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## On Faculty Development of STEM Inclusive Teaching practices

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## On Faculty Development of STEM Inclusive Teaching practices

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# 1 **On Faculty Development of STEM Inclusive Teaching practices**

2 Bryan M. Dewsbury<sup>1</sup>

## 3 Abstract

4 Faculty development of inclusive teaching practices has become more common in  
5 response to significant differences in STEM student retention between  
6 underrepresented minorities in the United States and students from other ethnic groups.  
7 Approaches to solve this have shifted from focusing on student deficits, to changing  
8 campus culture, including the mindsets of instructors who teach STEM courses. In this  
9 manuscript I argue that based on the literature informing the conceptual frameworks  
10 used for faculty development in inclusive teaching, faculty developers should reframe  
11 the message of their workshops to focus participants more on the scope of the journey,  
12 and shift the direction of overall efforts some to redevelop pedagogical training at the  
13 graduate and postdoc levels. Informed by historical as well as recent theories on the  
14 role of higher education to society, I highlight the areas of the literature that can  
15 effectively inform our current approaches to inclusion. I also briefly review the reasons  
16 why this approach is needed, and include suggestions for new faculty development  
17 approaches for long-term sustainable change in STEM inclusive education at the  
18 postsecondary level.

19 Keywords – inclusive teaching, faculty development, STEM, underrepresented students

## 20 Introduction

21 Institutions of higher education in the United States are still struggling to retain  
22 underrepresented minorities (URMs) in STEM disciplines in the first two years of  
23 matriculation. A recent report by Chen and Soldner (2013) concluded that a black  
24 student not retained in his/her STEM major (by virtue of failing or withdrawing from their  
25 introductory STEM course) had a 67% chance of not earning a Bachelor's degree at all.  
26 For a white student, this probability was 47.9%. This unfortunately is not only a recent  
27 finding. Almost two decades ago, a multi institutional study was launched to investigate  
28 a similarly troubling attrition rate (average 51% for the STEM disciplines; Seymour  
29 2000). The authors found that the structure of the first-year learning experience might  
30 possibly explain why 'switchers' (those who left the major) had low confidence in their  
31 abilities to pursue careers in STEM fields. Not only has the gap in attrition rates  
32 between ethnic groups remained, but more recent studies have showed that sense of  
33 belonging continues to be a major predictor of success in STEM courses (Booker 2016).  
34 The STEM education process may have become more equitable in its accessibility, but  
35 is still inequitable in terms of success for all groups. Concomitantly, the ratio of URM

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36 students to white students are increasing at the secondary level, meaning that the ratios  
37 of URMs to current majority populations in the US will adjust at the postsecondary level  
38 in the years to come (Fry 2007). Therefore, as we move forward, higher education  
39 administrators may have to adjust their assumptions of the traditional demographic  
40 backgrounds of their incoming students. As the evidence builds for the supportive role  
41 that inclusive environments and activities play in engineering success for all students  
42 (Kuh et al. 2011), institutions of higher education need to provide faculty and staff with  
43 professional development opportunities for them to gain expertise in this area. The  
44 thinking here is that in inclusive classrooms URM students will feel more connected to  
45 their peers, the instructor and the campus, and they will then be more likely to be  
46 successful in their STEM major pursuit (Ostrove and Long 2007, Palmer and Gasman  
47 2008). The literature on social belonging interventions in this population support these  
48 ideas (Walton and Cohen 2011, Yeager and Walton 2011).

