2017-3

Digital Realities and Academic Research

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Digital Realities & Academic Research

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UMASS

NIH NLM NNLM

National Network of Libraries of Medicine

Outline & Learning Objectives

Terminology & Background

NNLM & Digital Reality
NIH/Libraries & Data

Researchers & Digital Realities

Objectives:

Examine and contemplate some of the challenges and strengths related to digital realities, data, and research

Consider how digital reality content types are being used as supplemental material

Learn what role libraries can play in this shift to support researchers

About Me

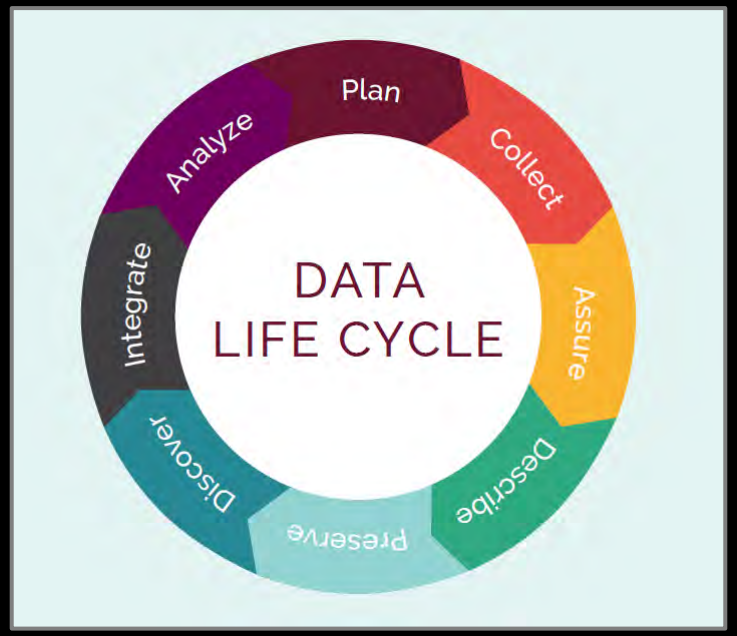
- BFA - Visual Culture Education Concentration in 3D Media
- Masters Library & Information Sciences
- Computer Sciences – JAVA, R, Data Analysis, Visualizations, Databases
- Archives, Museums, Cultural Libraries, Health Science Centers
- Gamification, Human Computer Interaction, and Cultural Identity Exploration

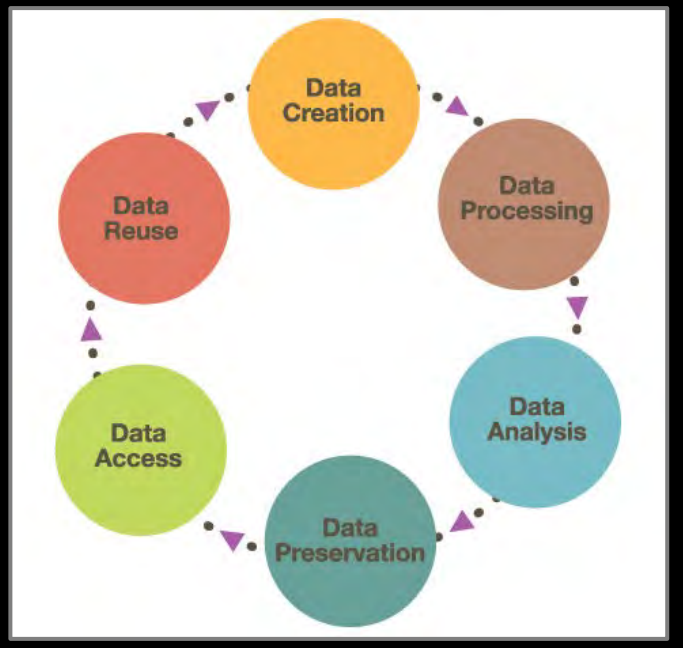
Terminology

Noteworthy phrases:

