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Differentiated Instruction in Information Literacy Courses in Urban Universities: How Flipping the Classroom Can Transform a Course and Help Reach All Students

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Abstract

Urban universities enroll highly diverse student bodies by every measure of “diversity.” In addition to different learning styles students may innately possess, many aspects of diversity impact the way they learn. Despite having diverse students, information literacy instructors in urban universities may approach teaching by attempting to reach the “average student,” even when there is little to no homogeneity among students. A differentiated instruction approach invites instructors to design various teaching and assessment devices in an attempt to appeal to how students learn differently. In order for differentiated instruction in information literacy to work, most classroom time should be dedicated to students working alone or in groups to learn and apply the material by the means that best complements how they learn. This article presents a discussion of the research on the impact of cultural diversity on learning, explains differentiated instruction and how it allows information literacy instructors to better reach a diverse group of students, and advocates for the adoption of a flipped classroom teaching approach to allow for the transformation of classroom time into a tutorial model where varied differentiated instruction opportunities can co-exist to support students of all learning styles and backgrounds.

Keywords: information literacy, differentiated instruction, flipped classroom, learning styles, diversity, culture, critical information literacy

Introduction

Historically, teaching at all grade levels took a one-size-fits-all approach. Teachers prepared lesson plans with the goal of reaching the greatest percentage of students, ordinarily those of average academic ability and fairly homogenous backgrounds. Assigned reading and in-class lectures were the dominant way of conveying

information to students, and tests or written assignments were most often used for assessment of students' understanding of the material. This uniformity, commonly referred to as "teaching to the middle," often left high-performing students unstimulated by the material while poor-performing students struggled. As for those whose cultural backgrounds differed from the majority, any impact their background had on their learning was largely ignored by instructors.

Research into differences in learning ability and learning styles among students has led to changes in how many educators approach teaching. Instructors now understand the importance of considering learning abilities and learning styles when designing their lessons and interacting with students. Studies have also shown that cultural influences in a student's life—often tied to aspects of their background such as ethnicity, national origin, socioeconomic status, gender, religion and so on—impact how they learn. In urban higher education settings, instructors encounter rosters of students with vastly diverse backgrounds and often struggle with lesson planning that will appeal to how their diverse students learn.

Differentiated instruction, a teaching and assessment technique where educators make available several means of both conveying course content to students and also assessing their understanding of that material, allows instructors to design course materials in ways that reach students of different abilities, learning styles, and cultures. Rather than focusing on the learning needs of the average student with the most common cultural background among a class, differentiation allows students to choose among several means of learning and applying course material in the way they believe best works for them.

Information literacy courses contain the flexibility needed for differentiated instruction because course content does not necessarily have to be delivered in-class for students to understand it and most courses already contain in-class exercises or other active learning components that are commonly used in differentiated instruction. With the diverse student bodies in urban universities, differentiated instruction may allow librarians who teach information literacy courses to help students acquire the desired knowledge and skills using teaching tools that best appeal to how they learn while empowering them to become more actively engaged in their learning. Adopting a critical information literacy approach may further learning empowerment by questioning the power structures present in the production and dissemination of information. However, sufficient classroom time needs to be set aside for differentiated instruction to work. This article presents a summary of the research on the impact of cultural diversity on learning, explains differentiated instruction and critical information literacy and how together they allow information literacy instructors to better reach a diverse group of students, and advocates for the adoption of a flipped classroom teaching approach to allow for the transformation of classroom time into a tutorial model where differentiated

instruction opportunities can co-exist to support students of all learning styles and backgrounds.

Learning Styles and the Impact of Culture on Learning

Most educators are familiar with one or more learning styles models that categorize how people learn based on personal characteristics that impact how they innately perceive new information (perceptual models), the manner through which they best absorb and retain information presented to them (cognitive models), their approaches to processing information and forming ideas (also cognitive models), or their attitudes and behaviors when engaging in learning (affective models) (James & Gardner, 1995, p. 20; Coffield, Moseley, Hall, & Ecclestone, 2004, p. 42; Zapalska & Dabb, 2002, p. 79). As awareness of research on learning styles has grown among educators, many have adapted the way they teach in order to accommodate differences in how students learn (Dunn, Honigsfeld, & Doolan, 2009, p. 137; Coffield et al., 2004, pp. 1–3). However, because of the the large number of learning styles models proposed by education researchers, it would be impossible for any educator to redesign a course to accommodate every learning style difference that has been identified.

In their systematic review of learning-style models, Coffield et al., (2004) acknowledge that “the research field of learning styles is both extensive and conceptually confusing” (p. 8). The differences between perceptual, cognitive, and affective learning style models are best understood by examining examples from each category. One widely know perceptual model focused on the sensory pathways that a learner prefers for engaging with new information is the visual, aural, reading-writing, and kinesthetic learning styles model, often referred to as VARK (Jacobson, 2001, pp. 150–151; Zapalska & Dabb, 2002, p. 84). While traditional in-class lecturing and written assignments appealed to two perceptual VARK learning styles, aural and reading-writing, the use of multimedia teaching tools and non-written in-class exercises are now more common as instructors seek to best accommodate different learning styles through a variety of instructional delivery methods and activities.