49 Inclusive pedagogy has come to represent a number of things loosely associated  
50 with the retention of URM students (Florian 2010, Florian and Black-Hawkins 2011). In  
51 this manuscript I define it as 'a philosophy of teaching that provides equal opportunities  
52 for all students to have a successful learning experience'. This paradigm places a  
53 certain burden of responsibility on institutions and faculty to specifically understand how  
54 conventional pedagogies generate inequity, and how a fuller understanding of  
55 themselves and the students can better leverage the psychologies needed for an  
56 engaging successful learning experience. Rightly, universities have invested in  
57 supporting their faculty to shift their thinking to consider these approaches as part of  
58 their teaching. In response, many faculty development opportunities on Inclusive  
59 Pedagogy have emerged, a consequence not entirely dissimilar to the increase of  
60 faculty development opportunities on active learning after the publication of 'Vision and  
61 Change in undergraduate biology: A call to action' (AAAS 2011). The implied goal with  
62 this push is to encourage existing faculty to think a little differently about their students  
63 and their overall pedagogical approach not limited to curriculum design and greater  
64 focus on affect within the classroom. There are conceptual frameworks that have helped  
65 guide inclusive teaching faculty development efforts that are specific for higher  
66 education. Marchesani and Adams (1992) for example proposed a model around which  
67 some inclusive pedagogy workshops are developed. This quadrant model asks faculty  
68 to critically analyze their own psychologies, understand more broadly situational factors  
69 around their students, create inclusive classroom climates, and design curricula that  
70 foster greater sense of community. This model (which I have used in my own faculty  
71 development work) challenges faculty to consider the various aspects of the teaching  
72 experience, arguing essentially that an overly explicit focus on one aspect is insufficient  
73 to meet the needs of a truly inclusive, high quality learning experience. Other models  
74 like Multiple Intelligence Theory (Barrington 2004), and Culturally Responsive Teaching  
75 (Gay 2010) that overlap conceptually with this approach, and vary in terms of the  
76 degree they were developed for higher education. It is not my goal here to review these  
77 approaches, but to discuss a critical consideration in inclusive teaching faculty

78 development practice that is a function of a more fundamental paradigm that needs  
79 shifting, than with the models themselves.

80 Current graduate training models in STEM are predicated heavily on large time  
81 investments in developing the academic behavior and skills of a scientific researcher  
82 (Tanner and Allen 2006). A shockingly small percentage of that time is spent developing  
83 skills in pedagogy, especially considering the fact that a semi explicit goal of these  
84 programs are to produce PhDs who can be effective academic faculty members, a  
85 position that typically involves significant teaching (Austin 2002). There have been some  
86 recent positive changes to this culture. Some postdoctoral programs offer opportunities  
87 for classroom teaching along with research opportunities so that future faculty members  
88 can try and fail at pedagogy and retool accordingly before becoming Assistant  
89 Professors (Sales et al. 2007). Some graduate programs now offer courses in pedagogy  
90 (Tanner and Allen 2006, Baumgartner 2007) or allow students to obtain 'teaching  
91 certifications' in collaboration with centers for teaching and learning. While the above  
92 are steps in the right direction, they are likely only a beginning if the ultimate goal is a  
93 seismic shift in the role that inclusive pedagogy will play in reducing URM attrition from  
94 STEM disciplines.

95 After several national reports in the United States encouraged a greater use of  
96 active learning as part of postsecondary science education reform, universities were  
97 tasked with training faculty on using this type of instruction. Similarly, , inclusive  
98 pedagogy faculty development has gained in popularity because prior to beginning the  
99 professoriate, faculty tend to have little experience in this area. In this vein, the long-  
100 term goals of the inclusive teaching movement should be to provide quality professional  
101 development for current faculty, and also promote the transformation of pedagogy  
102 training of pre-instructors. This way, development helps engineer a paradigm shift  
103 among current practitioners, and creates a pathway for inclusiveness-minded instructors  
104 for the future. At its heart, inclusive teaching development frameworks focus on  
105 relationships. They demand an understanding of the histories of the stakeholders before  
106 teaching strategies can be determined appropriate for a situation. It would be  
107 impractical to expect, within the timeframe of most professional development  
108 workshops, that full understanding will be achieved. Current STEM graduate programs  
109 in the United States are mostly devoid of robust pedagogical training (Tanner and Allen  
110 2006), therefore, faculty development on this issue might occur only when the individual  
111 is already in the classroom. This means that while inclusive teaching should continue to  
112 promote best practices and proven strategies toward developing inclusive climates (for  
113 examples see Tanner 2013), they should also lay out clearly the depth and scale of the  
114 understanding instructors need if full competency is to be achieved in this area. Absent  
115 of this, inclusive pedagogy training will only contain superficial approaches to the  
116 concept. Simultaneously, inclusive teaching development should focus more on the  
117 transformation of pedagogy training at the graduate and postdoc level, arguably the  
118 best strategy to create a new generation of differently minded instructors. This  
119 wholesale transformation might necessitate the elimination of terms such as 'inclusive

120 teaching', and rethink pedagogy training such that a full understanding of the social  
121 context of learning is deeply integrated in the development process. Terminology while  
122 useful, can create a sense of 'other' or 'type', where the term becomes a separate brand  
123 to the main exercise. In this manuscript I discuss how faculty developers can re-  
124 envision how a) pedagogy is developed at the graduate level and b) to send a clearer  
125 message to existing faculty on inclusive practices. The literature suggests that we  
126 dissociate broader social structure and the social dynamics of the classroom at our peril  
127 (Freeman et al. 2010), and full engagement in the latter requires a deep understanding  
128 of the former. I discuss that link here, focusing on why understanding the depth of the  
129 relationship is a critical component of the ways in which faculty should be thinking about  
130 inclusion. Through this examination I emphasize the ways in which our current  
131 approaches on faculty development of inclusive pedagogy skills may need upgrading  
132 and more in keeping with the realities of current and historical social structures.

