

## **Annotated Bibliography of Literature Concerning Course and Curriculum Design and Change Processes in Higher Education**

**Audriana M. Stark, April 2017**

**Akerlind, G. S. (2007). Constraints on Academics' Potential for Developing as a Teacher. *Studies In Higher Education*, 32(1), 21-37.**

This phenomenographic analysis investigates how faculty perceive the development process of becoming a university teacher. Akerlind makes meaning of the different ways in which teachers develop by analyzing semi structured interviews 28 academics. She provides insight into the large body of literature about university teachers thoughts about university teachers. She highlight two profound continuums of thought already found in the literature 1) varying from transmission of knowledge to conceptual understanding and 2) from teacher centered to student centered. Akerlind discusses other related studies about teacher development and change. The findings from her study build upon the literature and suggested that there are various pathways to developing into a teacher. The 5 major categories that emerged from this study include: Building up a better knowledge of one's content area, in order to become more familiar with what to teach; building up practical experience as a teacher, in order to become more familiar with how to teach; building up a repertoire of teaching strategies, in order to become more skillful as a teacher; finding out which teaching strategies do and don't work for the teacher, in order to become more effective as a teacher; continually increasing one's understanding of what works and doesn't work for students, in order to become more effective in facilitating student learning. Given that various developmental pathways may exist, developers can adapt development to align support with their understanding and tailor development for the individual.

**Andrews, Conaway, Zhao, and Dolan (2015) Colleagues as Change Agents: How Department Networks and Opinion Leaders Influence Teaching at a Single Research University. *CBE-Life Sciences Education* 15(2) American Society for Cell Biology.**

Andrews et al. begin with the premise that collegial relationships have the potential to support faculty who are changing how they teach, however the impact of these relationships is poorly understood. This mixed-methods study attempts to fill the gap in research by investigating how faculty influence one another to change. They ground their study and analysis in social-network theory and literature on opinion leaders. The analyses indicate that Department Based Educational Researchers (DBERs) promote changes in teaching to a greater degree than other departmental colleagues.

DBERs facilitated change through co-teaching, offering ready and approachable access to education research, and providing teaching training and mentoring. DBER faculty members were also seen as innovative educators with knowledge of teaching strategies that other faculty lacked.

They were perceived to be the resident education experts who were willing and able to provide resources for teaching and access to other education experts. DBER faculty were perceived as particularly influential to undergraduate teaching. The authors recommend pairing DBER faculty with new faculty to take a long-term approach to transforming teaching within departments. This approach is assumed to work well given new faculty members probably have not invested time in developing teaching materials or establishing their own identity as college instructors. Other findings showed that teaching professional development was impactful for some faculty, and department leaders and colleagues were key in promoting such experiences. Department leaders can insist that teachers engage in teaching professional development or work with a mentor.

**Andrews T.C., & Lemons P.P. (2015). It's personal: Biology instructors prioritize personal evidence over empirical evidence in teaching decisions. *CBE Life Sciences Education*, 14(1). doi:10.1187/cbe.14-05-0084**

Given the lack of response to the call for active learning, Andrews and Lemons investigate the process of adopting and sustaining active-learning instruction by using an innovation- decision model. This qualitative study sought to understand inhibitors and catalysts to sustaining change. The innovation-decision model was chosen as a framework given that it consists of stages of change that are experienced when trying to adopt new innovations in teaching. They interviewed 17 biology faculty members and described themes that emerged from the text analysis including excerpts of raw data. They found that instructors prioritized personal experience more so than empirical evidence in decisions regarding case-study teaching, a type of active-learning pedagogy, which was unexpected given participants' background in science. Authors also found evidence to support other claims about inhibitors and promoters, some of which were also cited in earlier studies mentioned in the literature review. Promoters included anecdotal observations of student outcomes, self-image as a teacher, a dislike towards lecturing, feeling as though it is a good fit, a willingness to try and fail, student engagement, supportive colleague and administration, and a need for teaching materials. Inhibitors included skills teaching, lack of time and knowledge, a lack of training and lack of incentives, not enough time, a need to cover content, a lack of skill, and needing support to deal with unsupportive colleagues. They offer several hypotheses for future consideration and conclude by adapting the innovation decision model to reflect the lessons learned such as including "prioritization" as a factor influencing a change in teaching.