Virtual Reality
Augmented Reality
Mixed Reality
Digital Realities

Data Life Cycle

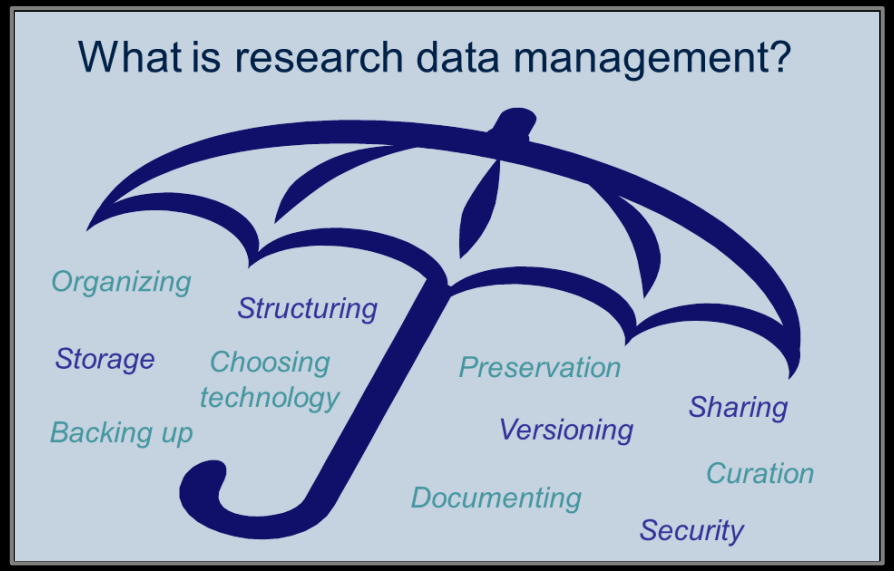




To understand data's role in the overall research process, and thus how to manage data better, we must start by breaking the research process down into the steps that make it up. (Briney, 2015)

Research Data Management

Research data management (often seen as RDM) is a term that describes the organization, storage, preservation, and sharing of data collected and used in a research project.



Researchers need to be able to improve, enhance, and professionalize their research data management skills to meet the challenge of producing the highest quality shareable and reusable research outputs in a responsible and efficient way (Corti, 2014)

Background of NNLM

U.S. Department of Health & Human Services (HSS)

National Institutes of Health

National Library of Medicine

National Network of Libraries of Medicine

The mission of the NNLM is to advance the progress of medicine and improve the public health by providing all U.S. health professionals with equal access to biomedical information and improving the public's access to information to enable them to make informed decisions about their health.

NNLM Regions

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New England Region (NER)

NER proudly serves: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. The New England Region is based in Worcester, MA, at the University of Massachusetts Medical School.

