

Instructional Readiness for Change in a Geoscience Learning Ecosystem

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Abstract

Geoscience education is, itself, a dynamical sub-system in the science, technology, engineering and mathematics (STEM) learning ecosystem. Both the larger STEM environment and the geoscience ecosystem are shaped by the ever-changing relationships among people, places, science content (and its communication), teaching practices, and shifting roles for each of these. In answer to calls in the literature for research on professional learning in which the faculty member is central to the process of change, the study reported here addressed the question: What is the nature of college science faculty readiness for change in instructional practices? The setting was a professional development experience in oceanography/marine science and paleoclimatology among 32 faculty from 2- and 4-year colleges. Ten of the 32 participated in interviews and all provided survey responses and documents used in analysis. Qualitative research methods resulted in three example cases to illustrate a new framework for exploring faculty readiness for professional change in teaching. This framework blends the Clarke and Hollingsworth (2002) model of a professional change environment with research from health sciences on readiness for behavioral change (Dalton & Gottlieb, 2003). From the first model came the multi-part foundation of personal, external, professional, and consequence domains of experience and from the second came how an instructor draws on those domains to: (a) see an instructional challenge as requiring intentional action to be resolved; (b) notice new significance (for the instructor) in some aspect of instructional practice; (c) feel able to manage instructional stressors/challenges; (d) have commitment to initiate/sustain change; (e) perceive adequate support in undertaking change. Three profiles of readiness for change are represented by three composite instructor cases named Lee, Pat, and Chris. In the case of Lee, factor c drove change efforts, for Pat, factors a and b were in the forefront, and for Chris it was factors d and e. Building a healthy learning ecosystem includes attention to faculty as learners. The three cases are valuable both as illustrations of the framework in use and as touchstones for future research and development related to post-secondary professional learning for teaching.

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Purpose

Why is professional development successful (or not)? For whom? Under what conditions? In answer to calls in the literature for research on professional learning in which the faculty member is central to the process of change, the study reported here was an attempt to address the question: **What is the nature of college science faculty readiness for change in instructional practices?**

Setting & Methods

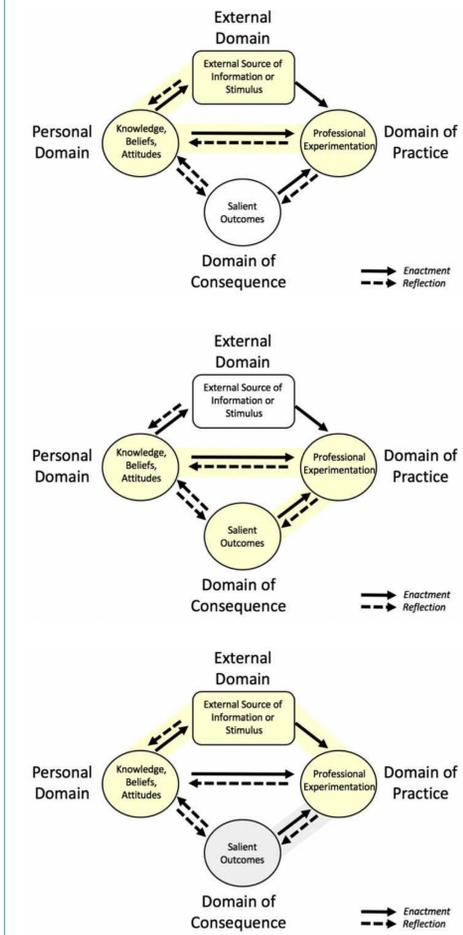
- Professional development experience in oceanography/marine science and paleoclimatology among 32 faculty from 2- and 4-year colleges.
- Two week intensive + follow-up
- Ten of the 32 participated in interviews and all provided survey responses and documents used in analysis.

Blending Two Models

Table 1. Merging the Five Factors (Dalton & Gottlieb, 2003) and Change Environment (Clarke & Hollingsworth, 2002) into an Instructional Readiness for Change Framework.

