Differentiation (DI) in Higher Education (HE): Modeling What We Teach with Pre-Service Teachers

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Practices of teachers in the K-12 classroom have been established to include differentiated instruction (DI) as a means to meet the needs of students. However, practices in higher education (HE) have limited opportunities for faculty to model DI. Previous research on DI in HE has centered on the practices that are utilized with students in open dialogue and intentional design. This study explored teacher candidates' level of familiarity with DI, perceptions of DI in HE, and intended future use of DI in their classroom instruction. Findings suggest that a difference exists with students' level of familiarity between programs and years in a program.

Teachers in K-12 settings are challenged to meet the diverse needs of their students. This often occurs through the process of differentiating content, process, and product. Differentiation is the process by which a teacher designs and implements lessons that are "adapted to meet students' individual and diverse need in order to facilitate student success" (Santangelo & Tomlinson, 2009, p. 308). The term differentiation has been established as having a place in the standards for the teaching profession at the K-12 level as evident, by the use of the term "differentiated instruction" in state standards for the teaching profession (Alabama, 2014; Connecticut, 2014; Hawaii, 2014; Massachusetts, 2014; Missouri, 2013; Montana, 2013; Nebraska, 2011; New York, 2011; North Carolina, 2013; Ohio, 2005). In considering the preparation of teacher candidates, one must consider how differentiation is taught in both theory and in practice. What is the current use of differentiation within higher education classrooms? This study investigated the perceptions of teacher candidates in regard to differentiated instruction (DI) in their higher education (HE) classrooms. Did candidates feel they were taught the concept of differentiation, and did they feel it was modeled? Are teacher education professors modeling what they teach in terms of differentiation?

As teacher evaluation takes hold in initial licensure and professional evaluation, a major component is the performance of teachers, in particular their ability to differentiate their instruction to meet the needs of all students in the classroom. Both national teacher performance assessments (edTPA) and state standards for the teaching profession (Alabama, 2014; Connecticut, 2014; Hawaii, 2014; Massachusetts, 2014; Missouri, 2013; Montana, 2013; Nebraska, 2011; New York, 2011; North Carolina, 2013; Ohio, 2005) call for teachers to engage in differentiation for the purpose of meeting student needs, "Teacher's differentiate instruction to support the learning needs of all students" (Ohio Department of Education, 2007, p. 12).

Prior studies and articles (Chamberlin, 2011; Chamberlin & Powers, 2010; Gould, 2004; Griess & Keat, 2014; Huss-Keeler & Brown, 2007; Pham, 2012; Sands & Barker, 2004; Santangelo & Tomlinson, 2008) have been the starting point for the discussion of whether or not teacher candidates have been exposed to the theory and practice of differentiation. Brimijoin (2002) has moved the conversation forward to look at the experience of pre-service teachers in regards to exploring their experiences with differentiation in the classroom. In being able to master the competency of meeting the needs of all students in the classroom, teacher candidates must have a working understanding of differentiation. The current state of teaching includes DI as part of standards for the teaching profession in many states (Alabama, Connecticut, Hawaii, Massachusetts, Missouri, Montana, Nebraska, New York, North Carolina, Ohio). This study contributes to candidates building competency by exposing the current practice of differentiation from the candidates' perspectives.

Four research questions frame the study: (1) What is the level of familiarity of DI for pre-service students by program; Early Childhood Education(ECE), Middle Childhood Education (MC), Adolescent and Young Adult (AYA) and Intervention Specialist (IS)? (2) What is the level of familiarity of DI for pre-service students by year in program (freshman, sophomore, junior, senior)? (3) What is the difference in student identification of courses that model DI by program (ECE, MC, AYA, IS)? (4) What is the relationship between exposure to DI (through modeling) and plans for future use in classroom instruction?

DIFFERENTIATED INSTRUCTION VS. CURRICULUM DIFFERENTIATION

Differentiation, both within instruction and curriculum, has become a common part of the culture of K-12 schools (Rice, 2012). This term, differentiation, has been used in a number of ways to mean a number of different things. When looking at education literature there are three main ways that this term can be used: curriculum differentiation, differentiated instruction, and then there are researchers that simply use the term differentiation alone to encompass everything, 2011). Curriculum differentiation refers to students enrolling and participating in a variety of different courses (Ayalon, 2006) or a completely different educational program than other students based on their personal academic ability levels (Schofield, 2010). Differentiated instruction (DI) concerns what is taking place, educationally and instructionally, within one specific classroom that has a variety of ability levels within it (Tomlinson, 2000b). For the purpose of this study we are going to be discussing and referring only to DI.

