

RUNNING HEAD: DI in postsecondary settings

Faculty Perceptions of Implementation of Differentiated Instruction in Higher Education

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Introduction

A common lament of teacher candidates is they often are not taught university-level courses the way they are expected to teach. In addition to this justification for incorporating constructivist and differentiated instruction (DI) approaches in higher education classes, it is our contention students (teacher candidates) learn better when taught by approaches that are responsive to their learning needs and preferences. However, there is limited implementation of DI in higher education classes (Santangelo & Tomlinson, 2009) despite the fact higher education has sought to increase access for students of diverse backgrounds. The purpose of this project was to involve faculty from various content/subject backgrounds in a workshop on DI, and document the process through which they implement DI in their classes. The first phase of this project was to analyze the strategies faculty (within each content area) felt they would like to implement. The second phase of this project is to follow up with faculty who attended these workshops to review their syllabi and survey them about their implementation of DI strategies. This paper reports data from the first phase.

Review of Literature

Differentiated Instruction (DI) is a student-centered approach that uses flexible instructional and assessment strategies and instructional materials that are responsive to learner differences. These differences in learners may be seen in terms of (a) readiness levels, (b) learning preferences, and (c) interests (Tomlinson, 2000). Hence, modifications in instructional and assessment strategies, after careful assessment of student needs and solicitation of student input may be called for, but in the context of course goals/outcomes. According to Tomlinson (2000) and Santangelo and Tomlinson (2009), instruction can be differentiated by modifying content, process, or product. *Differentiating content* may involve introduction of new topics or elimination of topics, incorporating various ways of representing the material, and/or providing scaffolding in reading/organizing content based on student interests, readiness levels, or styles/preferences. *Differentiating the process* may involve changing the pace, instructional and communication strategy, variety of activities to address student interests, readiness levels, or styles/preferences. *Differentiating the product* involves allowing students to demonstrate their understanding in a variety of ways. This may involve offering students choices in how they may demonstrate their learning, multiple attempts to demonstrating mastery/learning in ways that suit their preferences or styles. The development of the product may require peer and/or self-evaluation. *Differentiating the environment* may involve changing the physical space of the learning environment (variety of perspectives, multiple settings in which students may choose to read/learn, creating a sense of mutual respect and personal responsibility by setting up routines/expectations, etc.)

As an approach that keeps the student at the center of the instruction, DI may be seen as being in opposition to the content-coverage and specific assessment requirements of higher education classes. In addition, offering students choices may be seen as catering to students and reducing the rigor of courses. There is a distinct paucity of research in the use of DI in higher education settings, and the few studies conducted seem to be restricted to teacher education courses. In a qualitative study with six Literacy Education professors, Williams-Black, Bailey, and Coleman Lawson (2010) found that while the faculty had a fairly good conception of DI, their strategies for differentiating content primarily focused on choice of topics for in-class and out-of-class activities/assignments, and change in content to scaffold instruction for students who may lack the experiential background necessary for learning that topic. Respondents reported differentiating-the-process strategies as involving choices in class text; grouping based on student strengths, interests, or geographical location of residence; tiered assignments; mini-conferences with individual students; or giving student the choice of working alone or in a group. Strategies reported by this group for differentiating the product included project-based learning, and choices in projects (including “mixed media” projects, and format and weight of tests/quizzes). In terms of differentiating the environment, professors reporting giving choices for environments for completion of assignments, including guest speakers and incorporating field trips into the learning environment.

In a study of one’s own practice, Santangelo designed a course that incorporating multiple levels and types of differentiation in the context of clearly articulated course goals/outcomes. Strategies included using rubrics that served as a basis for self- and instructor evaluations, a mastery-orientation toward all projects except the summative project, and pre-assessment of students and responsive course design. Santangelo and Tomlinson (2009) found that the student outcomes related to this course exceeded expectations, with all members ($n = 25$) mastering course outcomes and 14 students completing assignments that reflected advanced goals. In addition, students perceived the course to be beneficial in terms of addressing their (a) diverse ways of learning; (b) diverse interests, experiences, and goals; and (c) diverse personal circumstances. A unique finding was the students’ personal circumstances that resulted in several, competing demands on their time (e.g., family members, financial obligations, and job responsibilities) creating a high need for differentiation. Santangelo and Tomlinson provide several insights from this research: (a) establishment of clear course objectives allowed for differentiation in that context; (b) assessment strategies that are integral to the course serve as a basis for students to communicate their needs and insights; (c) clear communication of student and instructor roles and responsibilities in the context of the DI model is essential; (d) DI requires a high degree of time and effort on the part of the instructor in preparation, instruction, and assessment of student learning.