### 133 Defining Inclusion

134 Faculty developers of inclusive teaching practices need to be clearer about what  
135 the term 'inclusive' actually means. In practice, it has been used to promote strategies  
136 that provide a boost to historically marginalized groups so that they can more effectively  
137 engage in the learning process. The disproportionately higher attrition of URM students may  
138 tempt an explicit focus on this particular group. There are a few critical issues with this.  
139 Firstly, it creates an artificial sociocultural hierarchy, arbitrarily assigning the dominant  
140 culture (the group currently being well-served) a normative status to which the  
141 marginalized must aspire. It offers no critiques of the mainstream pedagogy and its  
142 inherent exclusivity. Secondly, when interpreted out of context, in a superficial sense it  
143 still somewhat subscribes to a deficit model. It can assume that there are specific  
144 deficits with the marginalized which, when plugged, can eliminate the sense of  
145 exclusion that STEM classrooms can create. Many of these 'deficits' include identity  
146 contingencies associated with the underrepresented group (Crocker et al 2008) and  
147 addressing them are certainly an important part of a holistic approach, but a hyper focus  
148 on addressing 'the student' can preclude the need for other stakeholders, especially  
149 instructors to examine their own contributions to the process, especially with respect to  
150 their cultural competency. Thirdly, inclusive pedagogy training that creates instructors  
151 hyper focused on historically marginalized groups can have the ironic effect of creating  
152 *more* resentment of those groups by majority classmates and/or instructors. This is the  
153 potential result when inclusiveness is defined as a focus on a subset of identities (the  
154 historically marginalized) within the classroom. If inclusive pedagogy approaches do not  
155 engage the social contexts of non-minoritized populations, there will remain a probability  
156 for backlash. This potential effect was discussed as early as the 1960s, then with  
157 respect to Affirmative Action. Kaplan (1966, but see Elden 1969 for a rebuttal) warned  
158 that the legalization of identity politics will undoubtedly create a pushback effect from  
159 the majority, who, without a full understanding of the law's context will themselves feel  
160 discriminated against and marginalized. The effect of this contextual nuance has been  
161 seen more recently in corporate diversity trainings (Von Bergen et al. 2002), where

162 some implementations of the diversity training actually increased racial resentment  
163 (Kalev et al. 2006).

164 To be fully inclusive, pedagogy has to engage both majority and minority students. It  
165 should consider the systemic problems that have resulted in our current URM retention  
166 struggles, and also address the shared histories of all students in the classroom such  
167 that the social conditions that generate identity contingencies are understood as a  
168 collective responsibility. Faculty training on inclusive practices, especially components  
169 that encourage a deeper understanding of the students, should strongly promote  
170 intercultural knowledge. It should not solely focus on deficits of the disenfranchised, but  
171 also on opportunities for students to learn and grow from the diverse authentic  
172 experiences of their peers. The development of inclusive classrooms that promote  
173 sense of belonging mean that *all* students must belong. The transformation of  
174 classroom culture to create greater inclusion may fundamentally alter the conventional  
175 characteristics of these classrooms. Specific strategies that promote inclusive  
176 environments in STEM classrooms such as using multicultural examples (Chamany et  
177 al. 2008), or developing targeted exercises for teaching students how to work in teams,  
178 can be viewed as part of an overall structural departure from the traditional STEM  
179 course delivery. An inclusive approach should be one where the histories of both the  
180 privileged and disadvantaged are engaged with and understood more fully. Such an  
181 engagement requires a full understanding of how the intersections of those histories,  
182 with all its fractiousness and resilience, have come to inform the structure of the world  
183 today. Conceptually, engaging in totality would mean placing a common identity (in this  
184 case national identity) above the sub-categories (race, gender etc.) that have historically  
185 informed people's American experience. Disadvantage experienced by any group in this  
186 context will be viewed as an American problem, and not one defined by a particular  
187 group. This paradigm shifts the focus of inclusion from the underperforming or  
188 disadvantaged group in the classroom toward seeking a better understanding of shared  
189 histories. Beyond a 'pedagogy for the oppressed', inclusive practices can provide a  
190 platform upon which there is greater understanding between participants who exist in  
191 different spheres of the social power structure.