Definition of Differentiated Instruction

DI is considered to be a different way of thinking in comparison to a typical standardized method of teaching (Tomlinson, 2000b). This educational practice is based around a specific set of attitudes about how children learn, with the most general belief that all students are individuals and, therefore, no single student learns in exactly the same way as another student (Tomlinson, 1999). Parsons, Dodman, and Burrowbridge (2013) describes DI as being a "different way to offer content, engage students in learning, and provide opportunities for varied end product" (p. 39). When using DI, teachers essentially become allies with their students in creating educational plans more suited to individual wants, needs, and personal interests. Educators hold high expectations for their students while using DI, constantly challenging them to achieve their goals and continue to exceed them. Teachers need to know the students' personal interests, readiness to learn (Tomlinson et al., 2003), strengths, individual learning styles, and academic needs (Beecher & Sweeny, 2008). They need to be able to appropriately challenge and support all of their students in ways that will best benefit each student (De Jesus, 2012). The goal of DI is not to compare the students to one another, but to acknowledge the progress each student is achieving, no matter how small or large, without bias (Tomlinson, 1999).

According to Tomlinson (2000a), there are four different areas within the classroom in which an educator can differentiate: the content being taught, the process in which the content is being presented, the products that are being created by the students, and atmosphere of the learning environment. One, a few, or all of these areas can be altered at any time, depending on the needs of the specific child in question. DI is, by design, not intended to be used only if a child is struggling to keep up in class;

differentiation is also for a child that is not being challenged enough (Coleman, 2001). According to King-Sears (2008), instruction that is only differentiated for students on the lower end of the ability spectrum is not truly differentiated instruction. DI is not a substitute for quality education practices; rather, it is an additional tool that can be used to enhance already high quality practices (Tomlinson et al., 2003).

Differentiation in Higher Education

The major body of work on DI has been to establish the place for differentiation in the K-12 setting (Rice, 2012). A number of studies have been conducted and articles written that demonstrate differentiation is occurring in higher education classrooms (Chamberlin, 2011; Chamberlin & Powers, 2010; Griess & Keat, 2014; Hirsh, 2013; Huss-Keeler & Brown, 2006; Joseph, et al., 2013; Mok, 2012; Sands & Barker, 2004; Santangelo & Tomlinson, 2008; Varasvsky & Rayner, 2013;). Of those studies conducted, two common themes exist: faculty documenting their approaches to teaching and instruction in a specific course (Chamberlin & Powers, Huss-Keeler & Brown, 2007; Griess & Keat, 2014; Joseph, Thomas, Simonette & Ramsook, 2013; Sands & Barker, 2004; Santangelo & Tomlinson, 2009; Mok, 2012; Varsavsky & Rayner, 2013), and studies centered around education majors (Chamberlin & Powers, 2010; Huss-Keeler & Brown, 2007; Griess & Keat, 2014; Joseph et al., 2013; Sands & Barker, 2004; Santangelo & Tomlinson, 2009).

Huss-Keeler and Brown (2007) studied the role of differentiation in a math methods course for early childhood majors. Their research focused on graduate students in a cross-listed course. Huss-Keeler and Brown (2007) used the approach of differentiation to tackle a common problem in higher education, small class sizes requiring the combination of multiple classes to create cross-listed or double-numbered courses, in this case, a course for both math methods and math elective students in early childhood education.

Adding to the current issue, candidates from multiple in the process of different programs of study, Greiss and Keat (2014) explored the intentional design of an early childhood course using DI to meet the needs of graduate, undergraduate, and non-degree seeking students. Their exploration was through the eyes of two separate faculty members who taught the same course in different years (2005, 2011). Both instructors discussed the issue of intentional design to meet the needs of the students, as well as juggling the candidate expectations and course requirements. The findings suggest that differentiation was intentional from the instructors' perspectives as a means for meeting students' needs. Course evaluations are mentioned in the article, but references to student identification of specific examples of differentiation are absent.

