allied Health and

Radiography

Mineral Area College Park Hills, Missouri 63601

Professional Licensure:

October 1998 American Registry of Radiologic Technologists

Magnetic Resonance Imaging

January 1998 American Registry of Radiologic Technologists

Cardiovascular and Interventional Technology

July 1996 American Registry of Radiologic Technologists

Radiography

July 1995 Missouri Department of Health

Emergency Medical Technician

Additional Certification:

March 2002 Federal Aviation Administration

Certified Flight Instructor, Instrument, Airplane

March 2002 Federal Aviation Administration

Certified Flight Instructor, Multi-Engine Land,

Airplane

October 2001 Federal Aviation Administration

Certified Flight Instructor, Single-Engine Land,

Airplane

November 2000 Federal Aviation Administration

Commercial Pilot, Single and Multi-Engine Land,

Airplane

III. PROFESSIONAL EXPERIENCE

June 2011-August 2012 Radiography Program Director

August 2008-August 2012 Assistant Professor,

Southern Illinois University Carbondale

August 2003-August 2008 Clinical Assistant Instructor,

Southern Illinois University Carbondale

Carbondale, Illinois 62901

December 2001- Flight Instructor,

November 2007 Perryville Municipal Airport

Perryville, Missouri 63775

June 2006-December 2007 Flight Instructor,

Cape Air Charter

Cape Girardeau, Missouri 63701

February 1999- MRI Technologist,

September 2003 Cape Imaging

Cape Girardeau, Missouri 63703

May 1998-February 1999 MRI Technologist,

Southeast Missouri Hospital Cape Girardeau, Missouri 63701

October 1997-May 1999 Special Procedures Technologist, Southeast

Missouri Hospital Cape Girardeau, Missouri 63701

January 1998-May 1999 Clinical Instructor and Adjunct Faculty

Southeast Missouri Hospital Cape Girardeau, Missouri 63701

December 1996-October 1997 Radiologic Technologist, Southeast Missouri Hospital

Cape Girardeau, Missouri 63701

December 1994- Radiologic Technologist,
December 1996 Perryville Municipal Hospital

Perryville, Missouri 63775

IV. RESEARCH AND CREATIVE ACTIVITY

A. Interests and Specialties:

Medical Education and its evolution in the 19th Century

Medicine in the United States Military during 19th Century

19th Century Science and Technology in the United States Military

Graduate degree programs in Radiologic Sciences

Instructor preparation and pedagogy in Radiologic Sciences

B. Current Projects:

Identifying a need for graduate programs in radiology

19th Century Medical Education in Illinois

Radiology History

C. Grants Applied for:

Feminist Review Trust: A comparative oral history of American women during World War II: Military nurses versus civilian factory workers, £4,000 (~\$8,000)

CASA Research Award: Distribution of formaldehyde in tissues following embalming utilizing radiographic contrast measurement, \$1,500.

ASRT Educational Research Grant: Graduate Education in Radiologic Sciences, \$9,512.

ORDA Matching Funds: Matching funds for ASRT Educational Research Grant, \$8,376.

Nycomed-Amersham Educational Research: Distribution of formaldehyde in tissues following embalming utilizing radiographic contrast measurement, \$1,500.

D. Grants Received:

Nycomed-Amersham Educational Research: Distribution of formaldehyde in tissues following embalming utilizing radiographic contrast measurement, \$1,500.

E. Honors and Awards:

February 2008 William E. Nagel Award for Academic Excellence,

College of Education and Human Services, Southern Illinois University Carbondale

August 2006 Certificate of Recognition, for educational

program presentations for the Zebulon Pike Bicentennial Commission. Presented by Ken Wilk,

United States Army Assistant National Coordinator,

Lewis and Clark Bicentennial Commission.

September 2006 Commanding Generals Award of Excellence, for

educational and interpretive history service to the United States Army Corps of Engineers. Presented by Lieutenant General Strock, Chief of Engineers, Commanding General, United States Army Corps

of Engineers.

