Electronic Supplementary Material (ESI) for Chemistry Education Research and Practice.
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Appendix

Table S1. Modified TBI protocol used in this study

1. What is your role in the classroom?
2. How do you think students successfully learn in your classroom?
3. How do you maximize student learning in your classroom?
4. How do you decide what to teach and what not to teach?
5. How do you decide when to move onto a new topic?
6. How do you know when students understand?
7. What are the main strengths you have as a teacher?
8. What are some areas of your teaching that you would like to improve on?
9. Which scenario is worse; getting through the all of topics while only a minority of students understand them or getting through only some of the topics while a majority of students understand them?

Figure S1. Dendrogram illustrating the results of the agglomerative hierarchical cluster analysis for the post-interview data

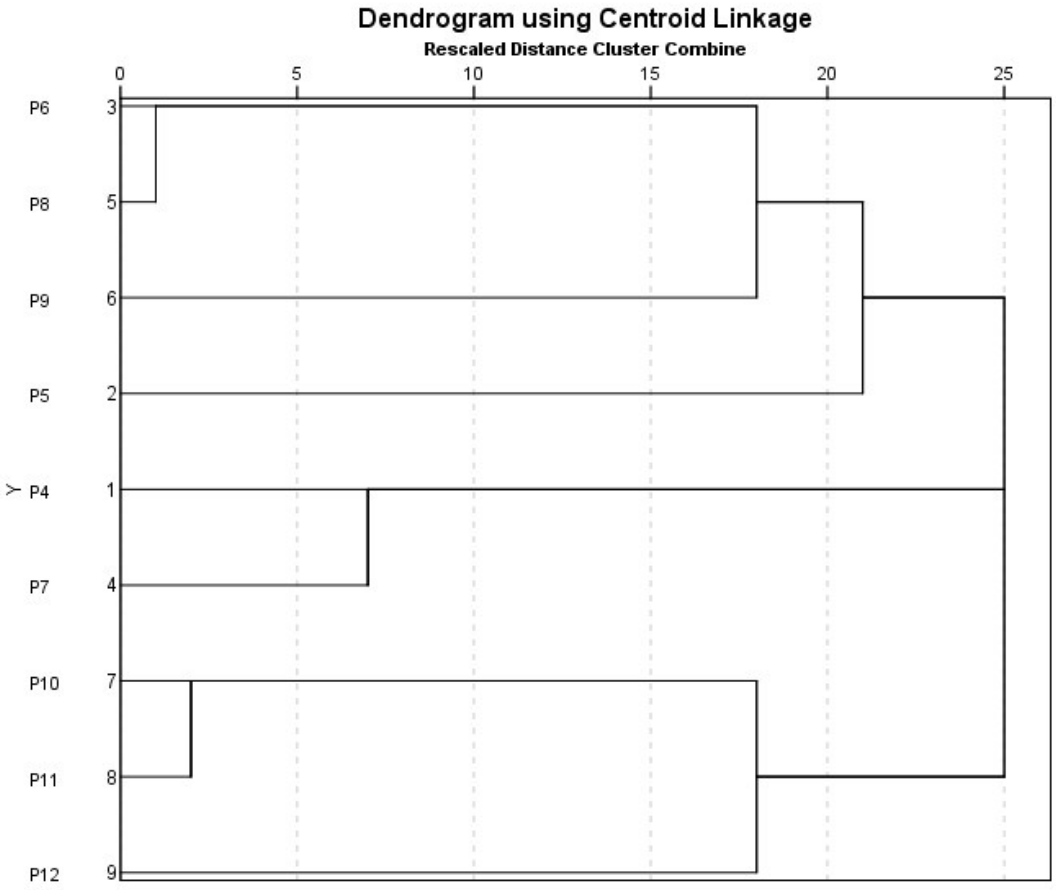

Table S2. Survey items used in this study. We indicate in parenthesis on which survey(s) the items was asked. Items marked with * were not included in the analysis since less than 50% of the faculty in at least one of the clusters provided answers for these items.