Studies that describe the use of differentiation in higher education have also been done with multiple licensure areas (elementary, secondary, and special education) at the graduate level (Sands & Barker, 2004). Similar to past studies (Griess & Keat, 2014), the emphasis of intentional design and instruction of teaching differentiation by modeling differentiation was explored by Sands and Barker (2004) with an overview of how they utilized one class session during a term to teach differentiation by modeling differentiation. A major theme of Sands and Barker's study included pre-service teacher candidates who "appreciated concretely doing and experiencing the topic we were covering in class. In other words, they felt that our teaching was authentic in that we were practicing what we were preaching" (p. 42).

Continuing research with early childhood majors, Santangelo and Tomlinson, (2008) explored three areas of research in DI at the graduate level: how does DI support student learning; how do students perceive DI in a higher education course; and what strategies help students achieve the outcomes of the course? Their self-study found that students were successful in achieving the objectives of the course through DI. The students also were able to articulate, through open questions, how they felt DI helped them to be successful. Finally, the three areas in which students identified DI as being important to their success included students as diverse learners, students as having diverse "interests, experiences, and goals," and students having "diverse personal circumstances" (Santangelo & Tomlinson, 2008, p. 317). Joseph and associates also explored the use of DI in a second year, undergraduate education course. Using a control and treatment group (those in a course with DI), students were surveyed and grades were

compared. Findings suggest a difference between the grades, with the students in the DI classroom "generally obtaining higher grades than their counterparts who were taught in the traditional whole class instructional setting" (2013, p. 37). Regarding data collected through surveys, Joseph and associates (2013) also found that the majority of students made comments suggesting they would use differentiation in their future classrooms.

In considering the impact of DI on student learning, Santangelo and Tomlinson (2008) state that the use of DI had "a positive and meaningful impact on student learning" (p. 316). In another study, Chamberlin and Powers (2010) also found DI to have an impact on student learning. Chamberlin and Powers (2010) studied the use of differentiation on student learning in a math course designed for undergraduate early childhood education majors. Their findings suggest that the differentiation was a means to instruct students and played a role in impacting student mathematical understanding. Student perceptions were also studied by Chamberlin and Powers (2014), who compared the perceptions of students in the treatment group (a course employing differentiation instruction) to students in the control group. They found that those students in the treatment group responded in a manner that was consistent with students identifying practices in the classroom reflective of differentiated instruction. Chamberlin (2011) further explained the findings of the Chamberlin and Powers (2010) study by focusing the research on asking students how they plan to integrate differentiation in their future instruction. Findings suggest that students are likely to use those strategies modeled in the course in their future practice (Chamberlin, 2011).

While the majority of studies investigating differentiation in higher education have been conducted with teacher education candidates (Chamberlin & Powers, 2010; Huss-Keeler & Brown, 2007; Griess & Keat, 2014; Joseph et al., 2013; Sands & Barker, 2004; Santangelo & Tomlinson, 2009) and an evaluation of a professional development course for university faculty on DI (Sikka, Beebe, & Bedard, 2011), a few have looked outside the education major (Ernst & Ernst, 2005; Hirsch, 2013; Mok, 2012; Varsavsky & Rayner, 2013). Mok (2012) used take home assignments for an undergraduate course in programming. The findings suggest that students were more motivated to engage in their assignments due to DI. Exploring science course work, Varsavsky and Rayner (2013) employed alternative assessments for students who required more challenging work. Neither Mok (2012) or Varsavsky and Rayner (2013) documented student gains, however both studies looked at the perception of students in regard to motivation and engagement. Hirsh (2013), in studying the use of DI in an RN-BSN program, also found that DI had an impact on engagement. Ernst and Ernst (2005) studied undergraduate students who found the modeling of DI throughout a political science course was a means for creating challenging and rewarding learning opportunities that supported student interest.

Gould (2004) suggested that university faculty must both model and share with pre-service teachers their differentiated instruction in university courses. Pham (2012) established the need to integrate both the practice and the theory into of differentiation into teacher education courses. Through her review of the practice of differentiation and its application in higher education classrooms, Pham emphasizes the role of differentiation as a "new pedagogy that can promote practical integration and knowledge transformation" (2010, p. 17), and as an approach that is necessary in the university classroom where the diversity of learners is ever expanding (Lightweis, 2013).

