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Renewing Teaching Practices: Differentiated Instruction in the College Classroom

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IN THE COLLEGE CLASSROOM

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Abstract: *At a time of high college student attrition rates, faculty who work in higher education settings are being challenged more than ever before with accountability for student learning. The purpose of this article is to share insights relative to a multi-year professional development initiative that provided college faculty with an opportunity to explore changes in their teaching. Over the course of three years, faculty members honed their knowledge, skills, and dispositions relative to a specific instructional strategy for their own classrooms: differentiated instruction. An experiential approach to the initiative was used, and the degree to which participants committed to change their own instructional practices was evaluated. Results indicated an encouraging degree of success, especially in technology integration, providing clear objectives and feedback to students, and enhanced student engagement.*

"Teachers change because they see the light *or* they feel the heat." (Tomlinson 1999, 114)

For faculty who teach in higher education institutions throughout the United States, the initial years of the 21st century have proved challenging. An imposing set of internal and external factors that complicate faculty members' work in classrooms has emerged. Demediuk & Armstrong (2014) identify a number of them, including the transition of higher education institutions to corporate entities, increased financial stress placed on institutions and especially students, intrusive government policies, accountability demands, and changing student demographics. The confluence of these factors has created an impetus for college faculty to consider changing their approach to teaching. Instructors feel heat to respond to concerns and criticism, as well as enlightenment from research that identifies best practices in college teaching.

Consequently, a multi-year professional development initiative (PDI) was developed at a Midwestern institution to give college faculty members an opportunity to consider changes to their teaching practices. The focus for the initiative was differentiated instruction (DI), a promising approach for elevating college student engagement and learning. The initiative provided faculty with sustained opportunity for thoughtful study of the DI theory base and its application in the college classroom. The experiential approach used for the initiative provided faculty with hands-on practice in DI strategies. This article discusses current pressures on faculty to adopt new instructional methods, literature describing implementation of DI in higher education settings, and components of the PDI. Key outcomes of the PDI will be presented, as well as conclusions and recommendations for future study.

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Feeling the Heat: Accountability and Attrition Pressures

As earlier noted, one reason college faculty may be motivated to change how they teach is pressure from internal or external forces. In the current context, faculty members are feeling heat from increased expectations to provide legitimate indicators of college student learning. Such increased expectations for higher education institutions are long overdue, according to the Spellings Commission Report "A Test of Leadership: Charting the Future of U.S. Higher Education" (U. S. Department of Education, 2006). The report concluded that institutions of higher education in the United States are characterized by a "remarkable absence of accountability mechanisms to ensure that colleges succeed in educating students" (p. vii) and the absence of a "reliable system to assess which institutions do a better job than others not only of graduating students but of teaching them what they need to learn" (p. x). The Spellings Commission pointed to college faculty when it urged postsecondary institutions to embrace "new pedagogies, curricula, and technologies to improve student learning" (p. 10).

Low-quality teaching/classroom instruction is a common reason college students withdraw from classes; thus, college faculty members are also on the hot seat relative to the high rate of student attrition. Attrition is a discouraging and persistent challenge currently experienced by most higher education institutions within and beyond the borders of the United States (Lobo, 2012; Turner & Thompson, 2014; Bok, 2013; Crosling, Thomas, & Heagney, 2008). First-year student attrition rates and six-year student graduation rates in the United States are particularly poor; the United States ranks last among industrialized nations with a first-year attrition rate of 30%-50% (O'Keefe, 2013) and presently only 50% of U. S. college students complete a college degree in six years or less (Tinto, 2012). Another troubling aspect of attrition is variation of rates across sub-groups, such as first generation college students (Soria & Stebleton, 2012), non-traditional students (Crosling, Thomas, & Heagney, 2008), male students (Henry, 2007), and ethnic minorities (Heisserer & Parette, 2002; Hunn, 2014).

Such statistics are discouraging. According to Brunsden et al. (2000) the far-reaching effects of attrition ranged from diminished self-esteem or self-image of an individual or institution to very significant short- and long-term economic disadvantage for individuals, institutions, and society. The attrition problem was also addressed by the Spellings Commission, which recommended that institutional success be measured in part by cost, price, and student success outcomes (U.S. Department of Education, 2006).