September 2006 Certificate of Recognition, for educational

program presentations for the Lewis and Clark Bicentennial Commission. Presented by Jeannine Nauss, United States Army National Coordinator, Lewis and Clark Bicentennial Commission.

October 2006

Commanding Generals Award of Excellence, for educational studies and presentations to the Combat Studies Institute, Combined Arms Center, Command and General Staff College, Fort Leavenworth, Kansas. Presented by Lieutenant General Petraeus, Commanding General, United States Army Combined Arms Center, Command and General Staff College.

F. Papers and Presentations at Professional Meetings:

Matthews, E.P. (2011, May). *The foundations of business education in the United States*. Paper presented at the 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Matthews, E.P. (2011, May). Exploring the genesis of business education in the United States. Poster session presented at the 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Matthews, E.P. (2011, May). *The historical foundations of distance learning*. Poster session presented at the 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Jensen, S., Collins, K.S., & Matthews, E.P. (2011, May). *The multigenerational classroom: A challenge for educators.* Poster session presented at the 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Matthews, T, & Matthews, E. (2011, May). *Educating women for the world of business: An examination of the foundations of female business education*. Poster session presented at the 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Collins, K.S., & Matthews, E.P. (2011, January). *Web-Based distance learning: Elements of a successful program.* Poster session presented at the 9th Annual Hawaii International Conference on Education, Waikiki, Hawaii.

Collins, S.K., & Matthews, E.P. (2011, January). *The educator's challenge: The multigenerational classroom*. Poster session presented at the 9th Annual Hawaii International Conference on Education, Waikiki, Hawaii.

- Matthews, E.P., & Collins, K.S. (2011, January). *The historical foundations of distance learning*. Poster session presented at the 9th Annual Hawaii International Conference on Education, Waikiki, Hawaii.
- Matthews, T.M., & Matthews, E.P. (2011, January). *The Seven Sisters: Exploring the genesis of female higher education in the United States.* Poster session presented at the 9th Annual Hawaii International Conference on Education, Waikiki, Hawaii.
- Putnam, A.R., & Matthews, E.P. (2011, January). *The foundations of American higher education: Pre-18th century colleges in the English colonies*. Poster session presented at to the 9th Annual Hawaii International Conference on Education, Waikiki, Hawaii.
- Matthews, E.P., & Jensen, S.J. (2011, January). 19th Century American medical education: Foundations of modern medical education. Poster session presented at the 9th Annual Hawaii International Conference on Education, Waikiki, Hawaii.
- Collins, K.S., Collins, S.K., Matthews, E.P., & McKinnies, R.C. (2010, June). *The evolution and essentials of an effective medical dosimetry distance learning program.* Poster session presented at the American Association of Medical Dosimetrists.
- Collins, S.K., Matthews, E.P, McKinnies, R.C., Collins, K.S., & Jensen, S.C. (2009, June). *Changing dynamics of leadership: An examination of workforce demographics and educational issues of chief executive officers in United States hospitals*. Paper presented at the Tenth Annual Hawaii International Conference on Business, Waikiki, Hawaii.
- Collins, S.K., Matthews, E.P., & McKinnies, R.C. (2009, June). *Succession planning in United States hospitals: Perspectives from the top office*. Poster session presented at the Tenth Annual Hawaii International Conference on Business, Waikiki, Hawaii.
- Matthews, E.P., McKinnies, R.C., Collins, K.S., & Collins, S.K. (2009, June). *Using employee satisfaction and employee retention to boost patient satisfaction*. Poster session presented at the Tenth Annual Hawaii International Conference on Business, Waikiki, Hawaii.
- McKinnies, R.C., Collins, K.S., & Matthews, E.P. (2009, June). *An exploration of employee incentives as utilized in the healthcare*

industry. Poster session presented at the Tenth Annual Hawaii International Conference on Business, Waikiki, Hawaii.

Matthews, E., McKinnies, R., & Collins, S. (2009, April). *Early 19th century medical treatment in Illinois*. Poster session presented at the Illinois Rural Healthcare Association Annual Conference, Effingham, Illinois.