Personal Factor Items

1. What type of institution did you attend as an undergraduate student? (Pre)

2. How long have you been in your current position? (Pre)

3. Have you previously participated in program(s), workshop(s) and/or course(s) on teaching? (Pre)

4. Since the workshop, have you participated in program(s), workshop(s) and/or courses on teaching? (1, 3 YR)

5. How many webinars provided by the CSC NFW organizers have participated in since the workshop? (3 YR)

6. Please indicate your level of familiarity with each of the following instructional strategies and methods: (Pre)
    a. Think-Pair-Share: Posing a problem or question, having students work on it individually for a short time and then forming pairs and reconciling their solutions. Followed by a whole classroom discussion of students' responses.
    b. Just-in-time Teaching: Asking students to individually complete homework assignments a few hours before class, reading through their answers before class and adjusting the lessons accordingly.
    c. Peer Instruction: A specific way of using concept tests in which the instructor poses the conceptual question in class and then shares the distribution of responses with the class. Students form pairs, discuss their answers, and then vote again.
    d. Teaching with Case Studies: Asking students to analyze case studies of historical or hypothetical situations that involve solving problems and/or making decisions.
    e. Process Oriented Guided Inquiry (POGIL): In groups, students complete a worksheet designed around the learning cycle.
    f. Problem-Based Learning (PBL): Acting primarily as a facilitator and placing students in self-directed teams to solve open-ended problems that require significant learning of new course material.
    g. SCALE-UP Classroom: Students work in small groups on hands-on activities, simulations, interesting questions or problems for the majority of the class.
    h. Interactive Lecture Demonstration: Three-step process where students predict, experience and reflect on a demonstration experience.
    i. Collaborative Learning: Asking students to work together in small groups toward a common goal.
    j. Cooperative Learning: A structured form of group work where students pursue

common goals while being assessed individually.

k. Teaching with Computer Simulations (Interactive Animations): Interactive computer animations, in which variables of the system or other aspects can be manipulated, are used to supplement classroom instruction.
l. Teaching with Molecular Animations: Computer animations, in which chemical phenomena are represented at the particulate level, are used to supplement classroom instruction.
m. Clickers: Using a classroom response system to collect data from students.
n. Concept Maps: Students diagram the relationships that exist between concepts.
o. Formative Assessment: Formal or informal assessments designed to gain timely feedback on students understanding of material and provide opportunity for instructor to modify instruction accordingly.
p. Concept Tests/Inventories: Assessment instruments designed to identify misconceptions.

1 I have never heard of it
2 I have heard the name but don't know much else
3 I am familiar but have not used it
4 I am familiar and plan to implement it
5 in the past I have used all or part of it but am no longer using it
6 I currently use all or part of it

7. Please indicate the instructional and assessment strategies/methods that you have experienced as a student: (check all that apply) (Pre)
   a. Think-pair-share
   b. Just-in-Time Teaching
   c. Peer Instruction
   d. Teaching with case studies
   e. Process Oriented Guided Inquiry Learning (POGIL)
   f. Problem-Based Learning (PBL)
   g. SCALE-UP classroom
   h. Interactive lecture demonstration
   i. Collaborative Learning
   j. Cooperative Learning
   k. Teaching with computer simulations (interactive demonstrations)
   l. Teaching with molecular animations
   m. Clickers
   n. Concept Maps
   o. Formative Assessment
   p. Concept Tests/Inventories
   q. None of these

8. Did you attend the following conferences within the last year? (*1 YR and 3 YR)
   a. Biennial Conference in Chemical Education
   b. Gordon Research conference: Chemistry Education Research and Practice
   c. Educational talks at national scientific meetings

d. National and/or regional meeting of the National Science Teachers Association
e. Other education-oriented conferences; please specify

Contextual Factor Items

1. Suppose you wanted to get advice about issues concerning teaching. Which source would you turn to for assistance or advice? Check one response for each suggested source of assistance. If you do not have access to the source, choose Not Applicable (3 YR)
   a. Department Chair
   b. Faculty within your department conducting bench chemistry
   c. Faculty within your department conducting research in chemical education
   d. Lecturer/professor of practice in your department
   e. Science colleague outside your department but at your institution
   f. A colleague in the College of Education (or equivalent) at your institution
   g. Faculty outside your institution conducting bench chemistry
   h. Faculty outside your institution conducting research in chemical education
   i. Your Ph.D. and/or postdoc advisor
   j. Students in your courses or in your research group
   k. Teaching and learning center
   l. Professional association
   m. Education texts or education-oriented websites; please specify
   n. The Journal of Chemical Education
   o. The Journal of College Science Teaching
   p. The Chemistry Education Research and Practice journal
   q. The education section in Science
   r. Other pedagogical journals
   s. Other sources; please specify