Seeing the Light: Promising Teaching Practices

Research studies driven in part by such criticism of higher education have shed light on promising approaches to student learning. Increasing student engagement is one approach; when students are engaged, a higher level of student learning is achieved (Krause & Coates, 2008; Crosling, Thomas, & Heagney, 2008). As long as three decades ago, Chickering and Gamson (1987) challenged traditional college teaching practices of the time; they proposed principles of good teaching practice in undergraduate education that focused on ways to actively engage students in their learning (e.g. providing prompt feedback on assignments and communicating high expectations). Since then, the Chickering and Gamson principles have been widely researched and validated as positively impacting student learning when implemented. Results from the National Survey of Student Engagement, which has focused on effective educational practices since the year 2000 (Pascarella, Salisbury, & Blaich, 2010), have reinforced the Chickering and Gamson principles. Again, the Spellings Commission has argued that the adoption of new teaching methods is an important key to retaining college students, increasing learning, and graduating citizens with skills to be successful (U.S. Department of Education, 2006).

Other engagement indicators have emerged from the literature including: engaging classrooms (a) are more student-centered (Brysen & Hand, 2007); (b) encourage students to think more critically and deeply (National Survey of Student Engagement, 2013); (c) are relational, using strategies that foster a high level of teacher/student and student/student interactions (Turner & Thompson, 2014; Lillis, 2012); and (d) utilize an assessment plan that provides students with formative assessment, instead of sole reliance upon summative assessment (Crosling, Thomas, & Heagney, 2008; Tinto, 1975; Yorke, 2001).

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Seeing the Light: Neural Science and Cognitive Psychology Research

Research conducted in the field of neural (brain-based) science has greatly increased in recent decades, providing considerable enlightenment for college teachers. Merzenich's work (2004) points out the plasticity and uniqueness of every human brain, and the Center for Applied Special Technology states, "…individual variability is the norm, not the exception" within the college student body (CAST, 2013). The Center also argues that understanding how differences in brain structure or functioning affect students is useful in class preparation, and a lack of understanding of these differences makes preparation for teaching much more difficult (CAST, 2011). Zadina's research (2014) has also highlighted the brain's capacity for forming new neural pathways essential to learning. Studies such as these have shown the positive benefits of increased self-efficacy, stress reduction, and enhanced learning for students who are offered multiple options and choices.

Research conducted in the field of cognitive psychology has also generated useful insights with direct implications for college teachers. For example, a study conducted by Bloom and Petrocco-Naupli (2012) concluded that both the length and quality of student responses to questions posed in a college classroom setting improved when wait time was lengthened from one to five seconds. Additionally, a study carried out by Fredrickson and Branigan (2005) indicated that students in a contented emotional state during exposure to input, as compared to angry or anxious emotional states, were better able to attend to a global picture and generate more planned, creative responses.

Why Differentiated Instruction?

Differentiated instruction is a set of teaching practices that attempts to meet students where they are relative to content taught and helps them toward engagement or mastery of the material (Tomlinson, 1999; Subban, 2006). According to Tomlinson, DI is a natural outgrowth of new insights about student learning, as it aligns well with key research outcomes from the fields of neural science and cognitive psychology. DI methodology is a potentially useful tool for responding to the pressures earlier cited. Advocates of DI believe that teachers are responsible for adapting instruction to address student differences. With DI, the unique qualities of every human brain are acknowledged, with emphasis on three areas of student variability: student readiness level, learning preferences, and interests. A college instructor may begin a course or unit by pre-assessing student readiness and conducting frequent formative assessments in order to challenge a student at the right moment. Instructors may also offer course content in different formats or environments to help students learn ways that best suit their learning style; additionally, they may choose to learn more about student interests and then present course content in a manner that connects with those interests (Tomlinson, 1999; Subban, 2006).

DI is an alternative to the most commonly used teaching methodology in college: lecture. Bok's (2013) rejection of lecture was predicated on research that challenged its effectiveness with regard to developing students' thinking skills and helping students achieve a deep understanding of the content taught. DI is more flexible than lecturing alone, and adapts to the unique learning needs present in all college classrooms. DI is more student-centered than other teaching methods and tends to be more collaborative; often, instructor and students work together to construct knowledge. Active student engagement is a primary goal of DI; students learn to think more independently, solve complex problems, and produce knowledge – all skills that King in her memorably titled *From Sage on the Stage to Guide on the Side* (1993) identified as being effective for the twenty-first century learner.