David Kolb’s experiential learning model is a cognitive model that identifies four learning styles based on how one experiences learning and assimilates information (Kolb & Kolb, 2005; Coffield et al., 2004, pp. 61–62; Beausaert, 2013, p. 51). Kolb’s model is rooted in his view that the process of learning occurs in four fundamental modes—two modes for perceiving information and two for processing information (Kolb & Kolb, 2005, p. 194; Coffield et al., 2004, p. 61). The two modes of perceiving information are either through the feelings one experiences from being involved in a new learning situation he calls the “concrete experience” (CE) mode, as opposed to a mode of creating theories through logical analysis to explain one’s observations using “abstract conceptualization” (AC). The processing of information occurs as

either a “reflective observation” (RO) from reflecting on one’s past experiences or watching and listening to others’ experiences and reflecting on them, in contrast to taking action oneself or influencing others to engage in “active experimentation” (AE) (Kolb & Kolb, 2005, p. 194; Yamazaki & Kayes, 2007, 1375-1376; Coffield et al., 2004, p. 61). Each learning style in Kolb’s model is comprised of one perceiving mode and one processing mode for which the learner demonstrates a preference, often measured using Kolb’s Learning Style Inventory (Kolb & Kolb, 2005, p. 194; Coffield et al., 2004, p. 61). The diverging style learner’s traits indicate a preference for CE and RO, assimilating style learners merge AC and RO, converging style learners display both AC and AE traits, and accommodating style learners show a preference for CE and AE (Kolb & Kolb, 2005, p. 194; Coffield et al., 2004, p. 61).

The Grasha-Riechmann Learning Style Scales is an affective model that uses three binary pairs of attitudes and behaviors to describe learners’ social interactions related to learning—avoidant or participative, competitive or collaborative, and dependent or independent (Grasha, 1994; Baykul et al., 2010). Teachers can have students at times work in small groups and at times work alone, or give students the choice, to ensure that not all learning experiences favor the preferences of dependent learners over independent learners, or vice versa. Likewise, instructors can design some learning opportunities where students compete against their peers and others where they work collaboratively, in order to balance the preferred approaches to engagement with new information by appealing to their various affective learning styles (Yassin & Almasri, 2015, p. 32). While participative students seek to fully engage in their learning, it may be difficult for instructors to accommodate avoidant students who show no interest in learning (Grasha, 1990, p. 25).

Additional research into learning styles has revealed that cultural backgrounds can also impact how one learns (Auyeung & Sands, 1996; Yamazaki & Kayes, 2007; Omidvar & Tan, 2012, pp. 276–279). The concept of “culture” can be considered to include “shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across generations” (House, Hanges, Javidan, Dorfman, & Gupta, 2004, p. 15). Research has shown that adopting a “one-size-fits-all” teaching style is inherently exclusionary of students whose cultural backgrounds differ from the majority and inhibits efficient and effective learning (Wynd & Bozman, 1996) because students of different backgrounds engage course materials in different ways (Packard, 2011, p. 146).

Most researchers who study the relationship between culture and learning style share five common assumptions about the students they study (Guild, 1994, pp. 18–19):

1. Students in different age groups differ in how they learn.
2. Both nature and nurture impact one’s learning style.

3. Learning styles are neutral, meaning that adapting instruction to a particular learning style can be successful for some students but can also be a barrier to learning for other students.
4. Learning styles cannot be generalized to apply to an entire group of people with a common culture because as much as there are common traits within a group, there are also numerous differences.
5. There are often cultural conflicts between some students' socialized behavior at home and the cultural norms imposed on them at school, forcing them to adapt to the classroom norms in order to succeed academically.

Several cross-cultural studies have attempted to assess whether differences in learning styles exist between college or graduate students in the same discipline but from different countries who were working on degrees in their home country. For example, one study compared Australian, Hong Kongese and Taiwanese accounting students using Kolb's Learning Style Inventory (Auyeung & Sands, 1996). The researchers found that students from Chinese cultures demonstrated significantly stronger adherence to traits aligned with the reflective (RO) and abstract (AC) modes and less so for active (AE) and concrete (CE) modes than the Australian students (Auyeung & Sands, 1996, p. 272). As stated in the fourth assumption above, these differences cannot be generalized to apply to all Australian students or those from Chinese cultures (Omidvar & Tan, 2012, p. 275). They should only be used to show that certain learning style traits are more likely to be found in one culture when compared to another.

Other studies administered learning style assessments to cohorts of employees doing the same job in the same industry, but raised in different countries. One study used Kolb's Learning Style Inventory to assess the learning styles of Japanese expatriates working as managers for multinational corporations on overseas assignments in the United States and compared them to American managers in the same multinational corporations (Yamazaki & Kayes, 2007). The Japanese managers were divided into four cohorts based on how long they had worked in the U.S.: less than one year, one to less than two years, two to less than three years, and three or more years. Yamazaki and Kayes found that the American managers displayed a preference for the converging learning style because of predominant abstract (AC) and active (AE) traits. On the other hand, Japanese expatriates preferred the diverging learning style because of their concrete (CE) and reflective (RO) traits. With time, Japanese managers transitioned from RO to the AE mode as they spent more time in the U.S., revealing that exposure to a different set of cultural practices in the workplaces can result in changes in learning traits with time (pp. 1390–1391).