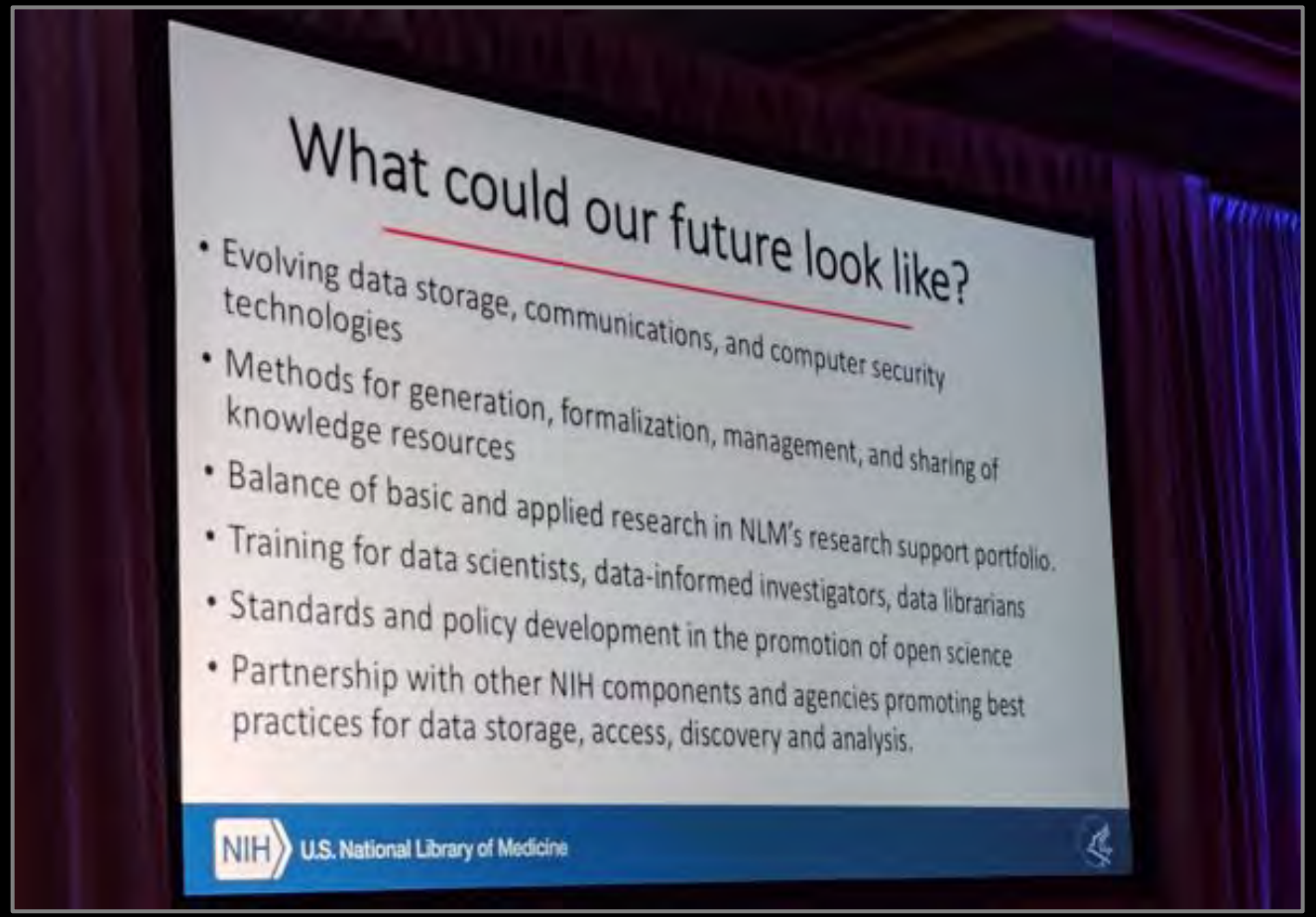
NNLM NER – Ongoing VR Project

Empathy Learned Through an Extended Medical Education Virtual Reality

University of New England
College of Osteopathic Medicine

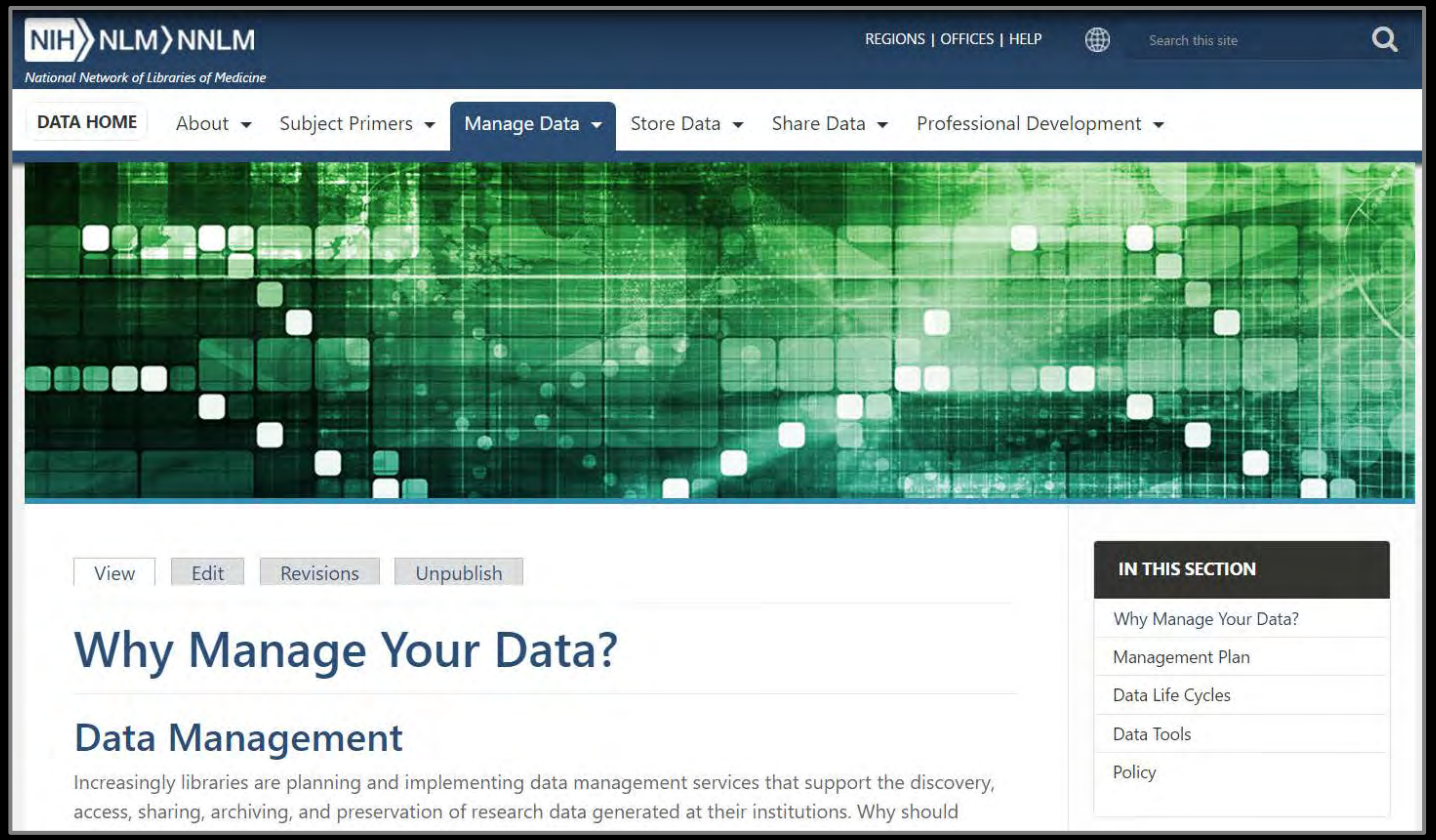
Innovative learning modules are utilized to augment medical students' learning about empathy in relation to older adult health care.