192 Creating a classroom atmosphere where these intercultural connections are fruitful and  
193 educational is no simple task, but, there is a rich history of the study of cultural  
194 assimilation in America that faculty developers and instructors can learn from. This  
195 scholarship underscores the fact that the ways in which new groups attempt to  
196 assimilate with an existing social structure is varied (Alba and Nee 1997). However,  
197 achieving equity between groups may require deep alterations of the power structure  
198 that exists at any given time. Understanding the dynamics of these structural shifts is  
199 critical to its replicability in other settings, including the college classroom and therefore  
200 it is to this area of scholarship we now turn our attention.

201 The social context of STEM education

202 Faculty development models of inclusive teaching request participants to consider more  
203 carefully the role that their own sociocultural histories and those of their students play in  
204 the classroom relationship (Marchesani and Adams 1992). A full understanding of this  
205 relationship requires participants to consider the sociological and psychological  
206 frameworks used to study the connection between history and identity. Among faculty  
207 developers these frameworks are well known. Stereotype threat (Steele and Aronson  
208 1995), implicit bias (Greenwald and Krieger 2006), sense of belonging (Hurtado and  
209 Carter 1997) and values affirmation (Miyake et al. 2010) to name a few are all  
210 predicated on the notion that social history in the United States has had unequal  
211 outcomes for different groups, and that this inequity has resulted in attitudes and  
212 perceptions that potentially create social barriers within the STEM classroom. Faculty  
213 development on inclusive teaching include some exposure to these conceptual  
214 frameworks, but are likely to lack the time to engage participants deeply with the social  
215 contexts that dictated the frameworks' development. This can perpetuate a 'best  
216 practices' approach to faculty development on inclusion, which has some use, but lacks  
217 the deeper understanding of social assimilation history necessary to ingrain a full  
218 understanding of the subject matter. To this end, faculty developers can ask  
219 practitioners to begin their journey toward a fuller understanding by asking - a) how  
220 assimilation of diverse groups has occurred in the United States' social history b) the  
221 relationship between that assimilation process and higher education and c) the specific  
222 ways in which our understandings of this relationship can inform our praxis.

223 *Cultural assimilation in the United States* – Any practical consideration of inclusive  
224 approaches should include a critical examination of the history of cultural assimilation  
225 within the United States. Such an examination would include an understanding of the  
226 chronological history of the assimilation of different cultures within broader US society  
227 as well as a critical look at the theoretical frameworks used to better understand these  
228 assimilation patterns. Some amalgamated works in this area may provide a useful  
229 starting point to understanding this history. In 'A Different Mirror' (Takaki 2012) for  
230 example, the author describes a multi-generational history of immigration and cultural  
231 assimilation in the United States. He explains that as various ethnic and cultural groups  
232 arrived, whether involuntarily or by choice, the ways in which integration occurred, or  
233 the degree to which it happened at all, was largely dependent on the views of the social  
234 power structures of the day. The integration process was rarely a linear one, and was  
235 sometimes further complicated by now mostly antiquated views on the relationship  
236 between race and intelligence. The result has been an uneven pathway for most groups  
237 from immigration or slavery status to being viewed in full equality as an American (Berry  
238 1997). Some might argue that for some groups this pathway is still in process (Yoon et  
239 al. 2012). It is important to understand therefore that 'sense of belonging' only makes  
240 sense as a concept when the normative culture serving as a reference point is clearly  
241 defined. If the reference point of 'belonging' is being 'American', then the challenge is  
242 figuring out what this label actually means (Schildkraut 2007). The literature suggests  
243 that the social articulation of this has varied in both time and space (Phinney 1996). This  
244 means that any consideration of the concept of 'belonging' must include an examination



245 of the overall social structure of the local community. Additionally, the evolution of social  
246 belonging on a national scale has impacted the degree to which various subcultures  
247 have been able to integrate into various social institutions. Faculty development on  
248 inclusive teaching should be deeply reflective of this integration process for higher  
249 education, and thus consider why the evolution of belonging in general matters for our  
250 classrooms and profession.