1	not applicable
2	never or very rarely
3	1-2 times per year
4	1-2 times per semester
5	1-2 times per month
6	at least once a week

2. Within this past year, how many courses did you teach per semester on average? (1, 3 YR)

3. Approximately what is the distribution of your appointment? (Total should add to 100%) If a field is Not Applicable, please enter 0. (Pre)
   a. Teaching
   b. Research
   c. Service
   d. Administration

*4. How much do your departmental colleagues have expectations for your teaching methods? (1 YR and 3 YR)

a. Expectation to use techniques other than lecturing
b. Expectation to have students be actively involved in class
c. Expectation to use a variety of teaching methods

not at all
very little
some
quite a bit
a great deal

*5. To what extent has your department been engaged in improving teaching practices of faculty within this past year? (1 YR and 3 YR)

not at all
a little
somewhat
very
extensively

Table S3 – Contextual factors investigated to examine change in beliefs over time. Only items that had a response rate of 50% or higher within each cluster are included.

TCSR Factor	Item	Change in Belief Clusters Over Time																	
		Shifted to Student-Centered (N=4)						Did Not Change (N=3)						Shifted to Instructor-Centered (n=2)					
	Broader Cultural Context																		
	Suppose you wanted to get advice about issues concerning teaching. Which source would you turn to for assistance or advice? **Resource:**	**1/4 No response**																	
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
	Education literature:																		
	Journal of Chemical Education	0	0	0	3	0	0	0	1	1	1	0	0	0	1	0	1	0	0
	The Journal of College Science Teaching	0	3	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0
	Chemistry Education Research and Practice	0	2	0	1	0	0	0	3	0	0	0	0	0	2	0	0	0	0
	The education section in Science	0	3	0	0	0	0	0	3	0	0	0	0	0	1	2	0	0	0
	Other pedagogical journals	2	1	0	0	0	0	1	2	0	0	0	0	0	2	0	0	0	0
	Education texts or education-oriented websites	0	2	0	0	1	0	1	0	0	2	0	0	0	2	0	0	0	0
	Human resources:																		
	Faculty outside your institution conducting bench chemistry	0	1	2	0	0	0	0	1	2	0	0	0	0	0	1	1	0	0
	Faculty outside your institution conducting research in chemical education	0	3	0	0	0	0	0	2	1	0	0	0	0	2	0	0	0	0
	Your Ph.D. and/or postdoc advisor	0	3	0	0	0	0	0	1	2	0	0	0	0	1	1	0	0	0
	Professional association	0	2	1	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0
	School Context																		
	Suppose you wanted to get advice about issues concerning teaching. Which source would you turn to for assistance or advice? **Resource:**	**1/4 No response**																	
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
	Teaching and learning center	0	1	2	0	0	0	0	2	0	1	0	0	0	1	1	0	0	0
	Science colleague outside your department but at your institution	0	0	2	1	0	0	0	1	2	0	0	0	1	0	0	1	0	0
	A colleague in the College of Education (or equivalent) at your institution	0	2	1	0	0	0	0	3	0	0	0	0	0	1	1	0	0	0