**Anderson, T. R., & Schönborn, K. J. (2008). Bridging the educational research-teaching practice gap. *Biochemistry and Molecular Biology Education*, 36(4), 309-315.**

This paper provides insights into how curriculum change can be brought about. The authors discuss supporting and opposing forces and strategies to deal with them. This includes realizing zones of feasible innovation, Communities of practices and zone of tolerance. Student opinion is critical for implementing successful reform and sustaining it. Faculty buy-in is crucial for

successful sustainable reforms, as well. They suggest that in order to help achieve ZFI, CoPs should be formed and supported.

Table one describes examples of opposing forces, supporting forces, and appropriate change strategies. For example, opposing forces include SOTL not being valued or counting towards promotion, innovations seen as top down initiatives, student resistance, feeling overwhelmed, isolation, and opposition from should-be support group. Supporting forces include faculty members being keen to implementing new methods, science faculty with educational specialties serving as champions and ambassadors, student enthusiasm, professional organizations encouraging SOTL. Change strategies include: senior management supporting SOTL, rewards and encouragement for change makers, needs assessments to target interests, taking time to help students understand why they are learning using research based teaching practices, gradual changes, supportive groups (CoPs), and see if changes are acceptable prior to making them.

**Chasteen, S. V., Perkins, K. K., Code, W. J., & Wieman, C. E. (2016). The Science Education Initiative: An Experiment in Scaling up Education Improvements at a Research University. *Transforming Institutions: Undergraduate STEM Education for the 21st Century*.**

This is an experiment in generating large-scale sustainable change in STEM education at an institutional scale. The model focuses resources at the departmental level, includes an explicit focus on course transformation, and provides human resources in the form of discipline-based postdoctoral education specialists. They were generally successful in their attempt but recognize that local factors affected success in individual departments. They review process and progress, and reflect on lessons-learned in. They build off of Weiman's questions for instructional design- What should students learn? What are they learning? What instructional approaches improve student learning? The results provide guidance in the creation of scalable, institutionally-supported models of educational change. They found that additional administrative oversight was needed as time progressed. Faculty desired incentives, the culture was influenced by the administrators including Deans, Chairs, and Directors and a supportive environment was necessary, guiding hiring, defining roles, and training the student specialists is beneficial, and the linear design of backwards design is not always effective. Student specialists were viewed as being highly valuable.

**Corbo, J. C., Reinholz, D. L., Dancy, M. H., Deetz, S., & Finkelstein, N. (2016). Framework for transforming departmental culture to support educational innovation. *Physical Review Physics Education Research*, 12(1), 010113.**

This paper provides a research-based framework for promoting institutional change in higher education. They pose that most educational change efforts focus on subsets of the university

system such as, faculty teaching practices or administrative policies. They argue that these features have limited success of such efforts to sustain, systemic change. They draw from the literature on organizational and cultural change. Their framework encourages change agents to coordinate their activities across three key levels of the university and to ground their activities in the various change perspectives that emerge from that literature.

Framework part 1 encourages working across the university. Framework part 2 encourages incorporating multiple perspectives. Important perspectives to include are scientific management, evolutionary, social cognition, cultural, political, and institutional at the faculty and administrative levels. They include a section that discusses challenges with the ability to generalize the approach beyond the campus. They use examples from a case study to illustrate how the framework can be used as a basis for planning and implementing holistic change.\

**Dancy, M., Henderson, C., & Turpen, C. (2016). How faculty learn about and implement research-based instructional strategies: The case of peer instruction. *Physical Review Physics Education Research*, 12(1), 010110.**

The authors pose that there is currently a lack of knowledge about spreading and sustaining best practices. This is primarily a result of: 1) Faculty self-reported user status is an unreliable measure of their actual practice. 2) Faculty generally modify specific instructional strategies and may modify out essential components. 3) Faculty are often unaware of the essential features of an instructional strategy they claim to know about or use. 4) Informal social interactions provide a significant communication channel in the dissemination process, in contrast to the formal avenues of workshops, papers, websites, etc., often promoted by change agents, and 5) experience with research-based strategies as a graduate student or through curriculum development work may be highly impactful.