Another strategy for differentiation of content and process is through technology. For example, audience response systems used in the classroom may well be a means of obtaining information

about student needs in “real time” (i.e., while instruction is taking place). One such approach, described by Kara-Soteriou (2009) involves “clickers” that allow teachers to ask fixed-choice questions and have students select their answers, which can then be aggregated and available to the teacher in grouped form. The value of this approach is seen in keeping track of student comprehension of concepts or their opinions and the immediate availability of this information that lends to responsive instruction. The benefit of technology in differentiating instruction is seen in terms of protecting student privacy, allowing for collaboration and communication, availability of software that organizes information, multiple ways of representing information (i.e., visually, orally, written), availability of choices available via Internet, and easier access to authentic learning via good quality software and Internet sites that support authentic learning.

Hence, though the implementation of DI in higher education is still limited, evidence suggests that DI is an effective approach to help students succeed in these settings. The ways in which this differentiation may be implemented varies and may require considerable planning and reflection. Following a workshop conducted by an expert in DI, faculty’s perceptions of DI and its potential implement in their subject area were captured in notes of small group discussions.

Method

Participants

Fifty-six part and full time faculty and two field supervisors for preservice teachers attended a four hour workshop on differentiating instruction in the higher education classroom. The faculty members (19 male, 37 female) represented nine subject areas supporting content area related to an undergraduate teacher education program: English ($n = 8$), Fine Arts ($n = 1$), Foreign Languages (Spanish) ($n = 2$), Life Sciences ($n = 6$), Mathematics ($n = 10$), Physical Sciences ($n = 4$), Social Sciences ($n = 7$), and Urban Education ($n = 14$).

Procedure

Faculty from subject areas supporting the preservice teacher education program were recruited to attend discipline-specific conferences with a focus on presentations addressing learner-centered teaching strategies, incorporation of technology in instruction, and other topics related to the task of differentiating instruction in the higher education setting. Seven faculty members were provided funding to attend a conference, and to serve as facilitators at a university-wide workshop on differentiating instruction in the higher education classroom. Additionally, these facilitators recruited faculty members from their disciplines to attend the workshop.

The workshop incorporated a sixty minute plenary session led by a nationally known researcher in the area of implementing learner-centered strategies in the higher education setting. This

session was followed by participants engaging in breakout groups organized by discipline and facilitated by the seven faculty members mentioned above. The focus of the breakout session was to identify common areas of interest in implementation, discuss potentially useful strategies, and consider issues and obstacles faced regarding differentiating instruction in their classrooms. Outcomes of these breakout sessions were listed on newsprint and briefly presented to the larger group. Participants completed an evaluation questionnaire which specifically asked for responses related to plans for implementation, misconceptions about differentiated instruction, challenges to implementation, and resources or support for implementation.

The quantitative results of the questionnaire indicate respondents indicated an overall strong positive response to the plenary session ($M = 3.6, SE = .06$) with a similar response toward the breakout session ($M = 3.4, SE = .08$) on a four point Likert-type scale. Participants indicated instructional strategies and student learning styles as the topics for which the most information was provided related to the use of differentiated instruction in both the plenary and breakout sessions (see Table 1).

Table 1. Indicated Strategies by Session Type

Strategy Indicated	Frequency in Plenary	Frequency in Breakout
Instructional Strategies	47	39
Discussion Techniques	23	22
Student Learning Styles	40	31
Assessment Practices	31	23
Use of Technology	8	16
Inquiry Strategies	18	13
Cooperative Learning Strategies	30	21
Mastery Learning	10	9
Others	3	2

Data Analysis

Faculty facilitators created notes from breakout sessions which were subjected to a relatively latent content analysis by two of the authors of this report. Each author independently derived the categories in which strategies may be classified and met twice to discuss these categories and classification of strategies. The resultant outcome was then reviewed to answer the following questions: (a) which DI strategies seem to be absent in these discussions; and (b) what unanswered questions and concerns remained to be addressed regarding the implementation of DI?