Review of research at the higher education level reveals that differentiated instruction (DI) is a means for meeting the needs of diverse students as well as diverse student needs (Chamberlin, 2011; Greiss & Keat, 2014; Santangelo & Tomlinson, 2008), both with students who have been exposed to a range of teaching experiences and when combining courses with varying requirements (Huss-Keeler & Brown, 2007) is an appropriate approach to teaching about differentiation (Sands & Barker, 2004). DI has also been shown to be effective as a means to help students make gains in their understanding of content (Chamberlin, 2011; Chamberlin & Powers, 2010) and as an instructional approach designed to help students achieve the objectives of a course (Santangelo,& Tomlinson, 2008). The review of previous research has shown that there is foundational faculty documentation of ways that DI been implemented in their university courses (Chamberlin, 2011; Chamberlin & Powers, 2010; Griess & Keat, 2014; Huss-Keeler & Brown, 2007; Sands & Barker, 2004; Santangelo & Tomlinson, 2008; Mok, 2012; Varsavsky &

Rayner, 2013). Addressing differentiation from the perspective of the teacher (higher education instructors and faculty), Santangelo and Tomlinson (2012), surveyed teacher educators to assess their perceptions and use of DI practices. Findings suggest that modeling is not occurring consistently in higher education settings.

Lacking in the literature, however, is an abundance of studies that look at the view of differentiation from the student perspective. Chamberlin and Powers (2010), Chamberlin (2011), Ernst and Ernst (2005), Joseph, et al., (2013) and Santangelo and Tomlinson (2008) remain the few voices in documenting and reporting student experiences of DI in higher education courses, while Chamberlin and Powers (2010), Chamberlin (2011), Edwards, Carr, and Siegel (2006) and Joseph, et al., (2013), remain the only studies that evaluate student's opinions on their future practice in using DI in their future K-12 classrooms.

Methods

In order to identify students' familiarity with differentiation, their perceptions of DI in higher education and to gather data regarding their licensure programs: Early Childhood Education (ECE), Middle Childhood Education (MC), Adolescent and Young Adult (AYA) and Intervention Specialist (IS), and their year in the program, a ten-question survey was created. Students were asked to determine their level of familiarity on a scale of 1 to 10, with 1 being unfamiliar and 10 being familiar. Familiar was explained to students as their basic understanding with the specific concept of differentiated instruction (DI). In prior studies, candidates were asked about their experiences in a specific course, the one in which the students were currently enrolled (Chamberlin & Powers, Huss-Keeler & Brown, 2007; Griess & Keat, 2014; Joseph et. al., 2013; Sands & Barker, 2004; Santangelo & Tomlinson, 2009; Mok, 2012; Varsavsky & Rayner, 2013). This study broadened that assessment by asking students to review course work over their entire program and determine the number of courses in which instructors had modeled differentiation, thus deviating from past research in which candidates had been asked to reflect only on an individual course. Prior to asking students to determine if they had experienced DI being modeled in higher education courses, it was necessary to determine their level of familiarity with DI.

Few studies (Chamberlin & Powers, 2010; Chamberlin, 2011; Edwards et al., 2006; Joseph, et al., 2013) have asked students about their future practices. For this study, candidates were asked to predict their future use of differentiation in their classroom by responding to the question, "How often do you, in general, plan to use Differentiated Instruction in your future classroom?" Students selected one of four responses: never, rarely, often, or always. Finally, demographic questions were used to determine candidates' gender, year in the program (freshman, sophomore, junior, senior) and licensure program [Early Childhood Education (ECE), Middle Childhood Education (MC), Adolescent and Young Adult Education (AYA) and Intervention Specialist (IS)].

Participants

A total of 316 undergraduate students from a mid-western Catholic institution were surveyed on their perceptions, experiences, and level of familiarity with differentiation. Of the 316, 90 failed to complete the survey and demographic questions and 8 students identified themselves as undecided with their licensure area. Surveys not completed or grouped as undecided were not used in the data analysis. Students results were grouped based on their enrollment in one of four different programs (ECE, MC, AYA, IS) and their year in the program (Freshman, Sophomore, Junior, Senior). Breakdowns of program and year are presented in Table 1.