The implementation of DI in a classroom setting encourages teachers to manipulate any one or more of four teaching/learning factors: (a) the content studied; (b) the instructional process implemented; (c) the product generated by students; or (d) the nature of the learning environment. DI-compatible strategies include the use of graphic organizers, learning centers, independent study projects, tiered assignments, learning contracts, and web-based inquiry projects. With most such strategies comes increased student choice, such as the option to work either collaboratively or independently, and thereby increased student engagement.

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The Use of Differentiated Instruction in Higher Education

DI has been most extensively researched and utilized in P-12 grade levels. However, a growing body of research focused on college-level implementation of DI methodology has emerged. Ernst and Ernst (2005) studied the implementation of DI in an undergraduate political science course in which 35 students were enrolled. Multiple assessments were conducted, including opinion surveys, daily response questions, question and answer periods, student presentations, participation points, mid-term, final, student essays, and group public policy debates. The students were grouped based on readiness into an advanced group, intermediate group, and a least-ready group with differing assignments. Groupings were fluid and could be adjusted based on assessment of a student's understanding of the material, student interest, and learning style.

Student surveys taken at the end of the course indicated satisfaction with the instruction received. The fairness of assigning different essays based on perceived readiness level was a concern for a minority of the students, but was an area of central concern for the instructor in that students might game the system by faking a lower readiness to receive easier assignments, and therefore potentially obtain higher grades. Of this the researchers wrote:

> Differentiated instruction rejects the notion that a student's grade serves entirely as a reflection of the student's performance in comparison to abstract norms (i.e., standards-based grading) or as a reflection of the student's performance in comparison to other students (i.e., mean-based grading). In a differentiated class, a student's grade at least partially reflects the amount of personal growth the student experiences throughout the semester. (p. 56)

Another study published four years later evaluated the effectiveness of differentiated instruction in an introductory graduate-level course in teacher education in which 25 students were enrolled (Santangelo & Tomlinson, 2009). These students were also assessed for readiness, interests, and learning style. A number of differentiation strategies were employed based on these assessments; content was differentiated through supplemental reading assignments and materials that addressed key points with paired oral and visual explanations. The knowledge acquisition process was differentiated through tiered assignments, learning centers, and group assignments using jigsaw and think-pair-share methodologies. Rubrics defined expectations for student products, work revisions were allowed, flexible due dates were assigned, and the final product could be either written or transmitted orally.

Santangelo and Tomlinson concluded that, based on student feedback, DI had a "positive and meaningful impact on student learning" (p. 316). They suggested that the most impactful differentiation strategies employed were "incorporating a wide-variety of materials and activities, using flexible grouping strategies, providing options for expression, supporting text comprehension, offering choices, and being flexible with timelines" (p. 319). Ultimately, they found that preparing for and conducting a course using DI was more intensive than doing so without these strategies. Yet, "the time, effort, and dedication required for effective differentiation is unequivocally worthwhile when the high level of student engagement and mastery are experienced" (p. 320).

Similarly, in a 2010 study of a first-year undergraduate mathematics course, differentiation was based on student readiness, interests, or learning styles (Chamberlin & Powers). Two hundred twenty-four students participated in the study and were divided nearly equally into two sections: one received DI and the other received instruction not employing DI strategies. Formative assessments and tiered assignments were used to differentiate based on readiness, and students were allowed to work in a process that best challenged them. Groupings based on personal interests were used in a variety of ways, thus allowing the students to differentiate their work with the content. Additionally, differentiation based on learning style allowed students to explore multiple ways to represent the same mathematical concept. Student products were differentiated as well; homework might differ by groupings, and students could select the subject and final format of some assignments. However, all students completed the same quizzes and tests.

Both the students who received DI and those who did not were surveyed at the end of the course. Students who received DI were found to recognize the elements of DI content, product and process, as well as readiness, interests and learning style. Quantitative results of the research indicated that DI was successful in supporting mathematical learning regardless of the incoming level of student understanding. Their recommendations for the successful implementation of DI included (a) define explicit learning objectives for the course; (b) organize the course by units; (c) differentiate instruction selectively, perhaps one-third or one-half of the time; (d) start small; (e) have students complete an interest survey; and (f) keep a log of each student's progress in meeting the learning objectives. The researchers concluded, "The hope is that better meeting students needs in college mathematics will

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ultimately increase the retention of students, potentially including women and minorities, in mathematically intensive majors and careers" (p. 131).