They suggest improving communication with faculty, supporting modification during implementation, and understanding large impact of social interactions. The authors use Roger's diffusion innovation of Innovation to argue most faculty developers do not persuade or help decide which instructional strategies to implement. Faculty are often unaware of, or have misunderstandings of, essential components of the strategies that they do implement. When that happens, a loss of fidelity can occur. Given many faculty learn from social interactions, transfer of an innovation without fidelity becomes more problematic. The implications of this study speak to communication gaps in disseminations efforts. It points to a need for better communication given faculty require more guidance to modify innovations if they do not want to decrease the outcomes desired. Informal social interactions are a key mechanism to communicating reform. After all, course reform is a highly social process.

**Finelli, C. J., Daly, S. R., & Richardson, K. M. (2014). Bridging the research to practice gap: Designing an institutional change plan using local evidence. *Journal of Engineering Education*, 103(2), 331 – 361.**

This study discusses a need for bridging the gap between research and practice. By collecting data from faculty and students, the authors are able to recommend an institutional change plan with emphasis on teaching practices. They provide a change plan for getting research to practice using factors influencing faculty to adopt, classroom observations of practice, and student survey. However, they are still collecting data to verify the plan. They advise using and adapting their plan for local contexts. This work is grounded in instruction, motivation, and organizational development. Specifically, they use expectancy value theory to understand faculty motivation. It uses both a bottom-up approach, focusing on faculty knowledge and motivation, and a top-down approach, focusing on administrators and policy

The literature review found that faculty members are generally aware of better teaching practices but don't adopt them due to constraints such as expectations of content coverage, lack of instructor time, departmental norms, student resistance, and limitations about the physical classroom and course structure. Factors that catalyze change include collegial and administrative support, the opportunity to engage with others, potential time savings, improvements in student learning, student perceptions of the class, and financial incentives. They argue that there is a need to affect members and culture in order to achieve change.

**Fowler, D., Lazo, M., Turner, J., & Hohenstein, J. (2015). Facilitating program, faculty, and student transformation: A framework for curriculum redesign. *Journal of Transformative Learning*, 3(1), 59-73.**

Fowler and Lazo discuss key steps that outline the Curriculum Redesign Process Checklist (CRPC). The CRPC informs a transformative process for developing faculty in teaching, designing a learner-centered curriculum, and enhancing student learning through high-impact practices and integrative learning ePortfolios. The literature that informed the curriculum redesign process checklist is grounded in the scholarship of teaching and learning and more specifically of curriculum and assessment, as well as research surrounding academic change. They argue that course redesign is driven by the faculty, informed by data, and supported by educational developers. An educational developer can assist in keeping the process moving and can work toward "striking a balance between staying neutral in process facilitation while promoting scholarly approaches to teaching and learning in higher education". The authors conceptualize curriculum to enhance decisions around (1) purposes; 2) content; 3) sequence; 4) learners; 5) instructional processes; 6) instructional resources; 7) evaluation; and 8) adjustments. Finally, they recommend the following steps and templates for curriculum redesign: 1) Orient and form team, 2) gather internal data, 3) gather external data, 4) develop program-level learning outcomes and performance criteria in the form of rubrics, 5) develop a curriculum map, 6) create supplementary materials, 7) create implementation plan, 8) create assessment plan, and 9) update curriculum implementation in conjunction with Mezirow's transformative learning process (experience, critical reflection, reflective discourse, and action.

**Fraser, S. P. (2016). Pedagogical Content Knowledge (PCK): Exploring its Usefulness for Science Lecturers in Higher Education. *Research In Science Education*, 46(1), 141-161. doi:10.1007/s11165-014-9459-1**

This paper seeks to understand teacher practice and contribute to the improvement of teacher education courses. The research aimed to investigate the extent to which one version of a school-based science pedagogical content knowledge (PCK) framework resonated with the pedagogical thinking of university science lecturers and the ways in which it could influence their teaching practice. PCK resonated strongly with participants. A key weakness was their pedagogical knowledge. Although participants' content knowledge and knowledge of context were well developed, participants' pedagogical knowledge was much less so. This potentially reduces their ability to develop their pedagogical content knowledge. Scholarship of teaching and learning was important for helping develop PCK. Prominent barriers included: 1. There is little valuing/rewarding of scholarly teaching, education research and engagement more broadly in SOTL in universities and hence time spent engaging in these endeavors. 2. There are not enough opportunities for lecturers to talk about learning and teaching and to share practice in appropriate and authentic situations. 3. Lecturers do not necessarily have the time or support to undertake the risky business of innovating learning and teaching. 4. Engaging with the enhancement of teaching is not undertaken in a systematic way; rather it is only considered when something is broken.