In a nine-year study by Tempelaar, Rienties, Giesbers, and van der Loeff (2013), cultural differences among 7,300 undergraduates from 81 countries enrolled in the same course at the same university were studied to explore how their learning-

related dispositions differed. “Learning-related dispositions” include not only learning styles, but also incorporates implicit theories of intelligence, effort beliefs, academic motivation, achievement goals, and learning attitudes (p. 3). The learning styles component of learning-related dispositions was assessed using Vermunt’s Inventory of Learning Styles model that breaks learning down into four domains: cognitive processing strategies, metacognitive regulation strategies, learning conceptions or mental models of learning, and learning orientation (Tempelaar et al., 2013, p.8; Coffield et al., 2004, pp. 103–109). Each domain is further divided into five scales, resulting in a complex model that can provide a more complete analysis of one’s learning style, but will not be explained here in greater detail because of its complexity.

The cultural differences among the students in the Tempelaar et al. (2013) study were measured using Hofstede’s six cultural dimensions, which is not a learning style model but a framework for cross-cultural communications used to examine cultural differences. The first, *power distance*, measures the expectation by less powerful members of a group that an unequal distribution of power will exist in the group. Next, *uncertainty avoidance* measures a group members’ tolerance for uncertainty and ambiguity. The third dimension, *individualism versus collectivism*, indicates whether a group operates with loose ties between members with the expectation that everyone cares for themselves and their family, or strong ties between members where there is a supportive, integrated collective. Fourth is the *masculine-feminine* dimension of a culture, with masculine cultures having distinct emotional gender roles and feminine cultures having overlap between emotional gender roles. The fifth dimension measures whether a society values fulfillment of present needs more so than future rewards (*long-term versus short term*), while the sixth measures *indulgence* in human drives that lead to the enjoyment of life versus cultural *restraint* that regulates gratification by strict social norms (p. 4).

Research by Hofstede and others using his framework have identified differences between nationalities in the six cultural dimensions. In comparing these differences to how students from different countries responded to five survey instruments measuring their individual learning-related dispositions, including Vermunt’s Inventory of Learning Styles, Tempelaar et al. (2013) found that differences in students’ cultures impacted their learning style to a small degree (p. 16), but those differences had a greater impact on the degree of motivation students had for learning and also how goal oriented they were when it came to learning (pp. 18–19). The researchers also investigated correlations between each of the dimensions and aspects of students’ learning-related dispositions and found that students from individualist cultures displayed many learning-related disposition traits inverse to those from collectivist cultures. Similarly, those from cultures that were different on the *indulgence versus restraint* and *masculinity versus femininity* indices were identified as having many differences in their learning-related disposition traits. Cultural differences related to *uncertainty avoidance* and *long-term versus short-*

term also showed some correlations with learning-related characteristics, although not as strongly as the other dimensions (pp. 19–20).

Research showing differences existing between nationalities or cultures within the scope of Hofstede's six cultural dimensions, coupled with the findings by Tempelaar et al. (2013) that differences in the Hofstede dimensions *correlate* to differences in how one learns, suggests that learning traits are not independent of culture (p. 28). Whether it be the availability of household financial resources to provide academic support to learners (APA, 2014), attitudes about learning appropriated from members of their community, views commonly held by people in their nation of origin about classroom behavior, or perceptions about whether gender affects academic achievement, these outside influences may cause students to modify their learning behaviors from an early age to conform to norms from one or more aspects of their background (Guild, 2001).

The studies examined here comparing the learning styles of individuals of different nationalities and cultural backgrounds lend strong support to the view that cultural traits influence one's learning style. Cognitive learning styles, such as those described by Kolb's model, appear susceptible to change over time if a learner interacts with individuals with different cultural traits for large portions of each week, such in the workplace (Yamazaki & Kayes, 2007), providing additional support to the idea of culture's influence on learning style. The studies above do not address whether the same type of malleability exists in perceptive and affective learning styles models.

The learning styles models described above are only a small portion of the 71 models that Coffield et al. (2004) identify in their systematic review of learning styles (p. 9). Although all the models are based in research claiming to have identified numerous differences in learning traits and abilities, many in academe have questioned the validity or reliability of learning styles models and the instruments designed to identify individual learning styles (Curry, 1990; Reynolds, 1997; Stahl, 1999; Coffield et al., 2004, pp. 1–2; Pashler, McDaniel, Rohrer, & Bjork, 2008; Smith, 2010; Spence, 2012; Dekker, Lee, Howard-Jones, & Jolles, 2012; Bjork, Dunlosky, & Kornell, 2013). The most prevalent critique is that no empirical evidence exists to convincingly prove the "matching hypothesis" that a teacher's matching of their instructional approach to their students' learning styles improves the students' learning (Stahl, 1999, p. 1; Curry, 1990, p. 33; Coffield et al., 2004, p. 2; Pashler et al., 2008, p. 105; Spence, 2012; Dekker et al., 2012, p. 2; Bjork, Dunlosky, & Kornell, 2013, p. 419). Despite the absence of such evidence, the differences in learning styles that researchers have identified can be helpful to educators who desire to create lesson plans, course materials, and formative and summative assessments that appeal to a variety of learning styles. The administration of instruments designed to assess students' learning styles can also help individual students better understand how they prefer to learn, empowering