Results

General and Discipline-Specific DI Strategies

The content analysis of faculty responses to the question – “What DI strategies could you implement in your subject area?” are included in Table 2.

Table 2: Themes emerging from content analysis of faculty perceptions of DI strategies that may be used in their discipline.

Themes And Strategies For Implementation Of DI In Higher Education

Differentiating Content

1. Modification of curriculum is necessary to meet the needs of every student. This can be done through various means (i.e., project-based learning, online materials, specific software, flexible time-frames, multiple exposure to content)
 - a. Modify curriculum to meet needs of each student
 - b. Use online materials to differentiate
 - c. Use course-specific software
 - d. Vary course content by using various texts (books), movies, lectures, field trips (to museums)
 - e. Use project-based learning
 - f. Use service learning
 - g. Make content flexible
2. Curriculum can be modified/remain flexible in response to student needs
 - a. Start with the familiar
 - b. Start with simple ideas and build to more complex
 - c. Common ground can be identified with the help of assessment
 - d. Assess students' prior knowledge at the beginning of the semester
 - e. Integrate reading strategies
3. Differentiated instruction lessons take into account the complexity of the content and scaffold accordingly
 - a. When planning lessons take into account the difficulty and complexity of the topic
 - b. Incorporate time for revision (multiple exposures)
 - c. Content remains the same but is presented at varying levels (i.e., need more time)
 - d. Stretch the students through metacognitive learning (guidance)

Differentiating Process

4. Differentiated instruction involves providing various levels/types of scaffolds
 - a. Email questions before reading that may be used to create a concept map
 - b. Provide skeleton outlines
 - c. Provide remediation/retakes for students not exhibiting mastery
 - d. Teach study skills
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Table 2: Themes emerging from content analysis of faculty perceptions of DI strategies that may be used in their discipline (continued).

Themes And Strategies For Implementation Of DI In Higher Education

Differentiating Process (continued)

- e. Use end-of-class/summary questions
 - f. Use strategies like jigsaw
 - g. Vary time demands for assignments
 - h. Teach background knowledge
 - g. Stretch students to application level
 - h. Model for students
5. Differentiated instruction classrooms have environment that are engaging, collaborative, and motivational
- a. Incorporate hands-on, minds-on experiences
 - b. Group with “group leaders”
 - c. Survey students’ interests when discussing application of concepts
 - d. Hold class discussions on “hot to teach this concept” which seeks individual student input on ideas to teach and master a concept
 - e. Have students reflect on class processes (exit ticket)
 - f. Provide rewards/incentives during the semester and end for student achievement
 - g. Reach out to students through use of You Tube
 - h. Use TAs for link between student and professor
 - i. Use simulations and role-playing
 - j. Use voting cards for student input on pacing of course material
 - k. Use strategies like “three-minute brainstorming”
 - l. Use oral presentations
 - m. Modify role of instructor to be that of a moderator
 - n. Create collaborative learning environments
 - o. Create blogs
 - p. Pair students carefully
 - q. Reflect on what makes students keep reading
 - r. Provide choice of materials (including readings)
6. Differentiated instruction addresses various learning styles
- a. Incorporate more visualization in teaching
 - b. Use graphing calculators to visualize data and modeling
 - c. Assess learning styles, content knowledge, and background knowledge
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Table 2: Themes emerging from content analysis of faculty perceptions of DI strategies that may be used in their discipline (continued).

Themes And Strategies For Implementation Of DI In Higher Education

Differentiating Process (continued)

7. Ongoing and continuous feedback is a key component of differentiated instruction
 - a. Use exit tickets to obtain feedback
 - b. Identify student weaknesses and build on strengths
 - c. Utilize the Reading/Writing Center
 - d. Assess learning styles, content knowledge, and background knowledge

Differentiating Product

8. Incorporate flexibility in course assessment
 - a. Find multiple ways to demonstrate mastery of a concept/skill
 9. Students should be given a choice of product options
 - a. Develop multiple possible projects
 - b. Students should be allowed to select a product based on their strengths/weaknesses, with the constraints of course objectives
 - c. In exams, give students choices between multiple choice and essay exams
 - d. Rely on/use various products – exams, homework, group projects, numerical methods, oral or written presentations
 10. Products should be interactive, engaging, and appealing to the 21st century learner
 - a. Use authentic problems in testing
 - b. Use TV commercials as products
 - c. Use persuasive student TV creations
 - d. Use strategies like “World Café” as an active learning technique
 - e. In homework, allow students to come up with questions and answers
 - f. Use project-based learning for individuals and groups
 - g. Use service learning
 - h. Use portfolios (to show long-term growth)
 - i. Engage students in identifying types of questions that would be good to ask on a test
 - j. Use take-home exams
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Table 2: Themes emerging from content analysis of faculty perceptions of DI strategies that may be used in their discipline (continued).