Professional Development Initiative

The professional development initiative (PDI) under study was born of a practical need on the part of the College of Education (COE) to prepare for a unit reaccreditation evaluation by The National Council for Accreditation of Teacher Education (NCATE). The COE leadership—dean, associate dean, and teacher education department chair—analyzed data that was collected from key unit and program assessments at the student teaching and induction stages of teacher candidate development.

The leadership determined that, while the target range was achieved, unit-wide assessment data consistently showed lower mean scores in three specific areas: (a) candidate possessing the knowledge, skills, and dispositions needed to design and implement instruction that addresses the needs of all students; (b) candidate using learner performance data to design instruction that meets the needs across different learners (differentiated instruction); and (c) candidate using learner performance data to design instruction that meets the assessment and adjusts instruction to meet the needs of each learner. After identifying these themes, the leadership established the PDI in order to increase faculty efficacy in using DI. They were firmly committed to the belief that teacher preparation is the joint responsibility of faculty in the arts and sciences, education faculty, and P-12-based educators. Therefore, the target participants for the PDI would be faculty members responsible for content knowledge in endorsement areas and for pedagogical preparation, and P-12-based educators. It was reasoned that, if faculty from multiple disciplines across the university better understood, practiced, and modeled DI in their own teaching, they could better prepare teacher candidates to do so as well.

To this end a five-member professional development (PD) team was appointed by the COE dean and charged with carrying the PDI forward with the goal of advancing *all* university faculty members' instructional knowledge and skills to more effectively maximize the learning of *all* students. Guiding principles for the initiative were (a) foster a greater sense of communication, collaboration, and community across colleges and disciplines; (b) utilize, celebrate, and showcase expertise possessed by all faculty participants with a pledge to learn from each other; (c) partner with P-12 school district professional development efforts; (d) use assessment data feedback from practicing P-16 educators relative to the initiative goal; and (e) provide professional development activities for colleges within the university system that would be congruent with the theme of differentiating instruction.

Over the next two years this PD team designed multiple experiential professional development opportunities for faculty participants across colleges and disciplines to enhance their knowledge, skills, and dispositions. Faculty would see DI strategies modeled and make plans to implement them in both undergraduate and graduate courses. During the first year of the PDI the opportunities included a Taskstream© in-service (online data collection and assessment system), *Differentiated Instruction for English Language Learners* seminar, *Using New Technology to Differentiate Instruction* workshop, *Teaching to "DI" For: Maximizing Differentiated Instruction in University Classrooms* seminar, *What's on the "Menu" for Differentiated Instruction?* brown bag luncheon discussion, and *Classroom Instruction that Works with English Language Learners* (Hill & Flynn, 2006) book studies. Faculty attendance at the professional development events was voluntary and totaled 151. Departments across campus represented at the events included Communication Disorders, Counseling and School Psychology, Economics, Educational Administration, Instructional Technology, Kinesiology and Sports Science, Library, Mathematics and Statistics, Modern Languages, Music and Performing Arts, and Teacher Education. Evaluation surveys were distributed electronically to attending faculty after each event so that the PD team could plan for future events.

At the conclusion of the first year of the PDI, the PD team analyzed data from attendance sheets, evaluation surveys, and informal feedback and concluded that PD opportunities in DI for the next year should continue to emphasize cultural diversity and that more technology-oriented experiential workshops should also be provided. Events implemented in the second academic year included *"Popcorn" Technology* reviews (two training events, spring and fall), *Extreme Prezi Plus* workshop, *Bridging Cultures for Latino Immigrant Families and Schools* workshop (Patricia Greenfield, presenter), *Differentiating Instruction* workshop (Sandra Page, presenter), *Teaching with Tablets* workshop, and *Real World DI* workshop (P-12 local school district classroom teachers, presenters). Total combined attendance for the second year was 200, up nearly 8% from year one. Attendance at *Bridging Cultures* and *Real World DI* were the highest, greater than any single event from the previous year. *Teaching with Tablets* was the best attended technology session.