them to adapt the way they engage with new information, organize their notes or summaries of what they have learned, and study to absorb and master the content. The learning traits and preferences that the research has revealed provide instructors insight into differences between students that may impact their success in the classroom. Any attempt by educators to make their instruction more student-centered should be encouraged as long as it does not hinder students' learning.

Teachers and researchers have designed many creative ways to adapt courses to better appeal to various learning styles, allowing instructors to make changes in anticipation of teaching students with different learning styles (Dunn et al., 2009). If an instructor begins to consider the full spectrum of students' learning-related dispositions, then the convenient structure of a learning styles model disappears because too many cultural variables exist. While some schools test students to identify their learning styles (Dunn et al., 2009, p. 136), the idea of surveying students to inquire about their cultural background and whether or not aspects of their background have any impact on how they learn may cross the line into invading students' privacy. In light of these complicating factors, how can an educator accommodate the impact culture may have on how students learn in a similar fashion to how many have already accommodated students of different abilities and learning styles? One possible solution is to give students options and let them choose.

The Impact of Culture on Information Literacy

The Association of College and Research Libraries (ACRL) in 2000 published the Information Literacy Competency Standards for Higher Education that defined information literacy using a set of abilities necessary for individuals to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ACRL, 2000, quoting ALA, 1989). This focus on skills has received substantial analysis and criticism in the library and information science literature for being overly broad and mechanistic (Swanson, 2005; Elmborg, 2006; Tewell, 2015), espousing a view of a single model of information literacy that is universally applicable to all individuals (Elmborg, 2006; Cope, 2010), failing to address the need to think critically when engaging with information (Swanson, 2005), reinforcing the outmoded belief that certain sources are “authoritative” without question (Kapitzke, 2001; Smith, 2009; Hall, 2010; Cope, 2010), not acknowledging the politics and processes of knowledge production (Seale, 2010; Kapitzke, 2001), and ignoring issues of social justice and social power (Elmborg, 2006; Cope, 2010).

Critical information literacy eschews a mechanistic and universal view of information literacy and instead emphasizes the importance of individuals to become active agents in their learning by questioning the power structures present in the production and dissemination of information through critical reflecting on the

political, economic, and social frameworks surrounding information (Luke & Kapitzke, 1999; Swanson, 2004; Doherty & Ketchner, 2005; Elmborg, 2006; Seale, 2010; Dunaway, 2011; Tewell, 2015). Luke and Kapitzke (1999) suggest that critical information literacy should also consider “the development of local communities’ and cultures’ capacities to critique and construct knowledge” (p. 484).

The teaching of critical information literacy can help counter the problematic “banking concept” of education where norms and frameworks, such as ACRL’s standards, reinforce a view that learners must passively accept and deposit information in their minds that educators and scholars determine is authoritative and valuable. This “banking concept” comes from the work of educational theorist Paulo Freire who laid the foundation for a critical pedagogy approach to learning that seeks to challenge repressive cultural and political forces which prevent empowerment of learners whose backgrounds do not align with those forces (Swanson, 2004, pp. 66-67; Doherty & Ketchner, 2005, pp. 2-4; Elmborg, 2006, p. 193; Elmborg, 2012, pp. 75-95; Smith, 2013, p. 19). Freire advances the idea that knowledge is not neutral but rather it reflects dominant social, economic, and political views. Freire calls on educators to aid students in developing “critical consciousness” by focusing on “problem-posing” where students seek to hone their ability to critically perceive the world around them, examine how that world influences the information and knowledge they encounter, and apply their own life experiences and cultural backgrounds to this critical analysis (Swanson, 2004, p. 67; Doherty, 2007; Elmborg, 2012, p. 91; Hall, 2010, pp. 167-168).

Critical information literacy empowers students to take control of their own learning by placing them at the center of the learning experience. Given that each student brings a unique set of cultural background traits and personal life experiences to the classroom, the whole of their perspective on the world around them will differ from that of the instructor and their peers. Even for students whose backgrounds may align with the white, straight, male, middle class, Judeo-Christian, capitalist, American-born, Standard American English speaking groups that have historically dominated knowledge making in the U.S. (Elmborg, 2006 & 2010), their personal life experiences alter their perspective. The cultural and political forces that limit some students may not limit those students who belong to the dominant or mainstream groups that set the social, economic, and political agendas in our communities and our society. By guiding students in the practice of critically analyzing the sources of the information they are presented with or seek out in their education, instructors can help students grow comfortable with the notion that information and knowledge should not be accepted as authoritative simply because a professor, librarian, scholar, author, publisher, or journal is the source. Students should be encouraged to critically evaluate the process of knowledge production and how information flows through that process, taking into consideration which groups have established the social, economic, and political views that have shaped the process and what the biases are of those groups’

members. They should also be invited to lend their own personal perspectives and experiences to this inquiry, even—or especially—if they conflict with the groups that control the process.