Collins, S.K., Collins, K.S., & Matthews, E. (2009, April). *Gray to gold, retaining the aging workforce*. Paper presented at the Illinois Rural Healthcare Association Annual Conference, Effingham, Illinois.

Matthews, E., & Putnam, A. (2009, April). 19th Century physician philosophies and beliefs. Poster session presented at the Illinois Rural Healthcare Association Annual Conference, Effingham, Illinois.

McKinnies, R., Matthews, E., & Collins, K.S. (2009, April). *Breast Cancer: Incidence, mortality, screenings, and treatments.* Poster session presented at the Illinois Rural Healthcare Association Annual Conference, Effingham, Illinois.

Matthews, E. (2008, August) (Presentation). *Medical education and treatment during the nineteenth century; Military physicians and surgeons*. Invited research presentation at the Mormon Trail Association History Conference, Leavenworth, Kansas.

Matthews, E. (2006, July) (Presentation). *Navigating the plains, the science of western military exploration*. Research presented to the Pike Bicentennial Commission, Pueblo, CO.

Matthews, E. (2006, July). *The medicine of Zebulon Pike and his expedition to the western mountains*. Research presented to the Pike Bicentennial Commission, Pueblo, CO.

Matthews, E. (2006, January). *The science and medicine of the Zebulon M. Pike Expeditions*. Paper presented at the meeting of the Colorado State Historical Society, Colorado Pioneers Museum, Colorado Springs, CO.

Matthews, E. (2005, November). *The science and technology of the United States Dragoons and the Army of 1840.* Research presented at the annual meeting of the Kansas State Historical Society, Topeka, KS.

Matthews, E. (2005, September). *The United States Army, 1839-1851*. Research presented to the Shawnee Mission Kansas Sesquicentennial Commission, Shawnee Mission, KS.

Matthews, E. (2005, August). *The technology of Lewis and* Clark. Research presented at the district meeting, United States Army Corps of Engineers, Portland, OR.

Matthews, E. (2005, August). *The science and medicine of Lewis and Clark*. Paper presented at The Society of American Military Engineers, Seattle, WA.

Matthews, E. (2004, November). *The officer cadre of the frontier army during the Mexican War*. Research presented to the Kansas State Historical Society, Annual Meeting, Topeka, KS.

Matthews, E. (2004, July). *Science and technology of the Lewis and Clark Expedition*. Research presented at the National Lewis and Clark Bicentennial Commission Signature Event, Atchison, KS.

Matthews, E. (2004, June). *The American military, 1792-1808 with emphasis on the science and medicine of the Lewis and Clark Expedition.* Research presented to the National Lewis and Clark Bicentennial Commission, National Historic Site, Fort Osage, Kansas City, MO.

Matthews, E. (2004, June). *Science, medicine and technology of the Lewis and Clark Expedition*. Research and paper presented to the Missouri State Historical Society and the National Lewis and Clark Bicentennial Commission, Kansas City, MO.

Matthews, E. (2004, May). *Science, medicine and technology of the Lewis and Clark Expedition*. Research presented to the National Meeting of the Lewis and Clark Heritage Trail Foundation, Alton, IL.

Matthews, E. (2003, November). *The United States Dragoons, 1839-1851*. Research presented to the Kansas State Historical Society, Annual Meeting, Topeka, KS.

Matthews, E. (2003, May). *The science of Lewis and Clark*. Research presented to the Society of American Military Engineers, National Meeting, Seattle, WA.

Matthews, E. (2003, January). *Science, medicine and technology of the Lewis and Clark Expedition*. Research presented to the National Lewis and Clark Bicentennial Commission, National Meeting of the Lewis and Clark Heritage Trail Foundation, University of Virginia, Charlottesville, VA.

G. Other:

Matthews, E. (2008, April) (Presentation). *The First United States Dragoons during the Mexican-American War*. Research presented to the Combat Studies Insitute, Combined Arms Center, Fort Leavenworth, Kansas.

Matthews, E. & Matthews, T. (2008, April) (Presentation). *Military medicine during the Second World War*. Research presented to the Saint Louis County Parks, Friends of Jefferson Barracks, St. Louis, Missouri.

