

SESSION NAME: RECRUITING & FACILITATING ALTERNATIVE CERTIFICATION OF TEACHERS

## HELPING SCIENTISTS BECOME TEACHERS: THIS DISTANCE EDUCATION PROGRAM DELIVERS!

Robert N. Carson, Director  
**Northern Plains Transition to Teaching (NPTT)**  
 Montana State University - Bozeman

### DO WE HAVE A TEACHER SHORTAGE? -- YES & NO

- Yes, though primarily in remote and rural areas, and in communities of high poverty and low SES.
- Shortages are concentrated in certain subject areas, including physical sciences.
- Teacher turnover fluctuates with market conditions. And businesses harvest talent from the teaching profession.
- Teacher salary is a factor, contrary to the assumption that education is somehow immune from the principles of market economics.

**Regardless, the profession must cultivate high quality teachers, and be innovative in doing so.**

### NPTT began in 2002

#### Structural Characteristics that Attract Our Audience.

- Graduate Level - Program, Concepts, Scholarship.
- Entirely Online, and Asynchronous
- Compressed Courses, Back-to-Back
- Paid Internship *or* Student Teaching
- International in Scope - Overseas Schools.
- Open Cohorts; Create a 'Community of Learners'
- Energizing weekly 'cadence' concentrates focus.
- Affordable
- Personable

*Non-traditional, adult learners cannot quit their jobs and move to a campus, or take classes during working hours. The program has to accommodate their lives. And, it cannot insult their intelligence. It has to build on what they already know and are able to do.*

### ORIGINS OF NPTT

- 2001 - No Child Left Behind: *No more 'emergency licenses'. "All teachers must be highly qualified."*
- Transition to Teaching Program - NCLB Ch B, Sec. 2311-2314.
- Alternative pathways; Distance delivery; High needs.
- Increasing demand from struggling schools.
- Increasing numbers of **non-traditional students** wanting to teach, but not via the traditional undergraduate route.
- R. Crosby: *"Can't you do something for us?"*

#### NORTHERN PLAINS TRANSITION TO TEACHING PROGRAM (NPTT) MONTANA STATE UNIVERSITY - BOZEMAN, MT.

|                                   |                               |   |  |
|-----------------------------------|-------------------------------|---|--|
| Kate Geraets<br>Program Assistant | Dr. Robert Carson<br>Director | Jamie O'Callaghan, M.Ed.<br>Student Advisor | Dr. Annette Chvilicek Carson<br>Assistant Director |
|-----------------------------------|-------------------------------|---|--|

★ **Programmatic Features**

- ❖ Conceptual Framework: Clear, Coherent, Sensible (Instead of encyclopedic and eclectic)
- ❖ Cultural-Historical Analysis of Subject Areas (Vygotsky's notion of the *co-evolution of culture & consciousness*)
- ❖ Intellectual Culture – How it Enables the Potential of the Human Mind (Look at your subject through *Foundational Perspectives*)
- ❖ Emphasize the Fascination, *Beauty*, and Intellectual Pleasure of the Disciplines (The Significance of *Affect* to Learning)
- ❖ Pro-active Cultivation of *Learning Communities* (Not just chasing misbehavior with 'consequences')
- ❖ Professionalism Grounded in Respect for Education

7

**Why people switch careers to teach...**

- "I helped teach some lessons in my son's high school class, and fell in love with the enthusiasm and energy of the students."
- "I was asked to serve as a [judge] for a science fair, and was blown away by some of the student's abilities and eagerness."
- I love science, but I also love people, and working in a laboratory analyzing soil samples got stale after doing it for six years."
- "I wanted to do something that had meaning. I realize how much influence teachers have in students' lives."
- "I always wanted to be a teacher, but in college my science professor talked me out of it... He said I was too smart to waste my talents teaching high school." \*

\* Do we have an image problem? 10

**NPTT Program Plan for Paid Interns\***  
M.Ed. in Curriculum & Instruction + Licensure

30 total credits

Phase 1: EDCI 552, 553, & 554

Phase 2: EDCI 558 & 559

Phase 3: EDCI 555, 556 & 557

Practicum for PAID INTERNS EDCI 558 3 credits  
May begin with Phase 1, 2 or 3

EDCI 540 (required elective) offered up to three times during Phases 1-3

\* Paid Intern: Works as a contracted teacher in the major area of teaching endorsement through NPTT for one academic year, either full or half time. Consists of EDCI 558 for 3 credits (1 credit Fall semester, 2 credits Spring semester, taken consecutively).