Because of the personalized nature of student engagement within the critical information literacy approach, differentiated instruction can be utilized to empower students to practice problem-posing through the filter of their own cultural and personal experiences. Students may be uncomfortable with the notion of questioning the authority of knowledge producers in an academic environment, especially when their background differs from the dominant groups. By giving students choice in how they engage with the material they are learning, differentiated instruction can help create a more comfortable learning space for students to critically question the power structures underlying the information and knowledge they seek.

Diversity Characteristics and Culture of Urban College Students

Before exploring how differentiated instruction can be applied to reach diverse students, it is important to gain a sense of the diversity in background characteristics of urban university students that contribute to their differences in culture. The National Center for Education Statistics the Beginning Postsecondary Students (BPS) Longitudinal Study gathers data on student demographics, school and work experience, persistence, transfer, and degree attainment, among other topics (Institute of Education Sciences, 2015). The survey, conducted by the U.S. Department of Education's National Center for Education Statistics, collects data of cohorts of first-time, beginning college students at the end of their first year and then three and six years later. The survey is conducted every eight years and the last complete data set of results are for the cohorts that entered college for the first time in 2003-2004 ("BPS:04/09"). Because this data does not contain detailed information about a student's home institution—such as whether a student's institution was in an urban, suburban, or rural area—Sparks and Nuñez drew information about each institution's characteristics from the Integrated Postsecondary Educational Data System (IPEDS) (Sparks & Nuñez, 2014). "Urban institutions" include all public and private postsecondary institutions, with 88.25% being public and 11.75% private.

Among first-time, beginning college students in the BPS:04/09 survey, the gender makeup for urban institutions was 43.54% male and 56.46% female. When looking at race and ethnicity in urban institutions, 62.5% of students were white (non-Hispanic) and 37.5% were non-white, with 13.49% of surveyed students identifying as Hispanic, 11.76% as black (non-Hispanic), 6.86% as Asian, and 5.39% as being of another race or multiple races. Age-wise, 84.78% of students reported beginning college at age 19 or younger, 6.95% between ages 20 and 23, and the remaining 8.27% began at age 24 or older.

In addition to race, gender, and age, the BPS also contains information about survey-takers' immigration status and income level, two background characteristics that impact a student's cultural background. At urban colleges, 14.28% of respondents were first-generation immigrants, 2.75% were second-generation immigrants, and 82.97% were third generation. Income was categorized into quartiles, with financially dependent students with household income under \$31,000 considered low income, then low-mid income covering the next cohort under \$57,000, high-mid income for the next group up to \$88,999, and high income for anyone above \$89,000. The low income quartile contained 21.89% of students, with 23.13% falling into the low-mid quartile, 23.58% considered high-mid, and 31.40% categorized as high income.

The cultural identity of urban college students extends beyond the demographic information collected by the BPS. Many urban college students also work part-time or full-time, have family responsibilities, and commute to campus (Hammer, Grigsby, Woods, 1998, p. 221; Riposa, 2003, p. 56; Schreiner, 2014, p. 12). The roles of worker in a particular field, parent, spouse, and/or commuter place these students into additional groups that bring their own sets of shared motives, values, beliefs, experiences and behaviors that influence a student's culture (Yamazaki & Kayes, 2007; Guild, 1994, p. 17; Regalado & Smale, 2015). A student's sexual orientation, gender identity, non-conformity to social norms, and creative or artistic expressions further influence a student's cultural makeup.

Differentiated Instruction

Differentiated instruction is a pedagogical approach based on the belief that students learn best when their teachers actively accommodate their differences in "background experience, culture, language, gender, interests, readiness to learn, modes of learning, speed of learning, support systems for learning, self-awareness as a learner, confidence as a learner, independence as a learner" and numerous other differences that impact how they learn (Tomlinson, 2011, p. 14). Rather than trying to change how their students learn, teachers who adopt this approach acknowledge that there is no single best way to teach a group of students and consider it their responsibility as educators to modify elements of their course to accommodate students' diversity.

Instructors can challenge all students by offering course materials with varied levels of difficulty and different modes for the students to interact with the material (Landrum & McDuffie, 2010, p. 9; Subban, 2006, p. 936; Chamberlin & Powers, 2010, pp. 114–115). They make the same course content available in several different modes, provide a variety of activities and tools for students to engage with the content and develop their understanding of it, and offer students choices for demonstrating their mastery of the material (Butler & Van Lowe, 2010, p. 4;

Landrum & McDuffie, 2010, p. 14; Chamberlin & Powers, 2010, pp. 115; Tomlinson, 2011, pp. 15–16; Santangelo & Tomlinson, 2012, p. 324; Dosch & Zidon, 2014, p. 334).