Libraries Future Roles for Supporting Researchers



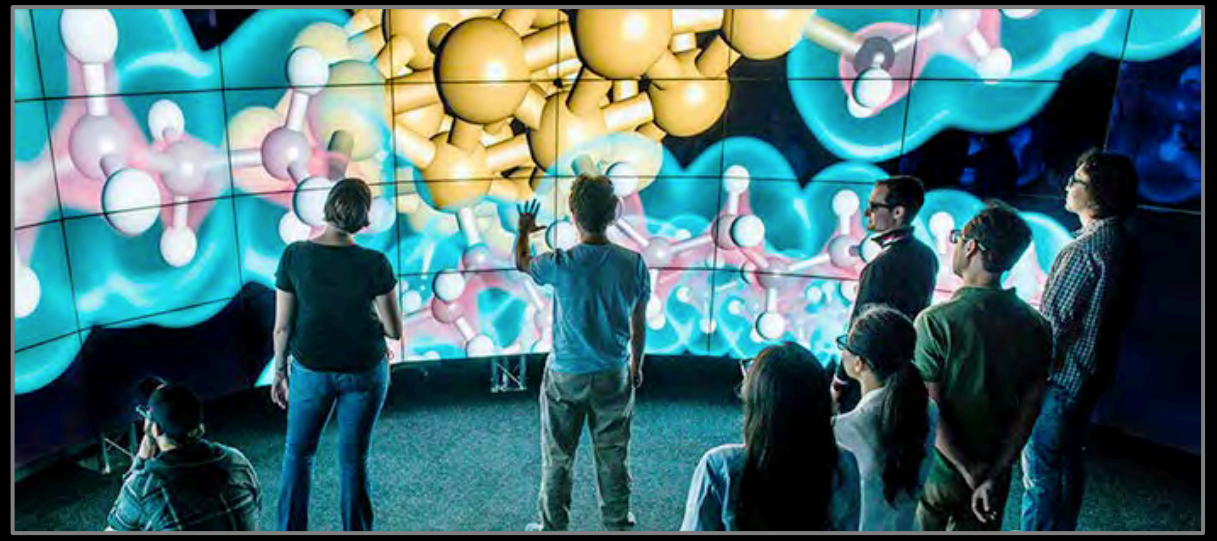
What the library was, which was a stable repository of knowledge, is no longer possible, now the big action is moving upstream to the data. The dynamic interplay of knowledge and medicine is where we're going and where we want to be. (Brennan, 2017)