TABLE 1
PARTICIPANT PROGRAM AND YEAR IN PROGRAM (N=219)

	Year in Program				
	Freshman	*Sophomore*	*Junior*	*Senior*	*Total*
ECE	18 (8.2%)	34 (15.5%)	4 (1.8%)	49 (22.4%)	105 (47.9%)
MC	5 (2.3%)	3 (1.4%)	4 (1.8%)	21 (9.6%)	33 (15.1%)
AYA	8 (3.7%)	11 (5.0%)	7 (3.2%)	22 (10.0%)	48 (21.9%)
IS	4 (1.8%)	5 (2.3%)	0 (0.0%)	24 (11.0%)	33 (15.1%)
Total	35 (16%)	53 (24.4%)	15 (6.8%)	116(53.0%)	219 (100%)

Data were collected in multiple education courses. All surveys were collected during the course time and reminders were given for students omit their names from the surveys.

Data Analysis and Results

Level of Familiarity

On a scale of one to ten, teacher candidates were asked to rate their level of familiarity with DI. Analysis of the data revealed that the data (level of familiarity) was non-normally distributed, therefore a Kruskal-Wallis Test was run first for the independent variable of year, and a second analysis was run for the independent variable of program. In both analyses, the level of familiarity was run as the dependent variable. For the first analysis, the year in the program was significant, Kruskal-Wallis Test = (3, N= 219*)* =125.6, p < 0.05, at the 0.05 alpha level. The effect size was 0.58. Follow-up tests were conducted to evaluate the pairwise comparisons among the four groups. The results of these tests indicated a significant difference among all years in the program, see Table 2 for means, medians, and standard deviations. Mean ranks are presented with each year comparison. Freshman (32.99) differed significantly from the sophomores (52.10), U= 524.5 , p <0.025*,* A= 0.28. Freshman (19.91) differed significantly from Juniors (38.53), U= 67.0 , p <0.025*,* A= 0.12, and Freshman (21.86) differed significantly from Seniors (92.34), U= 135.0, p <0.025*,* A= 0.03. Pairwise comparisons found that Sophomores (31.47) differed significantly from Juniors (45.20), U= 237.0 , p <0.025*,* A= 0.29, and Sophomores (36.13) differed significantly from Seniors (107.33), U= 484.0 , p <0.025*,* A= 0.07. In the final pairwise comparison, Juniors (33.27) differed significantly from Seniors (70.23), U= 379.0 , p <0.025*,* A= 0.21.

TABLE 2
YEAR IN PROGRAM WITH FAMILIARITY SCALE SCORES

	Year in Program			
	Freshman (N=35)	*Sophomore (N= 53)*	*Junior (N= 15)*	*Senior (N=116)*
Means	2.62	4.35	6.13	8.26
Median	2.00	4.00	8.00	8.00
Standard Deviation	2.01	2.30	2.38	1.41

For the second independent variable, program (ECE, MC, AYA, IS) was significant, Kruskal-Wallis Test = (3, N= 219) = 10.37, p = 0.016, at the 0.05 alpha level. Follow up tests were conducted to evaluate the pairwise comparisons among the four groups. The results of those tests indicated significant difference between the two distributions of ratings for multiple program areas. The mean rank of familiarity for the ECE (65.75) and IS (81.42), using a Mann-Whitney U test was significantly different, U= 1339.0, p <0.025, A= 0.38, between MC (48.18) and AYA (36.06) U= 555.0, p <0.025, A= 0.73, and AYA(34.00) and IS (51.18)U= 456.0, p <0.025, A= 0.28. See Table 3 for means, median, and standard deviations for program with familiarity scale scores.

TABLE 3
PROGRAM WITH FAMILIARITY SCALE SCORES

	Program			
	ECE (N= 105)	*MC (N= 33)*	*AYA (N= 48)*	*IS (N=33)*
Means	6.04	6.84	5.68	7.27
Median	7.00	8.00	6.00	8.00
Standard Deviation	3.07	2.85	2.51	2.75

Student Identification of Modeling of Differentiation

Students were asked to identify the number of specific courses in which they believed the instructors modeled differentiation. As the data was not a normal distribution, a Kruskal-Wallis test was run to determine the difference between programs with the number of course as the dependent variable. Analysis revealed a significant difference, Kruskal-Wallis = (3, N= 219) = 9.68, p = 0.02, at the 0.05 alpha level. Multiple Mann-Whitney U(s) were run as follow up tests to determine which programs were significantly different. Mean ranks are presented with each significant difference. The results of the analysis revealed that a difference existed between ECE (82.54) and AYA (64.88) U= 1938.0, p <0.025, A= 0.48, MC (48.73) and AYA (35.69) U= 537.0, p <0.025, A= 0.72, AYA (36.29) and IS (47.85) U= 566.0, p <0.025, A= 0.35. A breakdown of the programs and number of courses is presented in Table 4.