Students must begin the practicum within two years from the beginning of Phase 2.

EDCI 540 must be completed before the end of Phase 3.

M.Ed. + Licensure granted at the conclusion of Phase 3 and the Practicum.

Cost: \$10,500 (plus books & minimal fees; courses paid for one at a time)

Sample Page from NPTT Website. Illustrates how courses, paid internship, and program sequence work.

Application Process

Professional Coursework.

Internship or Student Teaching

Time to Completion

Approximate Cost

Licensure Completion.

M.Ed. Degree Completion.

Background checks, APA format, technology, academic guidance, student services, finding a job, using the MSU library, and so forth....

8

**Why would a Bench Scientist become a Teacher?**

"A career in science can be very exciting, challenging, and lucrative...."

Same ten people, same stupid jokes, year after year...

After twelve years of this, it really isn't fun anymore...

...or not."

11

**Who Do We Serve?**  
Our students...

- ❖ Average Age: 37
- ❖ Average Combined GREs ~1100 verbal & analytic (earlier version, no longer used).
- ❖ Praxis II scores: 79% above the national mean
- ❖ ~ 40% of endorsements are sciences
- ❖ Applicants must demonstrate a history of employment and a record of working with youth.
- ❖ For many, teaching is a second career after an early retirement (e.g. military).

9

#1 Reason: "Because it is meaningful work..."  
#2 Reason: "I Love the Energy of the High School Classroom..."  
#3 Reason: "I want to make a difference."

12



### NPTT cited as a national model by TEAC in 2010

- Currently admitting about 80 M.Ed. candidates per year.
- 15% from overseas, IB & American schools.
- Strong attraction of students from Science, Mathematics, Engineering...
- Graduates love the program, and the schools value them highly. Many become leaders.

14

### Appendix A - NPTT Courses and Requirements

Course Descriptions: NPTT consists ten or eleven courses under the Education, Curriculum and Instruction rubric - EDCI (depending on completion plan). All students take EDCI 552-559 and EDCI 540 as well as one of the two options for EDCI 598. Student Teachers also take EDCI 564 in addition to all other coursework.

EDCI 552: Human Development and the Psychology of Learning  
 EDCI 553: Diversity, Special Needs, and Classroom Discipline  
 EDCI 554: Curriculum Design, Pedagogy, and Assessment  
 EDCI 558: Methods of Teaching  
 EDCI 559: Equity, Special Needs, and Diversity  
 EDCI 555: Technology, Instructional Design, and Learner Success  
 EDCI 556: The Legal, Social, and Practical Basis of Schooling  
 EDCI 557: Brain Science, Educational Research, and Teaching  
 EDCI 540: American Indian Studies for Educators [or other multicultural course]

EDCI 598: Paid Internship (1 Credit, and 2 credits - must be taken for a total of 3 credits over 2 semesters), or  
 EDCI 598: Student Teaching (6 credits)

EDCI 564: The Comprehensive Portfolio (taken by Student Teachers only)

17

...as Wittgenstein would say...

### Concluding un-scientific post-script:

- ❖ **Great Teachers:**
  - ❖ Subject Matter experts
  - ❖ Enthusiastic about teaching
  - ❖ Great 'people skills'
  - ❖ Pedagogical expertise
  - ❖ Professional & Ethical
- ❖ **Consider the Scientist** who has the social skills maturity, experience, and knowledge ... and who wants to become a teacher *for all the right reasons.*
- ❖ **They are out there. Let's recruit them!**

"Have you ever thought of becoming a teacher?"

15

APPENDIX B - Cultural-Historical Framework *Ourstory*

*A History of Formal Intellectual Culture as Seen Against the Backdrop of the World's Cultural Traditions*