251 *Social structure and higher education* – The relationship between higher education and  
252 evolving social structures can be argued to be a cyclical one. Existing social structures  
253 influence to a large degree the demographics of student populations, the chosen  
254 research foci at universities, and the nature and style of the pedagogy (Naidoo 2004). In  
255 turn, universities act as intellectual vehicles, broadening our understanding of ourselves  
256 and our society so that we can make more inclusive, collective decisions that benefit all  
257 citizens. Many authors have considered the philosophy of the relationship between  
258 higher education and its role in solving or perpetuating social structures (Brennan and  
259 Naidoo 2008). More practically, faculty need not look very far back into history to see  
260 how society and classroom structure are inextricably linked. The passing of the Civil  
261 Rights Act, the American Disabilities Act, and Title IX legislation are all examples of how  
262 law profoundly influenced the demographics on college campuses (Ladson-Billings  
263 2006). Prior to these bills, college classrooms were dominated by a phenotypically  
264 monolithic culture. The change in legislation forced a fractious higher education  
265 integration process that was historically exclusive. While legislative changes were  
266 somewhat reflective of broader social upheavals that was taking place through the  
267 decades, laws alone do not necessarily engineer paradigm shifts (Wilkinson III 1995).  
268 Legislation helped create access, but when the historically underrepresented or  
269 marginalized newly occupy a majority space all parties need to rethink how that space is  
270 defined. Therefore, when faculty developers ask instructors to *know* their students, that  
271 knowledge should be contextualized within the re-configuration of these social spaces.  
272 It is only after there is a full engagement in this social history, that instructors can  
273 reliably make deep transformations to their practice.

274 *Faculty development of inclusive practices* – Implicit in faculty development of inclusive  
275 practices is an assumption of a facilitative approach to pedagogy. Freire's (1968)  
276 discussion of dialoguing as a means to create equity between the instructor and the  
277 instructed, and in general a more facilitative classroom is useful even in contemporary  
278 contexts. It is truly unfortunate that decades after Freire argues against the 'banking'  
279 concept of pedagogy as a means of oppression, national reports (in STEM) are still  
280 needing to urge instructors to move away from unidirectional instruction. In Freire's  
281 model, the denying of dialogue limits the scope of the education experience, and  
282 perpetuates existing hierarchies. The art of dialogue as a pedagogical tool is relevant to  
283 our efforts at promoting inclusion. If engaging through dialogue is inherent within the  
284 pedagogy, the instructor will always be primed to consider the experiences and histories  
285 of the students in the teaching process. Faculty developers of inclusive practices should  
286 explicitly encourage faculty to revisit some of the earliest discussions on education

287 viewed then as a vehicle for liberation (Friere 1989), and the promoter of democracy  
288 (Dewey 2004). In considering this liberation pedagogy faculty should be mindful of the  
289 role that both their own psychologies and the situational factors of the students play in  
290 fostering academic success. By asking instructors to engage more deeply in the social  
291 history of integration and assimilation through dialogue, faculty development of inclusive  
292 teaching is essentially challenging instructors to develop relationships. These  
293 relationships are not necessarily with individual students, but with the social context of  
294 the instructors' own selves *and* the student. This includes understanding the historical  
295 and contemporary sociological frameworks that inform the social context of learning.  
296 The effects of a potential paradigm shift on praxis can be significant. Some studies  
297 suggest that even low level improvements in our understanding of a framework like  
298 Implicit Bias for example, can augur behavioral change (Lebrecht et al. 2009). This  
299 should not discount the need for specific, proven long-term strategies, but  
300 understanding local contexts would put the instructor in a better position to automatically  
301 determine inclusive approaches for their own particular teaching situations. Faculty  
302 development on inclusive teaching may serve instructors better if, while providing useful  
303 tips, focus on understanding inclusion as a journey to which the participant must  
304 commit. It is here though that the demands of this engagement meet the realities of  
305 available time, mental bandwidth and professional development resources for  
306 practitioners (Sorcinelli 1994). It would be impossible therefore to consider a rethinking  
307 of inclusive teaching faculty development without addressing the overall environment in  
308 which pedagogy training generally occurs.