Research on using differentiated instruction in higher education courses is limited because this approach has only begun appearing in college and graduate school classrooms in recent years. In a mixed methods study involving undergraduate education majors enrolled in two sections of a math course, both sections did equally as well on the pre-test given before the semester began, but the students in the section who received differentiated instruction performed better on the final exam by an average of 20 points out of a possible 200, a significant difference within the scope of the study (Butler & Van Lowe, 2010). In an end-of-semester survey, many students responded that differentiating gave them more time with the instructor than in a traditional course, but several thought that the approach was a waste of time (p. 7).

Another study examined first-year undergraduates in a math course where instruction was differentiated in five sections and taught traditionally in five sections (Chamberlin & Powers, 2010). Because the differentiated group performed significantly better on the pre-test than the control group, analysis focused on the change in score from the pre-test to the post-test, with the differentiated group scoring on average 1.7 items higher on the post-test than pre-test, compared to .3 items higher for the control group, indicating significantly greater improvement for the differentiated group over the control group (p. 124–125).

In a study of two sections of an undergraduate educational psychology course, six graded assignments and the three exams were administered to both the differentiated instruction section and the control group (Dosch & Zidon, 2014). The differentiated group performed better on average on five of the six assignments, but only to a statistically significant degree on two of those assignments. (pp. 348–349). When aggregating the results of all six assignments, the differentiated group significantly outperformed the control group (pp. 348–349). Similarly, on all three exams the differentiated group scored higher on average, although only to a significant degree on one exam, but did significantly outperform the control group when looking all the three exams in aggregate (pp. 348–349).

In a qualitative study of undergraduates in a foundations of education course, researchers identified a series of recurring themes in students' feedback after taking a course taught with differentiated instruction (Livingston, 2006). Common themes included the majority of students expressing that they found the course more interesting, interactive, attention-holding, and enjoyable than traditional courses (pp. 13–17). Some students criticized the approach for the additional out-of-class time required to complete the active learning assignments compared to their

expectations, expressed dissatisfaction with being required to engage in group work at times, and questioned whether the approach provided them sufficient preparation for the final exam (p. 17).

A mixed methods study employed the Student Instructional Report (SIR) II, a standardized course evaluation instrument with well-established reliability and validity, to statistically evaluate student perceptions of the impact of differentiation on their learning. Students indicated that their learning increased significantly compared to traditional instruction and the quality of instruction positively impacted learning (Santangelo & Tomlinson, 2012, p. 318). Students felt challenged but supported, and saw the course as actively involving them in their learning. In students' narrative responses they expressed finding differentiation beneficial because college students have diverse ways of learning; they have diverse interests, experiences, and goals; and they have diverse personal circumstances (p. 317). Students expressed great support for having the ability to choose activities and assessments that they believe best suited how they learn. Students reported that having options "increased motivation to put forth effort, enhanced understanding and internalization of the concepts, and created a desire to pursue additional, independent learning" and "an increased sense of voice and personal agency in the class" (p. 318).

The limited quantitative studies of differentiated instruction in higher education all reveal statistically significant benefits in student performance over a control group. The researchers all anecdotally attributed the differentiated group's achievements in part to the greater amount of direct contact the students had with the instructor in comparison to the control groups (Butler & Van Lowe, 2010, p. 8; Chamberlin & Powers, 2010, p. 131; Dosch & Zidon, 2014, p. 352). The student insights from qualitative studies mentioned above lend support to the effectiveness of differentiation for accomplishing the desired instructional goals of accommodating varied learning styles and differences in students' cultures to improve student success and empower learners.

The instructors in these studies all reported that differentiation required a significant amount of time, effort, and dedication on their part because of demands of preparing for the course, reviewing assessments submitted in different formats, and providing feedback. However, many expected that the amount of time preparing for the course would return to past levels because course materials and assessments would only need revision in the future. Many also found the additional time and effort worthwhile because of the high level of student engagement and mastery.

An Example of Differentiated Information Literacy Instruction

In studying the factors that affect the ability of students of diverse backgrounds to thrive and succeed in higher education, Schreiner (2014) identifies five key elements: (1) engaged learning, (2) academic determination, (3) social connectedness, (4) diverse citizenship, and (5) a positive perspective. A thriving student “is engaged in the learning process, invests effort to reach important educational goals, manages time and commitments effectively, connects in healthy ways to other people, is optimistic about the future and able to reframe negative events as temporary setbacks, is appreciative of differences in others, and is committed to enriching his or her community” (Schreiner, 2014, 11). Instructors can directly impact the first two elements by creating a learning environment that is adaptable to each student’s learning style through differentiated instruction.

Because there is no one right way to implement differentiated instruction, the approach is easiest to understand with an example. Imagine an introductory information literacy course at an urban college in the U.S. with an enrollment of 40 first-year students. The makeup of the students’ backgrounds follows the BPS:04/09 data presented above, with the class consisting of 17 men and 23 women, 25 of whom are white, five Hispanic, five black, three Asian, and two of another or mixed race. 34 students are age 19 or younger, 3 between ages 20 and 23, and three age 24 or older.