Matthews, E. & Wilson, S. (2006, September). *The lives of the enlisted men of the Lewis and Clark Expedition*. Research presented at Site #1, Illinois Historic Preservation Agency, Wood River, Illinois.

Matthews, E. (2006, September) (Presentation). *The medicine of Lewis and Clark*. Paper presented at Site #1, Illinois Historic Preservation Agency, Wood River, Illinois.

Matthews, E. (2006, September) (Presentation). *Navigation, ethnology and diplomacy: The science of Lewis and Clark.* Seminar presented at Site #1, Illinois Historic Preservation Agency, Wood River, Illinois.

Allie, S. J., Lynch, D., Matthews, E., Matthews, M., Hinckley, D., James, A, Allie, C., & Allie, P. (2006, June). *British naval forces during the American Revolution: The Yorktown campaign*. Research presented at Colonial Williamsburg, Williamsburg, VA.

Matthews, E. (2006, April). *Westward expansionism: The Geo-Politics of America from 1790-1805*. Paper presented Carbondale Schools, Southern Illinois University, Carbondale, IL.

Matthews, E. (2006, April). *The medicine of Lewis and Clark*. Paper presented Carbondale Schools, Southern Illinois University, Carbondale, IL.

Matthews, E. (2006, April). *Navigation, ethnology and diplomacy: The science of Lewis and Clark.* Paper presented Carbondale Schools, Southern Illinois University, Carbondale, IL.

Matthews, E. (2005, January). *The 95th Rifles at the siege of Line Jackson*. Research presented at the Chalmette National Battlefield, National Park Service, New Orleans, LA.

Matthews, E. (2004, September). *Science and technology of the Lewis and Clark Expedition*. Research presented at the Lewis and Clark Interpretive Center, Sioux City, IA.

Matthews, E. (2004, January) (Presentation). *The British riflemen at the Battle of New Orleans*. Research presented for the National Park Service, Chalmette National Battlefield, New Orleans, LA.

Matthews, E. (2003, January) (Presentation). *The British Army and the Battle of New Orleans*. Research presented to the National Park Service, Chalmette National Battlefield, New Orleans, LA.

V. PUBLICATIONS AND CREATIVE WORKS

A. Articles in Professional Journals:

Matthews, E.P., Collins, K.S., Collins, S.K., McKinnies, R.C. (In Press). Chief executive officers in United States hospitals: A reexamination of workforce demographics and educational issues. *Health Care Manager*.

Collins, S.K., & Matthews, E.P. (Accepted, Fall 2012). Americans with Disability Act: Financial aspects of reasonable accommodations and undue hardship. *Journal of Health Care Finance*.

Matthews, E.P., McKinnies, R.C., Collins, K.S. (Summer 2012). An examination of discoveries leading to Dr. Roentgens discovery of x-rays, Part II. *Spectrum*.

Matthews, E.P., McKinnies, R.C., Collins, K.S. (Spring 2012). An examination of discoveries leading to Dr. Roentgens discovery of x-rays, Part I. *Spectrum*.

McKinnies, R.C., Collins, S.K., Collins, K.S., & Matthews, E.P. (2010). Lack of performance: The top reasons for terminating health care employees. *Radiology Management* 32 (3), 44-47.

Collins, K.S., McKinnies, R.C., Matthews, E.P., & Collins, S.K. (2010). Customer service: Desired characteristics of healthcare

employees. *American Academy of Medical Administrators (AAMA) Online*. http://newsmanager.commpartners.com/aamaeo/issues/2010-01-05/1.html.

Collins, K.S., Matthews, E.P., & McKinnies, R.C. (2009, Spring). Radiation induced spinal cord injuries. *Radiation Therapist* 18 (1), 56-59.

Collins, S.K., Matthews, E.P., McKinnies, R.C., Collins, K.S., & Jensen, S.C. (2009). Chief executive officers in United States hospitals: An examination of workforce demographics and educational issues. *Health Care Manager* 28(2), 134-141.