**Gusky, T. R. (1986). Staff Development and the Process of Teacher Change. *Educational Researcher*, 15(5), 5-12.**

Gusky provides a model that describes the process of teacher change, particularly through staff development programs. Gusky asserts that the majority of programs fail because they do not take into account two critical factors: 1) what motivates teachers to engage in staff development and 2) the process of change in teachers typically takes place.

A model of the process of teacher change is advocated. The process starts with staff development, which leads to change in teacher's classroom practices, which leads to change in student learning outcomes, which results in new teacher beliefs and attitudes. Importantly, this model presumes that changes in beliefs and attitudes (and therefore their commitment to continue) will only come after the teacher changes their practice and positive results emerge for students. Three lessons are reported: 1) Recognize that change is a gradual and difficult process for teachers, 2) ensure that teachers receive regular feedback on student learning progress and 3) provide continued support and follow-up after the initial training.

**Henderson, C., Beach, A., & Finkelstein, N. (2011). Facilitating change in undergraduate STEM instructional practices: An analytic review of the literature. *Journal Of Research In Science Teaching*, 48(8), 952-984. doi:10.1002/tea.20439**

This is a comprehensive review of the current literature about promoting change in instructional practices. They categorize change strategies into four areas including: 1) disseminating curriculum and pedagogy, 2) developing reflective teachers, 3) enacting policy, and 4) developing shared vision. The recommended change strategies are aligned with or seek to change the beliefs of the individuals involved; involve long-term interventions; last at least one semester; require understanding a college or university as a complex system; an understand their own practice and the conceptions of teaching that influence it in order to fully embrace change; and the ability to design a strategy that is compatible with this system. Two commonly used change strategies are listed as being not effective include developing and testing “best practice” curricular materials and then making these materials available to other faculty and “top-down” policy-making meant to influence instructional practices.

A distinction is made between faculty-development researchers (FDR) and higher-education researchers (HER). The FDR community is known for literature reviews about creating changes in faculty teaching practices, with an emphasis on helping faculty improve their teaching practices or teaching how to use a new piece of teaching technology. The HER community is much more interested in developing perspectives and methodologies for studying how change happens rather than proposing strategies for making change happen.

**Hora, M. T., & Hunter, A. B. (2014). Exploring the dynamics of organizational learning: identifying the decision chains science and math faculty use to plan and teach undergraduate courses. *International Journal of STEM Education, 1(1), 8.***

In this paper, the authors use a qualitative case study of how 24 science and math faculty engage in organizational learning and tap into the organizational memory while planning courses. They draw from the literature on organizational learning and development. They explore how a reform project influenced organizational memory. Finding showed faculty members accessed five repositories of organizational memory including: individual memory, cultural norms, social networks and human resources, curricular artifacts, and external archives. When retrieving information from these memories, faculty primarily ‘fine-tuned’ existing curricular artifacts (i.e., lecture notes and PowerPoint slides). This paper has important insights into organizational learning in higher education. They advocate for an approach that targets curricular artifacts for regular updating and imposing continuous improvement systems. However, the process should also allow faculty local control over this process.

**Horil C., Redd, K., Ouellett, M., Finkelstein, N., Beach, A., Carlisle, D., Shadle, S. (2016) Collaborating at the centers: Report from a STEM Education Transformation Workshop Involving Leaders of Centers for Teaching and Learning and STEM Education Centers.**

This report comes from a STEM education transformation workshop involving 46 leaders of centers for teaching and learning and STEM education centers. It includes key insights into

understanding complementary strengths of the centers, structures and networks, and assessment practices in order to learn from one another and create synergy among counterparts. The workshop (and this report packet) included pre-workshop material, workshop activities, and post workshop reflections and activities. The authors analyzed results from the pre-workshop survey into types of contribution and themes that become a foundation for the report. There is a guide to collaboration, including how to start collaboration, the process for collaborating, and promising forms of collaborating. They conclude with recommending action steps for centers and institutions, networks of centers, and national organizations in order for them to make them excel in collaboration efforts. Included is a robust appendix of materials developed for and at the conference such as surveys, tools, and results from activities.