Program Evaluation

The PD team then sought to evaluate the effectiveness of the PDI and its activities overall. As a result of this multi-year initiative, did university faculty members change their own teaching strategies? Were they advancing their own knowledge and skills in order to utilize DI?

A program evaluation survey was developed and administered to participants, once in year one and again in year two, in order to address these questions. Participants were asked to identify which training events they attended and the perceived degree of impact on eight instructional practices, using a Likert scale of 1-5 (1=Strongly Disagree to 5=Strongly Agree). Participants were provided with a list of 19 specific strategies that were modeled and taught during the training events and were asked to identify all strategies they had tried for the first time in their classrooms, or in significantly different ways or frequencies. In addition to the scaling questions, faculty were asked to describe changes in their teaching and perceived impact on student learning. The survey was developed and disseminated using Qualtrics software. An email was sent with the survey link to 54 unduplicated faculty members from the colleges in the university system who had participated in the initiative. A second email was sent as a reminder to complete the survey.

Findings. Of those 54 surveyed, 26 completed the survey (48.1%). The training events that had the highest attendance among those surveyed were Collectivist Cultures (75%), English Language Learners (71%), Differentiated Instruction Theory (63%), and Multiple Technology Events (46-54%).

Seven of the eight items assessing change in instructional practice were rated as Agree and Strongly Agree. The majority of respondents (73%) indicated an increased motivation to make future changes (X = 4.31). This was followed by the ability to integrate technology (65%, X = 4.25), facilitate the learning of all students (65%, X = 4.23), and make changes to own teaching (73%, X = 4.12). Respondents indicated the weakest degree of impact for improvement of student learning (54%, X = 3.81).

A number of strategies were used for the first time or in significantly different ways or frequencies. Thirty-six percent of the respondents tried Prezi non-linear presentation software and twenty-seven percent tried video streaming, VoiceThread, and cloud computing. An equal number also used the non-technology related teaching strategies of (a) *Stating Clear Learning Goals*, (b) *Utilizing Tiered Assignments*, and (c) *Educating Members of Collectivist Cultures*.

Only four respondents (15%) completed the English Language Learner (ELL) strategy assessment question. ELL strategies used for the first time or in significantly different ways were the *Setting Objectives* and *Providing Feedback* strategies as indicated by 100% of the respondents. *Cooperative Learning* was identified by 3 of the four respondents (75%).

In responding to three open ended questions, faculty members described changes in their own teaching and perceived impact on student learning. These responses were analyzed into themes relating to each of the questions.

Teaching Self. Faculty member were asked to summarize the impact of the changes on their own teaching. Themes that emerged from their responses are indicated in italics, followed by representative comments illustrating each theme.

Trying something new. "The introduction to new technology motivated me to give it a try at least once." "I have attempted to apply differentiation strategies in all of my classes." "Open to more ideas."

Modeling. "I am constantly working to model the strategies for the pre-service student teachers in my classes. Not only are they used for their learning but they can take the strategies into their own classrooms."

Affirmation and Reinforcement. "Many of the strategies I have already used in the classroom so I have had the opportunity to share these with my colleagues through the professional development opportunities."

Life-Long Learning. "Makes me realize that in teaching there is not standing still in one's own learning. If you are not moving forward and learning new things you will be going backward or getting behind." "More aware of the current vocabulary along with the theory and practice."

Pre-Assessment. "I have begun to extensively survey students on their initial entry into my classes to determine their learning preferences and interest areas."

Student Engagement. "I am open to different methods of delivery of material. I want to introduce material in different ways to keep my students engaged."

Student Learning Outcomes. Respondents were asked to summarize the perceived impact that differentiated instruction strategies had on student learning outcomes.

Increased student engagement. Several respondents indicated that the use of differentiated instruction had facilitated more student enjoyment, more choices, more options for demonstrating their learning and hearing *their*

ideas. "Giving students choices for assignments/assessments has allowed them to demonstrate their learning in different ways." "The students have enjoyed it more."

Broadened perspective. "The learning of my students has broadened (e.g., I often get feedback that says, 'I never thought of it that way before.')"