Libraries Future Roles for Supporting Researchers



- Growing extramural research
- Online Data Management Resources
- Direct deposit of data to support open data movements
- Training for data scientists, researchers, and librarians
- Policy development to promote open access
- Increasing understood value and use of big data

Researchers & Digital Realities



Strength – Collecting Data

A positive note in relating digital realities to the data cycle of “Data Creation” is there seems to be more possibilities to easily collect data. Considering how HMDs and simulation gear can track a variety of user actions: eye-tracking, head movement, general body language, the time that it takes users to make specific motions, etc.

IDENTIFYING ANXIETY THROUGH TRACKED HEAD MOVEMENTS IN A VIRTUAL CLASSROOM
Won A. S., Perone B., Friend M. , Bailenson J. N. (2016). *Cyberpsychology, Behavior, and Social Networking*. 19(6): 380-387.

Challenge – Collecting Data

On the other hand, there is also a challenge that has risen in the same sphere of thought. When considering digital reality technologies and the stage of “Data Creation” it is also easier to draw on data from multiple sources, and run into interoperability issues between data sets.

IDENTIFYING ANXIETY THROUGH TRACKED HEAD MOVEMENTS IN A VIRTUAL CLASSROOM
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Challenge – Data Security

Another researcher data challenge is related to the highly relevant data stage and management strategies revolving around “Data Security”
This data will ideally be anonymized, kept in secure conditions, and types of sensitive data should be dealt with accordingly.

AUTOMATIC DETECTION OF NONVERBAL BEHAVIOR PREDICTS LEARNING IN DYADIC INTERACTIONS
Won, A. S., Bailenson, J. N., & Janssen, J. H. (2014). Automatic detection of nonverbal behavior predicts learning in dyadic interactions. *IEEE Transactions on Affective Computing, 5* (2), 112-125.

Challenge – Data Storage

The next challenge that is significant to both RDM and the data life cycle is that of new digital reality data storage. This issue isn’t necessarily new, but it’s progressing quickly and a concern for researchers and publishers alike.

Challenge – Taxonomies

In research and the industry, there are currently many unique definitions, taxonomies, and technologies for the different types of digital reality technologies. Some researchers even view these “technologies” (such as AR or VR) as academic concepts rather than types of technologies.