**Hudson, D. L., Whisenhunt, B. L., Shoptaugh, C. F., Visio, M. E., Cathey, C., & Rost, A. D. (2015). Change takes time: Understanding and responding to culture change in course redesign. *Scholarship Of Teaching And Learning In Psychology, 1(4)*, 255-268.**

**doi:10.1037/stl0000043**

This is a study investigating a case of a psychology course redesign that went from traditional lecture to active learning with a hybrid component. The redesign resulted in improved learning however student resistance to active learning strategies was also notably higher. Over time, both student outcomes and student resistance to active learning improved. Redesign needs a culture change from both ends (student and teacher). Continual assessment and improvement are necessary for sustaining changes. Barriers that were noted included time, other commitments, feeling overwhelmed, being unfamiliar with the technology, being subsumed in a culture that resists innovation in teaching, and being discouraged from less than ideal initial results. Need to communicate change takes time. The findings of this study showed an initial performance slip and then improvement over the course of time. Thus, this article speaks to the need for patience and continuous improvement.

**Kelly, R. (2014). Informal Faculty Leadership: Spreading Innovative Teaching. *Academic Leader, 30(6)*.**

This study investigates informal sharing of pedagogy in higher education. It is noted that this is an under-researched subject. Some of the factors found to promote informal sharing of curriculum include having an atmosphere of collaboration, having Deans set collaboration as a priority and institutionalizing in. In contrast to other studies, rewards and recognition were not mentioned much by faculty that were interviewed. The largest noted barrier to informal collaboration was having time available to invest in it.

**Kezar A., Gehrke S., Elrod S. (2015). Implicit theories of change as a barrier to change on college campuses: An examination of STEM reform. *The Review of Higher Education, 38*, 479-506. doi:10.1353/rhe.2015.0026**

In this study, the authors investigate implicit theories of faculty that become barriers to changing pedagogy. They argue that in order for true change to occur and persist, people working towards creating change must raise awareness of and help develop new implicit theories by first making them explicit. Study looks at conceptions of change (implicit and explicit), effect on ability to change, and guidance for facilitating change. They build upon Weick's Sense Making theory and use observations and interviews to get at underlying questions about what implicit theories of change are held. They then used interventions to see if they could change implicit theories that act as barriers to change. What they found was that the teams had trouble articulating theory of change. The idea of reform is built on faulty beliefs that reform is individual. Theories that surfaced included 1) change by initiating intervention, 2) change is rational and not political, 3) change is either top down or bottom up, 4) change only occurs at department level, 5) data alone is convincing, 6) funding is necessary. Seven out of the eleven teams at the end had explicit theories that they could articulate and evaluate whether they were theories that brought about change or impeded change. The authors conclude by addressing the need for faculty developers to argue with explicit theories.

**Kezar, A., & Maxey, D. (2015). Adapting by design. *Delphi project on the changing faculty and student success*. Retrieved from [http://www.uscrossier.org/pullias/wp-content/uploads/2015/02/DELPHI-PROJECT\\_ADAPTING-BY-DESIGN.pdf](http://www.uscrossier.org/pullias/wp-content/uploads/2015/02/DELPHI-PROJECT_ADAPTING-BY-DESIGN.pdf)**

This is a report from The Delphi Project on the Changing Faculty and Student Success and the University of Southern California Earl and Pauline Pullias Center for Higher Education. The aim of this study is to create a model for improving student success and non-tenure track position. In fact, the authors put out a call to action to do so. Part I reviews the history and current state of the faculty. Part II presents ideas for a more thoughtful and intentional approach, reconsidering faculty roles in a way that is attentive to fostering professionalism among the faculty, ensuring institutional needs are met, creating opportunities to integrate the interests and voices of the communities and other stakeholders served, and considering landscape factors in the overall higher education environment.

**Lee, V., Hyman, M., & Luginbuhl, G. (2007). The Concept of Readiness in the Academic Department: A Case Study of Undergraduate Education Reform. *Innovative Higher Education*, 32(1), 3-18.**

This case study shows how change takes hold in department, promotes the readiness concept, and explores implications. The authors argue for department-level change rather than individual, isolated efforts. The authors point to collegiality, autonomy, academic freedom, and specialization as being associated with any departmental culture regardless of discipline. They propose that autonomy, academic freedom, and specialization conflict with collaborative reformation and thus become barriers to change. If the whole department is not ready, they suggest starting with a subunit that is. Department support, rewards, and external support from leadership were found to be critical to catalyzing and supporting change.