TABLE 4
PROGRAM WITH NUMBER OF COURSES WITH DI MODELED (% per program)

	Program				
	ECE (N= 105)	*MC (N= 33)*	*AYA (N= 48)*	*IS (N=33)*	Total *(N=219)*
0 Courses	34 (32.3%)	9 (27.2%)	22 (45.8%)	8 (24.2%)	73 (33.3%)
1-3 Courses	47 (44.7%)	14 (42.4%)	24 (50.0%)	19 (57.6%)	104 (47.5%)
4-6 Courses	22 (20.9%)	8 (24.4%)	2 (4.2%)	4 (12.1%)	36 (16.4%)
7 or More	2 (1.9%)	2 (6.0%)	0 (0.0%)	2 (6.1%)	6 (2.7%)

Student Plans for Future Use of DI

As a follow-up to students selecting a response (0, 1-3, 4-6, or 7 or more courses), students were asked to list the courses in which they recognized that differentiation was modeled. Using the student's listing of courses (total number) in which DI had been modeled and the student's plans for future use, a correlation was run to determine the relationship between number of course modeled and student's plans for future use. As the data was not normally distributed, Spearman R was conducted. Analysis revealed a weak, positive correlation between number of courses that modeled DI and students' plans for future, which was statically significant Spearman R= (219) = 0.284, p = 0.000). The strength of the correlation would be described as low (Best & Kahn, 2006). Squaring the correlation coefficients indicated that 8 percent of the variance in number of courses that modeled DI as identified by students was explained by the student's plans for future use. Table 5 presents the breakdown of student's future plans for differentiation by program.

TABLE 5
PRGRAM WITH FUTURE PLANS FOR DIFFERENTIATION WITH PROGRAM PERCENTAGES (N= 219)

	Program				
	ECE *(N= 105)*	*MC* *(N= 33)*	*AYA* *(N= 48)*	*IS* *(N=33)*	Total *(N=219)*
Never	4 (3.8%)	0 (0.0%)	3 (6.2%)	1 (3.0%)	8 (3.6%)
Rarely	2 (1.9%)	2 (6.0%)	8 (16.6%)	0 (0.0%)	12 (5.4%)
Often	83 (79.0%)	20 (60.6%)	30 (62.56%)	14 (42.4%)	147 (67.1%)
Always	16 (15.2%)	11 (33.3%)	7 (14.5%)	18 (54.5%)	52 (23.2%)

Discussion

This goal of the study was to access the current climate of the higher education classroom by looking at the perceptions of teacher candidates and their experiences in the HE classroom. Previous research on the topic of differentiation in higher education has focused on faculty describing their practices with integrating differentiation in specific university classrooms, with only two previous studies exploring the experiences of education majors (Chamberlin & Powers, 2010; Santangelo & Tomlinson, 2008). The purpose of this study was to document the students' views of differentiation beginning with their familiarity with the topic, as well as their experiences in university classrooms with faculty modeling of differentiation. The final areas to be addressed were students' plans for future use of DI in their own classrooms.

A foundation of understanding students' familiarity of differentiation, considering both their program and their year in the program, established that a difference existed between year in the program as well as specific programs. Reviewing the data, the means of the four groups, Freshman (M= 2.62), Sophomore (M= 4.35), Junior (M= 6.13), and Senior (M= 8.26), demonstrated that each year students increased in their level of familiarity. The growth of students during their university years is encouraging and speaks to the content and learning occurring in university classrooms (higher education). Differences in student levels of familiarity with DI appear between specific programs, ECE (M= 6.04) and IS (M=7.27), MC (M=6.84) and AYA (M=5.68), and AYA (M= 5.68) and IS (M=7.27). In reviewing the differences, it could be suggested that modeling differentiation plays an important role in specific programs to meet the needs of individual students. Past research on differentiation in higher education classrooms has been mostly documented with students in early childhood education (Chamberlin & Powers, 2010; Greiss & Keat, 2014; Huss-Keeler & Brown, 2007), while a few studies have explored DI in multiple licensure areas (elementary, secondary, and special education) (Joseph et. al., 2013; Sands & Barker, 2004; Santangelo & Tomlinson, 2009). Future research must be conducted to make an accurate assessment of differences between programs and the implications of those differences.