Collins, S.K., McKinnies, R.C., Collins, K.S., & Matthews, E.P. (2009). Recruitment tools utilized in the health care industry: A ministudy. *Radiology Management*. 31(4), 14-16.

Matthews, E.P. (2008, Spring). An abridged history of the computer as it pertains to diagnostic medical imaging. *Online Journal of Workforce Education and Development 3(1)*.

B. Creative Contributions:

Matthews, E.P. (2011). The foundations of business education in the United States [Abstract]. 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Matthews, E.P. (2011). Exploring the genesis of business education in the United States [Abstract]. 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Matthews, E.P. (2011). The historical foundations of distance learning [Abstract]. 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Jensen, S., Collins, K.S., & Matthews, E.P. (2011). The multigenerational classroom: A challenge for educators [Abstract]. 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Matthews, T, & Matthews, E. (2011). Educating women for the world of business: An examination of the foundations of female business education [Abstract]. 11th Annual Hawaii International Conference on Business, Honolulu, Hawaii.

Collins, S.K., Matthews, E.P., & McKinnies, R.C. (2009). Succession planning in United States hospitals: Perspectives from the top office [Abstract]. *Ninth Annual Hawaii International Conference on Business. Waikiki, Hawaii.*

Matthews, E.P., McKinnies, R.C., Collins, K.S., & Collins, S.K. (2009). Using employee satisfaction and employee retention to increase patient satisfaction [Abstract]. *Ninth Annual Hawaii International Conference on Business. Waikiki, Hawaii.*

Collins, S.K., Matthews, E.P., McKinnies, R.C., Collins, K.S., & Jensen, S.C. (2009). Changing dynamics of leadership: An examination of workforce demographics and educational issues of chief executive officers in United States hospitals [Abstract]. *Ninth Annual Hawaii International Conference on Business. Waikiki, Hawaii.*

Historical Consultant, *The Big Build-The Fort*. The History Channel, 2005.

Historical Consultant, *Battalion*. PBS Affiliate KUED7, The University of Utah, 2003.

Historical Consultant, The West. PBS, 2001.

Historical Consultant, Ride with the Devil. Universal Studios, 1999.

Historical Consultant, *The Frontier Forts of Kansas*. Kansas Forts Network: Kansas Travel and Tourism Division, Kansas Department of Commerce, Kaw Valley Films and Video, 1997.

Historical Consultant, *A History of Fort Scott*. Fort Scott, Kansas, United States National Park Service, 1996.

C. Chapters in Professional Books:

Jensen, S. J., & Matthews, E. P. (2011). The Urinary System and venous puncture. In Frank, G. and Long, B. (Eds.), *Merrill's atlas of radiographic positioning and radiographic procedures* 12th edition (Chapter 18, pp. 183-237) Saint Louis, MO: Mosby.

Matthews, E.P. (2010). The Civil Rights Act of 1964: Changing the face of employment. In McConnell, C.R. (Ed.), *The health care manager's legal guide*. (Chapter 5, pp. 71-90) Sudbury, MA: Jones and Bartlett.

Jensen, S. J., & Matthews, E. P. (2006). Venous puncture and IV administration. In Frank, G. and Long, B. (Eds.), *Merrill's atlas of radiographic positioning and radiographic procedures* 11th edition (Chapter 18 pp. 232-249) Saint Louis, MO: Mosby.

D. Other:

Matthews, E. P. (2008). The education of early nineteenth century American physicians: With relevance to the intercession attempts on the smallpox virus, with focus on the smallpox epidemic of 1837-1838. Available from ProQuest Dissertations and Theses database. (AAT3337329).

Matthews, E. (2006, January). *The Army of Zebulon Pike*. Research presented to The History Channel©, Colorado Springs, CO.

Matthews, E. P. (2005). American Indian smallpox epidemics: Fallacies in education regarding their distribution (Master's research paper). Available from Southern Illinois University Carbondale Graduate School.

Matthews, E. (2005, February). *The Mexican Army of Santa Anna*. Research presented to The History Channel©, Austin, TX.