| Historical Epochs / School Subjects | Early Cultures & Societies (12 <sup>th</sup> - 1 <sup>st</sup> BC)<br><i>The Agricultural Revolution</i> | Classical Civilizations<br>Greece (800-323BC).<br><i>Literacy, Reason &amp; Democracy</i> | The European Middle Ages (410AD-1300)<br><i>Christianity and Islam</i> | The Renaissance (1300's - 1600)<br><i>Rebirth of Classical Learning</i> | The Enlightenment (1600-1800)<br><i>Science and Romanticism</i> | Modernity (1800-1920)<br><i>Technology, Imperialism</i>                    | 20 <sup>th</sup> & 21 <sup>st</sup> Centuries<br><i>Post-Modernism, Cultural Pluralism</i> |
|-------------------------------------|--|---|--|---|---|--|--|
| Social Studies, History & Geography | A1   | A2  | A3   | A4  | A5  | A6   | A7   |
| Music, Art & Architecture           | B1   | B2  | B3   | B4  | B5  | B6   | B7   |
| Mathematics & Logic                 | C1   | C2  | C3   | C4  | C5  | C6   | C7   |
| Science & Technology                | D1   | D2  | D3   | D4  | D5  | D6   | D7   |
| Literature & Language               | E1   | E2  | E3   | E4  | E5  | E6   | E7   |
| Traditional Cultures                | F1<br><i>Egypt, Africa, Mesopotamia</i>  | F2<br><i>China, India, Persia, Rome</i>   | F3<br><i>Europe; Arabic civilization</i>                               | F4<br><i>American Indians; Inca, Aztec, Mayan</i>                       | F5<br><i>Africa Revisited; Tribal structures vs Colonialism</i> | F6<br><i>Clash of cultures; Traditional vs Scientific; Asia revisited.</i> | F7<br><i>Special topic: Philosophy of Language, Culture &amp; Mind</i>                     |
|                                     | Sixth Grade  |   | Seventh Grade  |   | Eighth Grade  |  |  |

### Appendix C – Cultural-Historical Examples

- ❖ Pre-Socratic’s speculations in Natural Philosophy. *Deduction.*
- ❖ Pythagorean view on *rationality* – in music and in nature.
- ❖ Plato’s emphasis on *abstraction*, advent of *idealization*.
- ❖ Aristotle’s skill at collecting, *observing*, classifying. *Taxonomies.*
- ❖ Tycho Brahe (observation/*data*); Kepler’s ‘*laws*’ (c. 1605).
- ❖ Galileo’s *mathematization* of pendulum motion (c. 1610). *Experiments.*
- ❖ Bacon’s *Novum Organum* (1620) – “*idols*” of the mind. *Inductive method.*
- ❖ R. Boyle (*Skeptical Chymist*, 1661) – *Social protocols* for the Royal Society.
- ❖ Newton’s co-development of calculus, and *Principia Mathematica* (1687).
- ❖ Kant phenomenology: *Constructing* the representative images of reality.
- ❖ Lavoisier, *The Elements of Chemistry* (1789). *Nomenclature* → *Theory.*
- ❖ Lyell (geology); Darwin (biology); Lobachevski (maths); Einstein (physics); ...as per Thomas Kuhn – *Conceptual Revolutions* reconfigure world view.
- ❖ Microscope & Telescope – transformed the scope and scale of human awareness.

❖ In the evolution of each scientific discipline, *key transformative events* change both the world view it embodies and the minds of those who learn them. Hence the notion of a ‘*co-evolution of culture & consciousness.*’

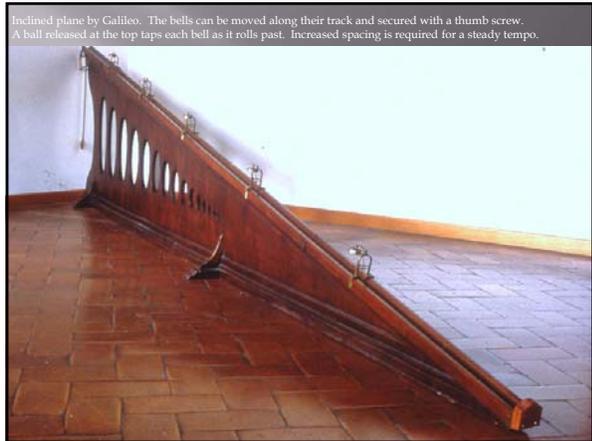
19

APPENDIX E – Concept & Symbol

### A PATTERN OF NUMBER... INITIATES A CONCEPT

E-1

22



### WORD & SYMBOL – NAMING THE CONCEPT SECURES IT IN THE MIND

E-2

23

Appendix D – Suggested Readings

SUGGESTED READINGS – An interesting sampling of foundational perspectives.

- Gribbon, J. (2004). *The scientists – A history of science told through the lives of its greatest inventors.*
- *Science & Education* (Academic journal, associated with the International History, Philosophy, Science, & Teaching group. Published by Springer).
- Matthews, M. (2014). *Science teaching – The contribution of history and philosophy of science.* Routledge.
- Coolidge, F. & Wynn, T. (2009). *The rise of Homo sapiens – The evolution of modern thinking.* Wiley-Blackwell.

21

### SYMBOLS → CONCEPTS

#### WORKING WITH CONCEPTS AND SYMBOLS AS INSTRUMENTS OF COGNITION

E-3

24