Themes And Strategies For Implementation Of DI In Higher Education

11. Product requirements and standards should be established
 - a. Create list of products to illustrate learning outcomes
 - b. Create a standardized list of requirements that each product choice must meet

Differentiating Environment

12. Get to know your students
 - a. Identify the most motivated and achieving students ASAP when classes start
 - b. Create a learner survey (that includes information about interests, needs, preferences, goals, etc.)
 - c. Use “buy-in” essays
 - d. Ask students to write an autobiography –model by reading a Latina author who writes one
 13. Establish an environment that demonstrates honor and respect for the students
 - a. Be more objective
 - b. Be fair – this does not mean that you treat everyone equally
 - c. Remember that making a choice in their learning often gets students engaged
 - d. Monitor behavior issues/respect – small personal interactions help, particularly eye contact
 - e. Student engagement and interests are important to consider
 - f. Engage students’ interests by reading aloud and explicating vs. reading
 - g. Impress on students that the learning goals remain the same but that their path to arriving at those goals may be different
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Some strategy sets were distinctly unique to the discipline and suggest a more discipline-specific approach to DI.

In the *Physical Sciences*, the discussion focused on concerns about fostering a climate of student responsibility, since many efforts on the part of the faculty result in low or no response. Faculty recognized that using diverse instructional strategies would promote better learning in the students who were responsive. Strategies that could be used are (a) demonstrating relevance of subject matter; (b) using more visualization and inviting participation in teaching; (c) incorporating more hands-on strategies; (d) modifying assessment to incorporate real-world problems (rather than multiple-choice).

In *Mathematics*, faculty recommended (a) using a “getting to know students” survey; (b) incorporating more student participation; (c) focusing on hands-on teaching techniques; (d) using “exit tickets” incorporating reflections and problems at the end of class; (e) inviting student input in how a professor may teach the concept; (f) using learning support like tutorials (on-line as well as face-to-face) and study-skills workshops; (g) using more visualization technology; (h) using collaborative (group) work for in-class and out-of-class assignments; (i) using supplemental instructors.

In *Political Science*, participants suggested using (a) visualization strategies; (b) incorporating technology like YouTube; (c) using models similar to Supplemental Instruction; (d) using strategies like roles playing, seminars, voting cards to determine if students are ready to move to next topic/theme, “world café” (that promotes perspective-taking from a international perspective), brainstorming ideas; (e) using assessment strategies like presentations or debates with the professor as moderator; and (f) the professor demonstrating objectivity and fairness that might encourage students to be more open.

In *Education*, faculty strategies included: (a) getting to know the students’ backgrounds, learning styles; (b) providing students with choices within a standardized list of requirements; (c) planning for students who are advanced (already know the content); (d) using strategies like paired/shared readings, reflections, apply to real world settings; (e) enhancing metacognitive knowledge; (f) modeling tasks and dispositions necessary for learning; (g) inviting students to meet with faculty individually.

In *History*, faculty emphasized the need to (a) creating opportunities that invite student responsibility for their own learning; (b) using reading and writing support available in learning support centers; (c) incorporating reading strategies in class; (d) providing choices; (d) using homework; (e) using learning aids like films, museums, library, lecture to support the struggling student; (f) working with other professors to create common learning support sessions; (g) using group work; (h) using exit ticket for feedback.

In the *Life Sciences*, faculty recommended (a) incorporating popular fiction (e.g., science fiction that center around diseases); (b) giving choices on assessment (multiple choice or essay questions); (c) creating multiple paths to learning, that address the needs of the poorly-prepared as well as the well-prepared learner (e.g., sharing interesting facts about a disease from textbook reading, writing a paper, creating a presentation, or working on a project); (d) using assessment strategies like problem-based learning, service learning (connected to co-curricular and extra-curricular clubs); (e) creating “recitation” sessions across courses; and (f) getting to know the student.