Matthews, E. (2004, July). *Science and Technology of the Lewis and Clark Expedition*. Research presented on The Morning Show© CBS Television, Atchison, KS

VI. TEACHING EXPERIENCE

A. Teaching Interests and Specialties:

General Radiography

Magnetic Resonance Imaging

Radiology Education and Administration

Graduate Education in Allied Health

19th Century American Medicine

19th Century Medical Education

B. Teaching Awards and Honors:

2006/2007 Outstanding Term Faculty Member of the Year, School of Allied Health, College of Applied Sciences and Arts, Southern Illinois University Carbondale.

C. Current Graduate Faculty Status:

Regular Graduate Faculty Status, Southern Illinois University Carbondale.

D. Number of Master's and Ph.D. Committees on which you have served:

Robert E. Lee (PhD), Education (Workforce Education and Development)

VII. UNIVERSITY EXPERIENCE

A. School and Program Committees:

School of Allied Health, Radiologic Sciences Hiring Committee, Spring/Summer/Fall 2009

School of Allied Health, Radiologic Sciences Hiring Committee, Chair, Fall 2008

School of Allied Health, Student Disciplinary Board, Investigatory Committee, Spring 2007

School of Allied Health, Ultrasound Hiring Committee, Summer 2006

School of Allied Health, Radiation Therapy Hiring Committee, Spring 2006

School of Allied Health Operating Paper Committee, Spring 2005-Spring 2008

School of Allied Health, Radiologic Sciences Advisory Committee, Fall 2003-Present

B. College and University Committees and Councils:

Southern Illinois University Carbondale, Assessment and Program Review Committee, 2010-2011 Academic Year

College of Applied Sciences and Arts, PhD Program Structure Committee (Chair), Fall 2009-Present

College of Applied Sciences and Arts, PhD Exploration Committee, Fall 2009-present

College of Applied Sciences and Arts, Scholarship Committee, Fall 2008-present

College of Applied Sciences and Arts, Off-Campus Degree Programs Curriculum Revision Committee, Fall 2007-Present

VIII. PROFESSIONAL SERVICE

A. Membership in Professional Associations:

American Society of Radiologic Technologists

The American Association for the History of Medicine

Association of Educators in Imaging and Radiologic Sciences

Association of Collegiate Educators in Radiologic Sciences

The Company of Military Historians

American Association of Museums, Educators Sub-Committee

Aircraft Owners and Pilots Association

B. Consultantships:

January 2005-2009 Vascular MRI Consultant, Rivercity Imaging, Cape Girardeau, Missouri

April 2000-September 2006 Historical Consultant on Medicine and Science, United States Army, Center of Military History, Lewis and Clark Bicentennial Team

C. Evaluation of Manuscripts for Journals and Book Publishers and of Grant Proposals for Agencies:

Spring 2010, Editorial Board, *Online Journal of Workforce Education and Development.*

Spring 2010, Book Reviewer-Delmar Cengage Learning.

Fall 2009, Managing Editor-*Online Journal of Workforce Education and Development*, Southern Illinois University Carbondale

Spring 2009, Manuscript reviewer-*Online Journal of Workforce Education and Development*, Southern Illinois University Carbondale.

Winter 2007-Present, Guest Managing Editor-Online Journal of Workforce Education and Development, Southern Illinois University Carbondale

Spring 2007, Manuscript Reviewer, *Online Journal of Workforce Education and Development*, Southern Illinois University Carbondale

Summer 2007, *Online Journal of Workforce Education and Development*, Southern Illinois University Carbondale

D. Other:

2011, Manuscript Evaluator, Student Essay Contest, Illinois State Society of Radiologic Technologists.

2010, Manuscript Evaluator, Student Essay Contest, Illinois State Society of Radiologic Technologists.

IX. COMMUNITY SERVICE

Friends of the Frontier Army Museum

Member, February 1992-Present

Vice President, January 1998-January 2000

Frontier Army Living History Association

Member, February 1992-Present

Board Member, April 2005-Present

National Living History Association

National Naval Historical Association

Friends of Fort Osage, Jackson County (MO) Parks and Recreation