

Reflections on being a good mentor

Joe Krajcik

CREATE for STEM

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Good
Morning





What will we do today?

Discuss: What does it take to be a good mentor?

Explore the advantages of mentoring?

Examine the disadvantages mentoring?

Answer and discuss questions

What expertise do I bring to understanding how to mentor?

Professor in Science Education at Michigan State University

- Director of CREATE for STEM – Institute for Collaborative Research in Education, Assessment and Teaching Environments for STEM: K-16
- Taught high school chemistry and physical science for 8 years
- Mentored over 50 PhD students and over 25 post-doctoral fellows
- Published over 100 journal articles in leading journals
- Some major recognitions:
 - 2018 Elected as a National Academy of Education Member
 - 2015 Invested as the Lappan-Phillips Professor of Science Education, College of Natural Science, MSU.
 - 2014 Recipient of George G. Mallinson Award from the Michigan Science Teachers Association for excellence of contributions to science education over a significant period of time.
 - 2010 Recipient of the Distinguished Contributions to Science Education Through Research Award from the National Association of Research in Science Teaching.
 - 2010 Recipient of the University of Michigan Faculty Award for Distinguished Graduate Mentoring.
 - 2009 Elected President of NARST



What does it take to be a good mentor?

A good mentor

- Is a good teacher
- Takes time to work with the mentee
- Takes personal interest in the mentoring relationship
- Has projects that provide mentees with experiences
- Uses excellent communication skills
- Committed to supporting the mentee
- Provides guidance and constructive feedback
- Sets good examples



Good mentors are good teachers!

- Teaches the mentee what he/she knows.
- Shares knowledge and expertise
- Accepts the mentee where they currently in their professional development and helps them grow from there.
- Listens carefully to mentee's needs and goals
- Is patient
- Challenges their thinking, their writing
- Helps the mentee reach their goals



Takes Time

- Excellent mentoring takes time and commitment.
- The mentor continually shares information and knowledge (and the intangibles)
- Ongoing support with the mentee.



Takes a personal interest in the mentoring relationship

- Good mentors do not take their responsibility as a mentor lightly.
- They feel invested in the success of the mentee
- Usually this requires someone who is knowledgeable, compassionate, and possesses the attributes of a good teacher
- Pushes (Nudges) mentee to meet their maximum potential and do exemplary work



Has projects that provide mentees with experiences that could include.....

- Reading literature to build rational/theoretical framework
- Engaging in research
- Designing studies, data collection and analysis
- Writing up results – publishing papers!
- Provides opportunities for presentations
- Grant writing
- Could be springboard for mentee's new research questions



Excellent communication skills

- Knows how to break the problem down
 - i.e., why is the mentee struggling?
- Knows how listen to the needs of the mentee
- Knows how to provide ideas



Committed to supporting the mentee

- A good mentor commits to helping their mentees find success and gratification in their studies and research
 - Not all will be a copy of you
- Good mentoring empowers the mentee to develop their own strengths, beliefs, and capabilities
- Support mentee in her/his own work
- Recognizes when mentee needs more support and when they need less support



Sets good examples

Good mentors

- 1) Remain professionally engaged
- 2) Determined to continue to learn
- 3) Treat mentors with respect and professionalism



You can't mentor everyone

- Limit who you will mentor –
 - It is very challenging to mentor someone outside of your interests and expertise
 - You are the best mentor when you and the mentee share the same common goals
- At the same time, you need to realize not everyone will follow in your footsteps



Benefits of mentoring graduate students and post-doctoral fellows

- Impacting and building the field over time
- Becoming a life long collaborator
- Impacting K – 12 Science Education
- Impacting the world
- Expanding your vision and your research agenda
- Mentoring the next generation(s) of researchers, curriculum designers and leaders
- Collaborations throughout the world



Impacting the field

- The Case of Shirley Magnusson and PCK
- One of my graduate students at the University of Maryland from 1987 – 1992
- Shirley, Hilda Borko, and I wrote a book chapter on PCK
- Although we finished the chapter in 1992, it was not published until 1999
- It did not take off until 2012 when it received 200 citations. It currently has been cited 2278 times!
- A major impact on the field
- You think of it as the Magnusson Model of PCK in South Africa



Life long collaborator

- The Case of David Fortus
- Graduate student at the University of Michigan from 1999 – 2003
- Currently an endowed chair at Weizmann Institute of Science
 - The Chief Justice Bora Laskin Professorial Chair of Science Teaching
- 2004, Outstanding Doctoral Dissertation Award from NARST
- David and I still work together
- Since his graduation, we have published 16 refereed journal articles or chapters, developed secondary curriculum materials and one book.
- The latest publication (2018) is in JRST and resulted from work from the NSF project on energy
- We are currently working on a new grant to the NSF



Impacting K-12 Science Education

- The Case of Kate McNeill
 - Professor at Boston College
 - As a graduate student we worked together on how to support middle school students in writing scientific explanations
 - You may have heard of Claim, Evidence and Reasoning or CER model
 - CER has had a major impact on K – 12 science education in the US
 - We have published 13 referred journal manuscripts and chapters and one book. The book has had a major influence on professional development. Helped to develop a leading curriculum series in middle grades science
 - Received the Early Career Research Award in 2011 for NARST



Impact science education in various countries

- The Case of Hsin-Kai Wu
- Graduate student at the University of Michigan from 1997 to 2002
- Published 3 articles in very competitive research journals by the time she graduated
- A Professor of Science Education at National Taiwan Normal University
- Numerous recognitions
 - 2003 Outstanding Doctoral Dissertation Award from the National Association for Research in Science Teaching
 - 2008, Early Career Award from NARST
 - 2009, Outstanding Research Award of the National Science Council
 - 2014, the Outstanding Research Award from the Ministry of Science and Technology



New ideas to expand your research agenda

- The Case of Julia Plummer
- Graduate student at University of Michigan from 2001 – 2006
- Dual degree in Science Education and Astronomy
- Received the Outstanding Doctoral Dissertation Award from NARST in 2007
- I learned lots of astronomy, but more importantly her work inspired my work on learning progression research
- Published paper on learning progression with Julia in JRST



Mentoring the next generation(s) of researchers, curriculum designers and leaders

- The Case of Tali Tal
- Post doc at the University of Michigan from 2000 – 2002
- Full professor at the Technion in Israel
- Currently NARST President
- Published a manuscript in JRST
- Family friend
- Continue our collaborations



Collaborations throughout the world

- Chanyah Dasha
 - Post-doc, Thailand
- Hsin-Yi Chang
 - Graduate student, Taiwan
- BaoHui Zhang
 - Graduate Student, China
- Yael Shwartz
 - post-doc, Israel
- Ibrahim Delen
 - graduate student, Turkey
- Sebastian Opitz
 - post-doc, Germany



Not everyone will follow in your footsteps but they still do excellent and critical work

- Joe Hoffman, Graduate Student at the University of Michigan, Currently Technology Director at a large high school
- Yael Bamberger, Post-doc at the University of Michigan, director of informal education science education center in Israel
- Angela Kolonich, graduate student and post doc at MSU, clinical faculty at MSU doing professional development



Disadvantages of mentoring

- I can't think of any
- It does take time and effort
- But any endeavor worth pursuing takes time and effort





Mentor – Mentee Relationship

- A mutually benefitting relationship
- The mentee learns much,
- The mentor gains in new ideas, expanding his/her publication record, and accomplishing work.



Questions??????

Comments

Contact information:

Joseph Krajcik

krajcik@msu.edu

Twitter: @krajcikjoe