The authors look at a successful case in relation to unsuccessful cases and literature. They noted components from these cases that led to success, which included: department's tie to departmental vision, pressure for change, agreement about content, feeling protected as a subunit, prior commitment to undergraduate teaching, the strength of collegiality within the department relative to the academic values of autonomy, academic freedom, and specialization, an openness to the insights and recommendations of any faculty member regardless of rank, and a willingness to act upon these insights and recommendations, a champion within the department who has credibility with senior faculty, and recognition of efforts in undergraduate teaching during the promotion and tenure process.

**Lowenthal, P. R., Wray, M. L., Bates, B., Switzer, T., & Stevens, E. (2013). Examining faculty motivation to participate in faculty development. *International Journal of University Teaching and Faculty Development*, 3(3), 149-164**

This mixed-method study looks into faculty motivation for development, obstacles, and preferred format. The study calls for faculty developers to think about type and format of development program. In this study faculty did not value short workshops or online learning. Most faculty members that participated preferred books, videos, retreats and one hour workshops. Most faculty participants did not care about nonmonetary incentives however, a moderate amount wanted certificates. Time and competing priorities were listed as deterrents to participation. Most faculty members that participated admitted that their motivation was that they wanted to improve their teaching or to learn new teaching technology. The program offering and time/day mattered to whether faculty members were able to attend development opportunities.

**Madson, L., Trafimow, D., Gray, T., & Gutowitz, M. (2014). What Predicts Use of Learning-Centered, Interactive Engagement Methods?. *The Journal of Faculty Development*, 28(2), 43-52.**

The authors use the theory of reasoned action to predict faculty members' interactive engagement methods. They found that beliefs about personal positive benefit is a good predictor of intention to use. Those who had positive beliefs about the benefits of using learner centered engagement methods were more likely to use them. The implication is that there should be a shift from motivating faculty by talking about benefit to student to talking about benefits to self. For example, faculty developers can focus on how enjoyable and rewarding learner centered methods of teaching are. Faculty members' perceptions of the academic context, their epistemological beliefs, and their perceptions of students' academic preparation also were found to predict faculty member's use of student-centered approaches to teaching.

**McKenzie, J. (2007) *Variation in patterns of teacher development and change: Connections with the development of scholarly teaching and the scholarship of teaching*. Paper presented at the Annual Conference of the Higher Education Research and Development Society of Australia. Adelaide.**

This study seeks to determine the extent to which development and change in conceptions of teaching relate to the development of the attributes of scholarly teaching and the scholarship of teaching. McKenzie noticed four patterns describing development or change in teachers' conceptions of teaching over time. There was changing content and/or teaching strategies, relating teaching more effectively as learning as acquisition, relating teaching more to development of student understanding, and change as experiencing teaching in a more student-focused way. These were crossed with patterns in which teachers became or remained student focused in their teaching situations. The participating teachers described many of the features of scholarly teaching: pedagogic content knowledge, investigating and reflecting on connections between teaching and their students' learning, learning from students and seeking to communicate with peers, either informally or through publication.

The literature review suggests that teachers might become capable of experiencing teaching in student-focused ways through progressive reflection on different aspects of their teaching experience (Entwistle and Walker, 2002), participation in action research projects (Kember and McKay, 1996), formal teaching development programs based on ideas of conceptual change (Ho, 2000), and scholarly engagement with literature on learning (Halliday and Soden, 1998). Scholarly teaching or scholarship of teaching will not happen if teachers are stuck in teacher centered mode. A major finding was the criticalness to see teaching from student perspective.

**Oliver, S. L., & Hyun, E. (2011). Comprehensive curriculum reform in higher education: Collaborative engagement of faculty and administrators. *Journal of Case Studies in Education*, 2, 1.**

This is a case study utilizing grounded theory. The work is framed around two research questions: "How did the curriculum review team experience the comprehensive curriculum review process? How did the faculty and administration collaborate during the comprehensive curriculum review process?" The authors then explore the comprehensive curriculum review processes. Findings from the study include insights into what is needed for a comprehensive curriculum reform to take place in higher education. Critical factors include the following: 1) have a shared vision 2) share responsibility 3) a willingness to collaborate and 4) have a sense of community and connectedness. Barriers to curriculum reform included a culture that impedes change. Another important finding was that curriculum modification to existing courses or content will not always lead to the desired reform even though a collaborative approach has been the foundation of the process. Most importantly, the process requires time and participation from various stakeholders including faculty teaching the courses and a supportive administration. In this case study a community of practice was formed as the group problem solved together. A full list of recommendations to faculty developers, faculty, and administration are included.