	Carnegie Classification	2/4 Very High Research Activity 1/4 Doctoral /Professional 1/4 Master's: larger programs	1/3 Very High Research Activity 2/3 high research activity	1/2 Very High Research Activity 1/2 Master's: larger programs
	Department Context			
	Suppose you wanted to get advice about issues concerning teaching. Which source would you turn to for assistance or advice? **Resource:**	**1/4 No response**		
	Department Chair	1 2 3 4 5 6 0 1 1 0 1 0	1 2 3 4 5 6 0 2 0 1 0 0	1 2 3 4 5 6 0 0 2 0 0 0
	Faculty within your department conducting bench chemistry	0 0 1 0 2 0	0 1 1 0 1 0	0 0 0 0 2 0
	Faculty within your department conducting research in chemical education	0 0 3 0 0 0	2 0 0 1 0 0	1 0 1 0 0 0
	Lecturer/professor of practice in your department	0 1 1 0 1 0	0 0 2 1 0 0	0 0 1 0 1 0
	Students in your courses or in your research group	0 0 0 3 0 0	0 0 2 1 0 0	0 0 0 2 0 0
	Average Appointment % Teaching	36 ± 6.4 %	31.7 ± 5.8 %	30 ± 28.3%
	Research	44.8 ± 7.5 %	51.7 ± 11.5 %	65 ± 28.3%
	Service	16.8 ± 10.4 %	13.3 ± 5.8 %	5 ± 0%
	Administration	2.5 ± 5.0 %	3.3 ± 5.8 %	0 ± 0%
	# courses taught on average per semester In 1 YR survey	3/4 One course **1/4 No response**	2/3 One course 1/3 Two courses	2/2 One course
	In 3 YR Survey	2/4 One course 2/4 Two courses	3/3 One course	1/2 One course 1/2 Two courses
	Classroom Context			
	Course Context change from Post to 3 YR	3/4 same course & level 1/4 same course, change level	1/3 same course & level 1/3 same course, change level 1/3 change course, same level	1/2 same course & level 1/2 same course, change level

Table S4. Personal factors investigated to examine change in beliefs over time. Only items that had a response rate of 50% or higher within each cluster are included.

TCSR Factor	Item	Change in Belief Clusters Over Time		
		Shifted to Student-Centered (N=4)	**Did Not Change (N=3)**	**Shifted to Instructor-Centered (n=2)**
Personal	**Demographic Profile**			
	Sex	2/4female 2/4 male	2/3 female 1/3 male	2/2 female
	Types and Years of Teaching Experience			
	Year of teaching experience as faculty	1/4 third year 2/4 fourth year 1/4 fifth year	1/3 third year 1/3 fourth year 1/3 fifth year	1/2 third year 1/2 fourth year
	Nature and extent of teachers' preparation to teach			
	Type of institution attended as an undergraduate student	3/4 Research university or institution with Masters and/or Ph.D. as the highest degree in chemistry offered 1/4 4-year university or college with BS, BA, or Masters as the highest degree in chemistry offered	2/3 Research university or institution with Masters and/or Ph.D. as the highest degree in chemistry offered 1/3 4-year university or college with BS, BA, or Masters as the highest degree in chemistry offered	1/2 Research university or institution with Masters and/or Ph.D. as the highest degree in chemistry offered 1/2 4-year university or college with BS, BA, or Masters as the highest degree in chemistry offered
	Average % of EBIPs experienced as a student (of 16 listed)	2.8 ± 2.1 (17 ± 13%)	4.0 ± 1.7 (25 ± 11%)	8 ± 1.4 (50 ± 9%)
	Overlap between experienced as a student and familiarity	24 ± 20%	55 ±14%	73 ± 21%
	Nature and extent of teachers' continued learning efforts			
	Professional Development attended Prior to NFW	1/4 Yes 3/4 No	1/3 Yes 2/3 No	2/2 Yes
	Additional Professional Development in **past 2 years**	3/4 Yes 1/4 No	2/3 Yes 1/3 No	1/2 Yes 1/2 No

	Average # of webinars participated (provided by CSC NFW organizers)	5.5 ± 1.3	5.0 ± 1.0	5.0 ± 1.4
	Conferences attended in past year:	**1/4 No response**		
	Biennial Conference in Chemical Education	3/3 No	3/3 No	2/2 No
	Gordon Research conference: Chemistry Education Research and Practice	3/3 No	3/3 No	2/2 No
	Educational talks at national scientific meetings	3/3 No	2/3 No	2/2 Yes
	National and/or regional meeting of the National Science Teachers Association	2/3 No	3/3 No	2/2 No
	Other education-oriented conferences; please specify	3/3 No	3/3 No	1/2 Yes