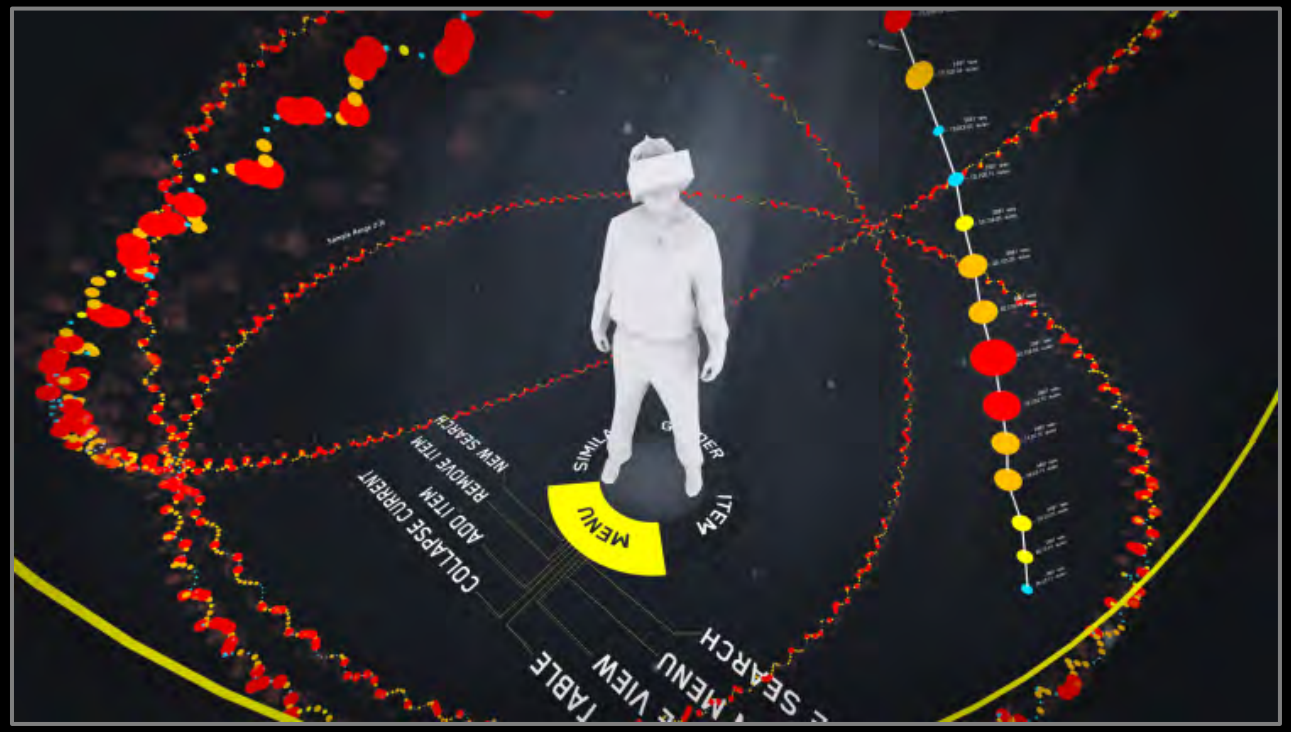
Mixed Reality, Augmented Virtuality, Augmented Virtual Reality, Transmogrified Reality, Dual Reality

Challenge – Supplemental Material

One of the most interesting challenges in relation to digital reality technologies is that these different content types are treated as supplemental material when being published. In the data life cycle this could be categorized as a part of “Data Publication” and “Data Sharing”

Some examples of supplemental material policies online: Oxford Academic, American Psychological Association, Society for Industrial and Applied Mathematics, Journal of Neuroscience

Strength – Data Visualizations



One of the most popular pros that I've seen for researchers is the idea of being able to share the research data with VR. This strength could be a part of the "Data Sharing" part of the data life cycle, or a couple other stages, depending on how it's utilized.

Olshannikova, E., Ometov, A., Koucheryavy, Y., & Olsson, T. (2015). Visualizing Big Data with augmented and virtual reality: challenges and research agenda. *Journal of Big Data*, *2*(1), 22.

Concluding Remarks & Questions

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Research

Briney, K. (2015). *Data Management for Researchers: Organize, maintain and share your data for research success*. Pelagic Publishing Ltd.

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Lindgren, R., & Johnson-Glenberg, M. (2013). Emboldened by embodiment: Six precepts for research on embodied learning and mixed reality. *Educational Researcher*, *42*(8), 445-452.

Olshannikova, E., Ometov, A., Koucheryavy, Y., & Olsson, T. (2015). Visualizing Big Data with augmented and virtual reality: challenges and research agenda. *Journal of Big Data*, *2*(1), 22.

Won, A. S., Perone, B., Friend, M., & Bailenson, J. N. (2016). Identifying Anxiety Through Tracked Head Movements in a Virtual Classroom. *Cyberpsychology, Behavior, and Social Networking*, *19*(6), 380-387.

Won, A. S., Bailenson, J. N., Stathatos, S. C., & Dai, W. (2014). Automatically detected nonverbal behavior predicts creativity in collaborating dyads. *Journal of Nonverbal Behavior*, *38*(3), 389-408.

Wu, H. K., Lee, S. W. Y., Chang, H. Y., & Liang, J. C. (2013). Current status, opportunities and challenges of augmented reality in education. *Computers & Education*, *62*, 41-49.