**Rogan, J. M. (2007). How much curriculum change is appropriate? Defining a zone of feasible innovation. *Science Education*, 91(3), 439-460.**

This study investigates how much change is appropriate in a context and time given experiences in Africa. He uses the zone of feasible innovation (ZFI) to assess how much change is appropriate to undertake. He offers procedures to define ZFI and has case studies to provide counterpoints to theoretical constructs as defined by the literature.

ZFI consists of a collection of teaching strategies that go beyond current practice, but are feasible given the existing resources available. The extent of the innovation should be collectively decided upon. A critical factor is being especially inclusive of those that will implement it. The innovation should be manageable and coherent. An innovation's practicality rests on concreteness, compatibility, and determining that the benefits outweigh costs.

Rogan draws from Vygotsky's social learning and Zone of Proximal Development and Lave and Wenger's conception of situated learning. Rogan distinguishes between ZPD and ZFI. ZPD is the individual level while ZFI is at the organizational level. Rogan proposes that 1) ID forces shape ZFI continuum, 2) it is important to create a coherent sequence within a continuum of possibilities, 3) collaboration is valuable when deciding on a degree of innovation that is feasible and meaningful. Scaffolding will likely be needed in the initial stage of implementation. 4) motivation for implementation matters. Case studies did not show real big changes but rather small steps in right direction. They suggest that the results may have been better if a CoP existed.

**Sabagh, Z., & Saroyan, A. (2014). Professors' perceived barriers and incentives for teaching improvement'. *International Education Research*, 2(3), 18-40.**

The authors argue for continuous improvement of teaching however they pose that teachers aren't always willing to invest in improvement activities and bad practices may be employed that negatively impact students. They investigate factors that hinder or motivate continuous teaching improvement. Time was found to be the most significant factor in improving teaching. Other barriers include competing demands and a lack of incentives. Critical to success is a supportive teaching culture. Faculty members' interest and need to enhance student learning were also listed.

The following research questions were addressed: a) What are professors' perceptions of motivating and inhibiting factors for engaging in professional development to improve their teaching? b) Are there any differences between pre-tenured and tenured faculty in perceptions of motivating and inhibiting factors with regard to engaging improvement activities? They conclude that more recognition and rewards are needed to encourage continuous improvement. Self-motivation, time release, and teaching evaluations, support arose as themes in their study as incentives to teaching improvement. They also found tenured faculty members can more readily engage in development given the job stability.

**Saroyan, A., & Trigwell, K. (2015). Higher education teachers' professional learning: Process and outcome. *Studies in Educational Evaluation*, 46, 92-101.**

The authors use “professional learning” to discuss activities that result in enhancing teaching and learning. Things that influence professional learning include: institutional support; small scale and voluntary participation; mechanisms to foster reflection, SoTL, CoPs, situated learning, and identity. To enable change : (a) individuals are likely to acquire new knowledge if they acknowledge a gap and feel the need for acquiring new knowledge, (b) individuals must value and appreciate the relevance of the learning opportunity and feel that what is gained from participating in a professional learning activity is worth the invested resources (e.g., time, money), (c) the teacher must know how to change and this is best mediated by credible individuals, and (d) there must be an element of intrinsic and/or extrinsic motivation such as personal satisfaction or external rewards to facilitate change. The study outlines areas for future research.

**Stanford, C., Cole, R., Froyd, J., Friedrichsen, D., Khatri, R., & Henderson, C. (2016). Supporting sustained adoption of education innovations: The Designing for Sustained Adoption Assessment Instrument. *International Journal of STEM Education*, 3(1), 1.**

This study reviews literature in order to develop an assessment instrument that supports development, analysis, evaluation, and refinement of innovations in education. This tool helps developers improve their plans to diffuse and encourage sustained adoption of innovations. They argue a primary reason for the lack of adoption is that developers focus their efforts on dissemination (spreading the word) instead of propagation (promoting successful adoption). The Designing for Sustained Adoption Assessment Instrument (DSAAI) is based on three concepts from literature: (1) change theory, (2) instructional systems, and (3) effective propagation strategies. The assessment instrument was designed in the form of a rubric to help education developers identify strengths and areas for improvement of their propagation plans. It has proven useful for a variety of audiences to evaluate and improve proposals and current research projects. Education developers who provided feedback during the development of this assessment instrument found it useful because it helped them not only evaluate their propagation plans but also become aware of other strategies they could use to help develop and disseminate products of current projects, as well as strategies for supporting future adopters.