The topic covered in this example is “Critically Evaluating Sources,” which focuses on the course objective of students being able to evaluate information sources for accuracy, authority, objectivity, purpose, currency, and appropriateness while critical reflecting on the political, economic, and social frameworks surrounding the production and dissemination of the sources. The instructor ordinarily assigns one chapter from the course textbook to be read before class and delivers a 70-minute lecture on the topic without any visual aids in a classroom where students all face forward, mostly sit quietly, and occasionally raise their hands and ask questions. At the end of class, students are told to write an essay evaluating any three resources they have used in earlier course assignments that must be submitted by the beginning of the next class to be graded.

With differentiated instruction, course elements could be modified in several ways.

- **Content delivery**
 - Instead of only assigning reading, also make similar content available as...
 - an audio recording.
 - a PowerPoint or other presentation slides.
 - a series of video recordings that another instructor has made freely available on the Internet.
 - Instead of delivering content via a lecture, the instructor can...
 - distribute lecture notes for students to read.

- record that same lecture for students to view online.
- create and distribute presentation slides with lecture content.
- record short videos with the instructor narrating presentation slides that contain the lecture content.
- **Process (making sense of the content)**
 - Instead of students engaging with the content by only asking questions in classroom, the instructor can also...
 - create online discussion boards for students to ask questions.
 - create in-class assignments for students to engage with content either individually or in small groups.
 - lead a class-wide discussion on the topic.
 - divide students into groups that will spend half of the class preparing brief presentations that will be delivered in the latter half of class.
 - divide students into two or more groups to debate different sides of issues regarding evaluating resources.
- **Product/Assessment**
 - Instead of only accepting essays, also allow students to submit evaluations of three resources by...
 - writing out bullet points explaining their evaluations.
 - designing a chart or table explaining their evaluations.
 - creating presentation slides explaining their evaluations.
 - recording audio of themselves explaining their evaluations.
 - recording a video of themselves explaining their evaluations.
 - creating and recording a multimedia presentation explaining their evaluations.
 - designing mind maps explaining their evaluations.
 - designing flow charts explaining their evaluation process and conclusions.

This example should neither be considered the “right way” to adopt differentiated instruction or be viewed as containing an exhaustive list of possible modifications. Rather, it helps explain how differentiated instruction can be put into practice.

Using Differentiated Instruction to Help Reach Diverse Students

Remember that differentiated instruction focuses on teachers accommodating differences in how students learn and giving them choices about how instruction and their learning happens (Subban, 2006, p. 938; Tomlinson, 2011, p. 14; Chamberlin & Powers, 2010, p. 115). Beginning with delivering content, the instructor can modify content so that that same material is delivered in different ways that may better suit different learning styles and cultures. The substance of the content should not change, only the vehicle for its delivery. Some of the examples listed may be time-consuming for instructors to create (Butler & Van

Lowe, 2010, p. 3; Dosch & Zidon, 2014, p. 345; Chamberlin & Powers, 2010, pp. 130-131), but they may already be available as an open educational resource (Johnson, 2014, p. 86). A well-planned offering of different approaches to content delivery, where students are given the freedom to choose, empowers them to experiment with different approaches and identify which best suits their learning style and other learning traits (Subban, 2006, p. 940; Chamberlin & Powers, 2010, p. 115; Dosch & Zidon, 2014, p. 350).

The process or activities for formative assessment, where students engage with course content to check their own understanding while instructors begin gauging students' understanding (Chamberlin & Powers, 2010, p. 120; Tomlinson, 2011, p. 21; Dosch & Zidon, 2014, p. 347), may also take some time to prepare or may require creativity to find ways to offer several options simultaneously. It may not be possible to both have some students debate and others prepare and deliver group presentations in the same class period. However, an instructor can spend part of class time leading a discussion or debate and the rest of class time students can choose to either work on an exercise or prepare a presentation that they will then record outside class and submit to the instructor online. Some of the formative assessment devices can be offered for one topic, and a different set of devices can be offered for the next topic. Differentiated instruction does not mean offering all options all the time, since accommodating all differences simultaneously is not feasible.

The product(s) accepted for summative assessments may be easier for instructors to adapt than other elements of their course. The goal of a summative assessment is to determine whether a student has satisfied the learning outcomes that the assessment addresses (Tomlinson, 2011, p. 21; Santangelo & Tomlinson, 2012, p. 313; Dosch & Zidon, 2014, p. 347). In some instances, such as the above example, a written essay assessment can be modified to allow students to submit work showing their successful fulfillment of a learning outcome in a non-written form, or in a written form other than an essay. With some creative thinking, and a willingness to evaluate and grade work that is submitted in different formats than in the past, instructors may find this to be the easiest adjustment. Not only can an instructor expect to put in additional time to create additional formative assessments, but grading and providing feedback on work submitted in different formats may take more time than with a single format. Grading with rubrics or a set of grading criteria can become complicated and instructors must avoid any criteria that depend on things such as the use of proper grammar for written submissions or the clarity of the presentation of non-written work (Dosch & Zidon, 2014, p. 347).