#### 309 Suggestions for the future

310 The continued disparities in STEM performance between URM students and other  
311 ethnic groups in the United States demands our sustained critical attention. While  
312 inclusive practices in principle should be practiced across the curriculum, demographic-  
313 related performance gaps in STEM points to a particular need for a deeper  
314 incorporation of these approaches in science classrooms. As we shift from solely  
315 addressing student deficits to transforming campus culture, faculty development of  
316 inclusive practices will play an increasing role. In this vein I am suggesting two main  
317 things. First, faculty development on themes of inclusion should focus more squarely on  
318 the scope of work instructors need to engage in as they move toward cultural  
319 competency. It should be made clear to faculty that to effectively transform their  
320 practice, they should commit to a cultural understanding that is ongoing and permanent.  
321 It behooves faculty developers to point out that workshops can only serve to launch  
322 participants on a journey of understanding, and that commitment to this journey is  
323 mainly up to them. Secondly, greater efforts should be placed on the infusion of  
324 inclusive principles in transformed pedagogical training programs, **before** individuals  
325 become postsecondary instructors. This would mean a deep, purposeful transformation  
326 of the training STEM graduate students receive to a) focus more explicitly on pedagogy  
327 competency and b) ensure that cultural competence is a major part of that training.

328 In the long-term, inclusive teaching aims for every student in the classroom to have an  
329 equal opportunity to leave the classroom having developed particular skills. To ensure  
330 that possibility, the classroom environment should be one where the diverse identities of  
331 the students are validated and that critical engagement in a broad range of issues,  
332 including highly polarizing ones, are not only encouraged but expected. Faculty  
333 development on inclusive practices should be backwardly designed from this goal to  
334 hone in on the skills instructors need to enable this environment. Such a vision would  
335 require instructors to shore up their understandings of the social context around diverse  
336 identities (both their own and students) and social barriers that prevent equal  
337 opportunities from happening. These are not simple steps to take. The emphasis on  
338 'journey' in this essay is deliberate, as the mental and emotional effort required to  
339 understand these barriers are great. The structure of most American instructor positions  
340 often provide little space for that effort to be fruitfully expended. Faculty development of  
341 inclusive practices therefore cannot focus simply on the tools. Developers should also  
342 look at a more comprehensive reconfiguration of the academic system to incentivize,  
343 promote and even demand a dialoguing approach to pedagogy.

344 A systemic overhaul will demand that we embrace not only inclusive teaching practices  
345 but also take a critical look at the overall practice of teaching. Effective teaching by  
346 definition should be structured such that it creates equitable outcomes for all students.  
347 In essence, this paradigm shift for inclusive teaching faculty development requires a  
348 slight shift in focus from solely promoting best practices to existing faculty, to the  
349 development of future faculty's pedagogical skills at the graduate and postdoc level.  
350 Some notable efforts are being made in this regard (Allen and Tanner 2006). STEM  
351 graduate students and postdocs can now access a sizeable number of robust  
352 professional development opportunities focused on pedagogy (e.g. Nadelson et al.  
353 2012). What is unknown is the extent to which those programs currently contain robust  
354 treatments of the social context of learning. Simultaneously, developers should consider  
355 messaging to faculty more strongly the need to delve deeply into the literature on  
356 inclusion. In this way, even if the time demands of current instructors preclude the ability  
357 to fully develop competencies in this area, they remain aware of the fact that best  
358 practices are only a part of the solution.

359 Ultimately, faculty development on inclusive teaching should lead us away from  
360 inclusive teaching as a term and refocus our efforts on a different model of higher  
361 education pedagogy training. Inclusive teaching risks becoming an approach or style,  
362 separate and distinct from the craft of teaching itself. I refer to my suggested approach  
363 here as 'Deep Teaching'. In the same way we challenge students to develop academic  
364 skills that promote 'deep' learning for long-term retention (Chin and Brown 2000), our  
365 pedagogy should reflect a deep engagement with the human aspect of the learning  
366 experience. Learner-centered pedagogy can only be effective insofar as there is a  
367 clear understanding of the learner.

368 As institutions of higher education position themselves to address the issues of URM  
369 retention by rethinking their campus and classroom cultures, faculty developers will  
370 continue to play an important role in assisting instructors in refining their practice. As  
371 potential stewards of progressive approaches to pedagogy, it behooves faculty  
372 developers to reflect on approaches to faculty development. The dogged persistence of  
373 achievement gaps between URM and white students in the United States suggest that  
374 in general, a lot more work needs to be done in the area of equitable STEM pedagogy.  
375 The underlying frameworks that currently guide our models further suggest that our  
376 current approaches to inclusive teaching training might be somewhat simplistic. The  
377 training of existing faculty should be clear on the broad scope of the relationship  
378 between inclusion and higher education, and instructors of the future can only be  
379 positioned to serve all students if they are steeped in a critical rigorous exposure to an  
380 understanding of the society they aim to serve.

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