Paying it forward. "My students now appreciate with more clarity the fact that teaching is so much more than helping someone else understand the information being delivered to him/her–that it is helping the student to learn and continue to learn beyond the classroom walls and beyond the time period in which you have him/her as a student."

Unique benefits and challenges. Respondents were asked to share any additional reflections about the professional development initiative.

Experiential Learning. "Opportunities for differentiation were far better in the technology offerings. We could attend 'exposure' as well as 'in depth' training as suited our needs. I use more of those strategies as a result."

Shared learning experiences with colleagues. "I have enjoyed the opportunity to work and learn with my colleagues on these professional development opportunities."

Interdisciplinary collaboration. "Had enough variety to engage faculty from all departments and from a variety of viewpoints."

Quality. "Happy to get top name people and also learn from our own local top-tier professional colleagues."

Differentiate the differentiated instruction initiative. Respondents indicated that the professional development initiative should account for differences in student age groups (e.g., elementary vs. secondary). "Most of the materials/sessions did not fit the age group I prepare teachers for." They also indicated that the more differentiated and experiential the activity was, the better. "The differentiation should be done as a scenario much like one would offer in a game." "We need to stretch ourselves a little more."

Induction of new faculty. "I would like to see future efforts geared toward identifying the essentials of professional development that we can agree on for all new incoming faculty–the development of a coherent induction process."

Discussion

The findings suggest that a clear majority (73%) of those that responded to the survey believed that the ideas and strategies improved faculty ability to implement DI in their own college classrooms. Nearly all of the differentiation practices were endorsed as increasing instructor response to learner needs. This finding is consistent with Earl's (2003) recommendation that teachers proactively plan varied approaches to what students need to learn (content) and how they will learn it (process). In particular, the PDI assisted faculty to integrate technology as a tool for task development, continual assessment, and flexible grouping. However, improvement of student learning was identified as an important area for future training as faculty may need additional ideas and support in order to assess the learning (product). Tomlinson and Imbeau (2010) indicate this is an essential practice that will advance faculty understanding and use of DI.

Specific differentiated strategies favored by faculty participants were primarily related to technology. This finding supports Stansbury's (2009) position that technology empowers teachers to differentiate their instruction through a variety of strategies that utilize software, video streaming and internet resources. Faculty readiness for learning digital-age skills contributed to their willingness to attend training events and try new things. According to Smith and Throne (2007), DI should be used to promote 21st-century skills, including digital literacy, inventive thinking, effective communication, and productive effort. In short, when technology is used as a tool for DI, a better learning environment is created for *all* students.

Non-technology related teaching strategies that were strongly endorsed by participants were use of (a) Clear Learning goals, (b) Tiered Assignments, (c) Educating Members of Collectivist Cultures, and (d) English Language Learner (ELL) strategies. These non-technology strategies provide teachers with a better instructional match between students and their needs. Because students arrive with varied cultural and linguistic backgrounds, learning opportunities and experiences, interests, and readiness levels, the faculty that participated in the PDI recognized the importance of varying learning tasks, processes, and products.

The narrative survey responses perhaps best illustrate the transformative impact of the experiential nature of the PDI on faculty teaching. Not only were faculty empowered to try new things in their own classrooms after experiencing them in the training events, but they were also willing to plan for future changes in their instructional

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practice. An important finding that emerged was that faculty had begun to pre-assess their students upon initial course entry in order to determine student learning preference, interests and readiness—hallmarks of DI.

DI strategies are deemed especially important in how faculty increase student engagement; this supports Tomlinson and Imbeau's (2010) observation that students assume greater responsibility for learning in a democratic classroom. Student engagement is conducive to improving student affect through enjoyment, voice, and choice (Taylor & Parsons 2011). However, no comments indicated that faculty conducted post or summative assessments of student engagement or learning. This may indicate a need for further PD in ways to effectively assess student learning outcomes, and future study is warranted to determine how those outcomes have been impacted by DI strategies. In addition, attrition rates specific to students in classes where DI strategies are being used could be tracked for comparison purposes.

Light and Heat Revisited

To sustain the momentum created by this initiative continued professional development will be needed. Yet the level of success achieved by the PDI described in this article was certainly encouraging. Sufficient doses of both light and heat in a supportive context did motivate faculty across the university to learn and use differentiated instruction as a strategy to enhance student engagement and learning. Twenty-first century learners deserve no less.

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