Concerns/Pending Issues

Emerging themes related to concerns/pending issues were rather revealing, though these questions remained in the breakout groups and were not addressed in large group discussion in this study. Hence, some questions are answered by the strategies described in Table 2. Any attempts to implement DI should consider and address these concerns:

- (i) If you give students choice, instructors must be ready to accept that choice
- (ii) How can we ensure that students take responsibility for their own learning?
- (iii) How do we encourage student adaptation to college-requirements without catering?
- (iv) How do we address the needs of underprepared students, particularly when some students highlight their weaknesses?
- (v) How do we integrate “A” and “C” students? How do we assess them?
- (vi) How can we avoid a situation where a few people are doing the work – exams will tell whether everyone is engaged
- (vii) How do we address the needs of students who are non-native speakers of English?
- (viii) How can we enhance learning for those who already know the content?
- (ix) How can we avoid creating a caste system (tracking)?

Some suggestions that emerge (regarding implementation of DI) are:

- (i) Use software like Statcrunch/My Math lab
- (ii) Streamline effort by using review sessions across courses
- (iii) Meet with faculty: talk about pedagogy, find common ground, mentor faculty
- (iv) Involve adjuncts in the conversation
- (v) Faculty should observe Teaching Award winners
- (vi) Meetings on pedagogy should count as service
- (vii) Focus on (using DI in) classes that are more likely to prepare teachers
- (viii) Get administrative support to implement DI/and increase student responsibility for Learning
- (ix) Encourage faculty peer review of instruction

While there is no fixed set of DI strategies, one notable gap in faculty responses (as summarized in Table 2) is that there were no course delivery/pacing suggestions. For example, “stretch” or accelerated courses, learning community and linked courses and credit-by-examination were not listed, though there have been considerable conversations about these in the university community. This may imply that faculty may perceive DI to be limited to what goes on within the classroom.

Discussion

After a plenary session and breakout sessions facilitated by faculty leaders, faculty discussed ways in which they could implement DI in their subject area/classes. Discussions (breakout

sessions) were held by disciplines (Biological Sciences, Communication & Theater, English, History, Life Sciences, Math, Political Science, and Teacher Education). Faculty identified strategies that fit into each of the four areas of differentiating content, process, product, and environment. The respondents were clearly excited about the opportunity to discuss pedagogy and discipline-specific issues in the workshop (as demonstrated by the workshop evaluations). While some strategies were more discipline-specific (e.g., visualization techniques in Math; teaching metacognitive strategies in Teacher Education courses), in general, the strategies centered around getting to know students, allowing for choices, creating multiple ways of accessing the course material, and creating an environment that is conducive to learning.

The incentives and support for DI in postsecondary settings might be important to examine. In a culture of individual accountability in terms of teaching, service, research/scholarly activities, any time spent on planning/course redesign might take away from the more traditional definition of faculty workload. Institutional support of DI might include modifying promotion and tenure policies to allow for creativity and risk-taking in course redesign, recognizing the large amount of time that might go into implementing DI, capping course size, and creating institutional cultures that emphasize student responsibility and engagement (through student orientation, student services, etc.). Perhaps, allocating financial resources/course releases for course redesign and facilitating dialog about pedagogy might be other strategies that could promote a philosophical shift to placing the students' needs at the center of coursework. Facilitating nontraditional course delivery options would also be advisable (e.g., stretch courses, accelerated courses). Discipline-specific discussions that involve the adjunct faculty will also facilitate a cultural and philosophical shift in teaching and learning in postsecondary settings.

Concerns about implementation of DI also include upholding course standards and avoiding tracking students and catering to their needs. Next steps in implementation of DI might need to include strategies to differentiate within the context of course outcomes – particularly by developing/articulating standards of performance that could be communicated to students (e.g., Santangelo and Tomlinson (2009) report using a general rubric with standard levels of performance for all assignments within the course). Concern about opinions/perceptions of peers may also constrain faculty efforts in creating courses that are responsive to student needs. In addition, with the explosion of online courses in postsecondary settings, differentiating in online environments is a critical discussion that needs to be held.

The lag between the needs of an increasingly diverse student body and higher education institutions teaching approaches (Santangelo & Tomlinson, 2009) is of significant concern. Through faculty and institutional effort changes in course delivery and assessment might be achievable. Time for dialog, planning, and implementation of DI is critical and institutions must provide support to faculty who plan to redesign courses to respond to the needs of their students.

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