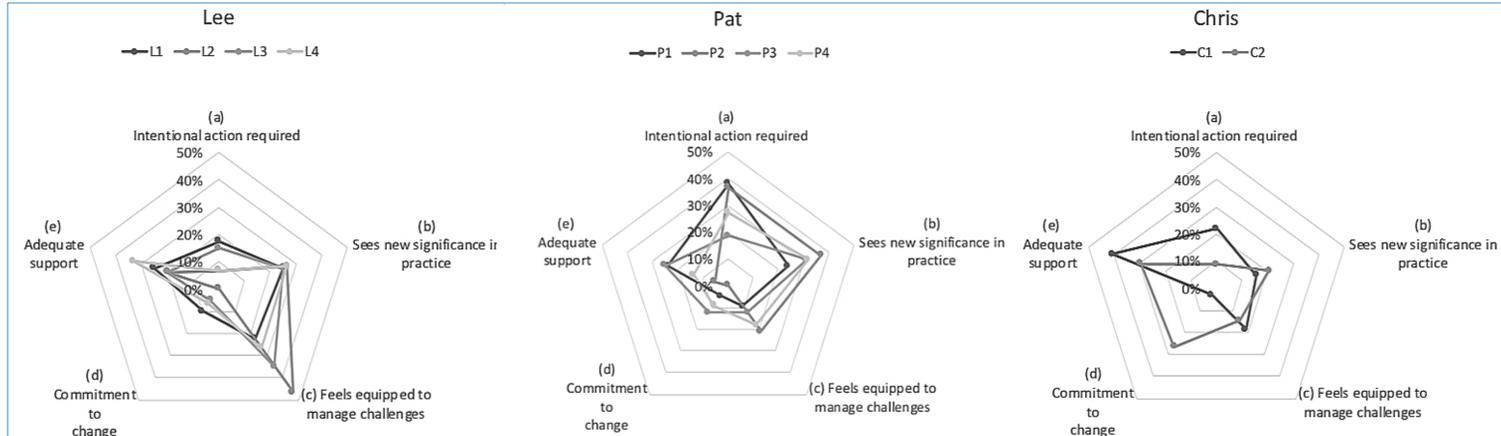
Faculty Readiness for Change Factor	Illustration
(a) a person sees an instructional challenge is not going to resolve without intentional action	
(b) an aspect of instructional practice takes on new significance	
(c) instructor feels able to manage instructional stressors/challenges	
(d) instructor has commitment to initiate/sustain change	
(e) instructor perceives adequate support in undertaking change	

Results: Faculty Readiness Cases



- Lee: Can Manage Instructional Stressors/New Challenges with External Support (c; b+e).** For Lee, envisioned change was teacher-centered. The role of students was not in the foreground. Lee focused on what students would do (as opposed to what they would learn), reporting frustration about students who did not learn in expected ways. Understanding student thinking was not salient for Lee
- Pat: Intentional Action to Address New Significance (a+b).** Pat was ready for student-centered change but unsure how to make it also be responsive to student learning needs. Unlike Lee, Pat noted which outcomes (for students and for Pat) were salient in thinking about future practice and instructional change efforts.
- Chris: Committed to Change and Marshaling Support (d+e).** Chris was ready for student-centered, student-responsive change. For Chris, the most important aspect of preparing for, experimenting with, and sustaining change are strong and supportive relationships with others who have power and influence to support the change.

Analysis



Next Steps

- Research on PD Provider readiness as instructors of professional development.
- Henderson et al. (2011) suggest a faculty member has to become a Chris (or at least, to pass through a Chris-like phase of professional readiness).
- In the world of college faculty development, professional learning communities have emerged as powerful but under-researched supports in change efforts (Kastens & Manduca, 2017). Further research using readiness to change ideas can explore the dynamics of group readiness.

Challenge Questions for Readers:

- In what ways might professional isolation play a mediating role in readiness for change?
- Think about your own PD experiences – how do each of the readiness factors influence your own readiness for change?
- Do you identify with one or more of the cases? How has that changed over time?
- If you are a Provider – which case is like you as a PD provider?

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