Students were asked to identify specific courses in which they had recognized differentiation being modeled. To assess differentiation in the past, researchers had asked students to review a specific course in which they were enrolled (Chamberlin & Powers, Huss-Keeler & Brown, 2007; Griess & Keat, 2014; Joseph, et. al., 2013; Sands & Barker, 2004; Santangelo & Tomlinson, 2009; Mok, 2012; Varsavsky & Rayner, 2013). However, this study is unique in that it asked students to review their program-to-date for courses in which instructors modeled differentiation. A review of the number of courses and the programs in which candidates were enrolled revealed that a difference existed between ECE and AYA, MC and AYA, and AYA and IS. In comparing ECE and AYA, the majority of ECE students [71 (67.6%)] reported that they had one or more courses in which DI had been modeled, while only a little over half [26 (54.2%)] of AYA students responded that DI had been modeled. In comparing MC, only nine (27%) reported that they had not seen DI modeled, in comparison to AYA where 22 (45.8%) responded they had not seen DI modeled in a higher education classroom. Finally, 25 IS students (71.7%) reported that DI had been modeled in a HE classroom, while in contrast 22 (45.8%) AYA students reported that DI had not been modeled in a higher education classroom. Of the total students surveyed, 73 (33.3%) reported that DI had not been modeled, while a total of 140 students (80.8%) responded that DI had been modeled in 1-6 classes. As this study did not ask students about types of classes, education general courses or program specific courses, the findings need to be further reviewed for course titles, content, and program.

The final question addressed by this research was future use of DI in classroom instruction, specifically student's plans to utilize DI in their own classes and the relationship to number of courses where DI was modeled. Prior research has been limited on studies that addressed student future use (Chamberlin & Powers, 2010; Chamberlin, 2011; Edwards et al, 2006; Joseph et al., 2013). In previous studies, students had been asked to rate their level of frequency for future use (Edwards et al., 2006), complete a survey with statements on their agreement to differentiate (Joseph et al., 2013), or have written open ended responses on their future plans to differentiate (Chamberlin, 2011). In this study the total number of candidates 199 (90.8 percent) who plan to differentiate, either often or always, is comparable to prior research (Joseph et al., 2013) where findings indicated that 88 percent of respondents planned to use DI in their future teaching. This study also wanted to determine the relationship between the number of courses in which candidates identified differentiation being modeled and their future use in the classroom. The analysis failed to detect a strong relationship between the two variables. Best and Kahn (2006) refers to the relationship as low (p. 388).

Two areas that support the relevancy of this topic are the survey findings documenting pre-service teacher candidates' exposure to differentiation and their implications for policy change to encourage instruction in higher education to model differentiation. Intended outcomes of this research are changes in instruction to support the expectations of the standard. Findings of this study suggest that teacher candidates are becoming more familiar with DI over the course of their years in a university teacher education program. Differences do exist among programs in candidates' level of familiarity of DI. Differences also exist among programs with the number of courses in which candidates reported that DI was modeled. As it has been suggested that modeling DI is important in higher education (Gould, 2004; Lightweis, 2013; Pham, 2012), it is recommended that future research investigates the specific courses in which candidates document the modeling of DI. As the current trend of teacher assessment (K-12) requires the documentation of instruction to meet the needs of students, it is to be suggested that higher education institutions will adjust to better meet the needs of their students through the use of differentiation.

Limitations of this study include the limited number of candidates in specific licensure programs. Although this study is a key factor in overall program evaluation for a specific university, the strength of this study would be improved by the inclusion of candidates from a range of other universities and licensure programs. Future research should continue to examine the overarching view of students from a variety of university and licensure programs, and investigate their experiences in developmental understanding of (DI), as well as its identification and application. It is recommended that future research consider the merits of implementing professional development for faculty (Sikka, Bebbe, & Bedard, 2011) as a means to support student learning in higher education.

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