**Stes, A., Min-Leliveld, M., Gijbels, D., & Van Petegem, P. (2010). The impact of instructional development in higher education: The state-of-the-art of the research. *Educational research review*, 5(1), 25-49.**

The authors provide a systematic review of the literature about nature and design of the impact of instructional development in higher education. The studies were clustered by the level of outcome that was measured. They address questions about the impact of initiatives with varied duration, format, or target group, because these questions were seen as a gap in the other literature reviews. The results provide a guide to improve instructional development in order to

get more insight into the real impact at different levels (teachers' learning, teachers' behavior, the institution, and the students). Some evidence is found of the influence of the duration and nature of instructional development on its impact. They believe that impacts should be measured at the student level and institutional level.

**Taylor, K. L., & Znajda, S. K. (2015). Demonstrating the impact of educational development: The case of a course design collaborative. *Studies in Educational Evaluation, 46*, 39-46.**

The authors investigate why many recently graduated PhDs are under-prepared for their teaching roles. They use a case study approach to assess the impact of an institutionally sponsored, collaborative course design initiative on the professional learning of early-career academics in a research-intensive university in Canada. The study was an educational development opportunity that touched on the integration of faculty, instructional, curriculum, and organizational development in a holistic approach to professional learning. The case documents the impact of a 5-day workshop on course design and teaching complemented with three cycles of classroom observation and feedback, and a monthly discussion group on teaching. Across 10 participants, three strong patterns of results emerged with respect to teaching beliefs, practices, and confidence about teaching. Skill building, collaboration, and reflection were important impacts of the program. Notably, a misalignment between beliefs and practice was noted.

**Wieman, C., Deslauriers, L., & Gilley, B. (2013). Use of research-based instructional strategies: How to avoid faculty quitting. *Physical Review Special Topics-Physics Education Research, 9*(2), 023102.**

In this study, authors examine why faculty members participating in their study persisted in using research based techniques when other studies had much high attrition rates. The main difference they found in their participants and those from other studies included the following: 1) They have an intensive ongoing collaboration with one or more faculty to transform a particular course. They attend many of the classes, interview students, sometimes helping directly with implementation, and offering feedback to the faculty member. 2) They are consultants to one another throughout the process. Most faculty members in the study persisted however some members resisted. Faculty developers should help with implementation and creating a supportive departmental environment. One limitation of the study is uncertainty in the extent that strategies and innovations are carried out with fidelity. However, they argue that with good support nearly all faculty members can successfully adopt and happily continue using research-based instructional strategies.

**Wright, M., (2008), Building a shared value of teaching in a department: What chairs can co. *Department Chair, 19*: 1–32. doi:10.1002/dch.20032**

This author advocates for conscious development of the culture of teaching and learning that is influenced heavily by chairs. She provides key examples of what chairs can do to develop a

shared value of teaching in their departments including: Spread out instructional work, create peer review opportunities, develop a multiplicity of practices for evaluating teaching, give attention to informal departmental practices that support good teaching and clarify tenure and promotion policies for evaluating teaching, use your time well to communicate symbolically the value of teaching, cultivate instructional discussions among faculty, use your time well to communicate symbolically the value of teaching. These approaches advocated for in this article are time and cost effective.

**Yelon, S., Sheppard, L., Sleight, D., & Ford, J. K. (2004). Intention to transfer: how do autonomous professionals become motivated to use new ideas?. *Performance Improvement Quarterly*, 17(2), 82-103.**

This study recognizes a gap in the literature about transfer from the perspective of an autonomous professional. The authors seek to fill this gap by answering: How do autonomous professionals learning from a training program form their intentions to apply an idea? After eight years of collecting over a hundred stories of physicians attending professional development they found high intentions to transfer innovations that were learned. Participants weighed experiences in training against personal and professional factors such as job requirements, experience with the task, self-evaluations, and their goals and values. They would consider credibility, and need of using an innovation prior to transferring. Participants would not use transfer and application because of a lack of time or opportunity to. Using lessons learned, the authors create a model for the intention to transfer.