Carol Ann Tomlinson, a prominent scholar of differentiated instruction, offers many helpful considerations for educators planning to introduce differentiated instruction in their classroom (Tomlinson, 2014, pp. 151–169). She suggests instructors start small by attempting differentiation in one or a few units in a course so they do not

feel burdened by too many changes. It is important to explain to students why you have chosen to take this approach because they may be resistant to the change. Introducing the idea that you seek to empower students by allowing them to take control of their learning, and reinforcing that idea throughout the semester, may help students understand the benefit of a student-centered approach. Instructors should assess the effectiveness of differentiation and reflect on the classroom experience for themselves and the students before expanding the approach to more of the course.

More practically, Tomlinson suggests giving thoughtful directions for each type of content and assessment, especially those that may be new to students. Encourage students to approach you with questions and ask for help when needed. Because a differentiated classroom can seem disorderly or hectic at times, it is important to be comfortable with the chaos, stay aware of what is happening in all parts of the classroom, and stay organized by taking notes on how students are engaging with the material. Emphasize to students that the quality of their work matters, not speed, especially when taking a critical information literacy approach where students may need to spend time reflecting and thinking critically. Expect that some students will resist differentiation at first and strategize how to address such resistance if it arises. Spending more time working alongside resistant students may help reinforce the approach if you point out places where the approach allows for them to be more empowered in their learning than in traditional instruction. Lastly, it can be helpful to develop a support system of other teaching librarians to discuss your experience, even if they are not using differentiated instruction in their courses.

Examining differentiated instruction within the context of the first three cultural dimensions of Hofstede's framework helps explain how the approach may be effective for reaching diverse students. For students whose cultures do not align well with the unequal distribution of power that exists in a traditional teacher-centered lecture class, differentiated instruction reduces the *power distance* gap by putting students in control of when and where they receive the passive lesson. The instructor still remains the dominant authority figure in the classroom, which may be comforting for students who expect and prefer an unequal distribution of power. Turning to *uncertainty avoidance*, students who have a low tolerance for uncertainty and ambiguity may continue to ask questions of the instructor in class and write a traditional essay where they may have a better idea of what is expected of them. Those with a higher tolerance for uncertainty may choose new options that better suit how they learn, even if they have no experience with how that option will be assessed and graded. As for the *individualism versus collectivism* dichotomy, having options for group work or individual work allows students to choose what will suit them best.

Using a Flipped Classroom to Enable Differentiated Instruction

One common aspect of the options listed in the *content delivery* portion of the information literacy course example above is that the content that was once a lecture is instead delivered by other means where the student and instructor do not need to be in the same place at the same time. Within a differentiated instruction framework, students may be given the option of whether to access this content inside or outside the classroom. Similarly, they can choose the location where they prefer to engage in the *process* stage of making sense of the content through active learning exercises, although options like debates that require the instructor or classmates to be present are restricted to the classroom. However, if an instructor plans to spend class time on an exercise that involves the entire class, they may expect students to access the content that was once a lecture on their own time, outside class. This swap between the time and place for direct instruction, traditionally as in-class lectures, and active learning, traditionally as homework assignments, describes the central tenet of a flipped classroom teaching approach (Lage, Platt, & Treglia, 2000, p. 32; Bergmann & Sams, 2012, pp. 14–16; Driscoll, 2012, pp. 4–5, Hamdan, McKnight, P. E., McKnight, K., & Afrstrom, 2013, p. 4). It is important to remember when considering adopting a flipped classroom that the goal of the approach is to create additional active learning opportunities in a course by removing direct instruction from the classroom (Upchurch, 2013, p. 60; Demeski, 2013; Hamdan, et al., 2013, p. 4).

Although a flipped classroom is not required for differentiated instruction, adopting the approach allows instructors to dedicate class time to active learning exercises where they can participate with students. For example, instructors can in-class discussions, moderate debates, or supervise students engaged in individual or group work. In courses where students are working to develop information literacy skills, having the instructor in the room can help students quickly clarify concepts that may be confusing to them and avoid developing bad research habits. In class, instructors can move around the room and work with students one-on-one, or in small groups, to provide guidance and answer questions as they arise during the activities. This classroom experience follows a tutorial approach where instructors work closely with students to support their learning and clarify their understanding of key concepts (Lage, Platt, & Treglia, 2000, p. 41; Bergmann & Sams, 2012, pp. 14–15; Hamdan, et al., 2013, p. 4; McLaughlin et al., 2013).

Instructors can take advantage of easy-to-use technology tools to transform the lecture content into a format that students can access outside of class. Offering a variety of multimedia content options, as presented in the example above, allows instructors to offer differentiation in students' learning experience outside the classroom (Mestre, 2006; Bergmann & Sams, 2012, pp. 28–29; Hamdan, et al., 2013, p. 13). To create lecture notes—the first suggestion given above for how lectures can be modified for differentiated instruction—all one needs is word processing software to write out a script of what would be said in class. Recording oneself delivering a

lecture to an empty room requires a video camera that can record in a digital format, and a smartphone or tablet camera can be used if a standalone camera is not available. Presentation slides can be made in Microsoft PowerPoint, Apple Keynote, Prezi, Google Slides, or other presentation software. To narrate these slides, instructors can use a computer's built in microphone, a headset with a microphone, or a desktop microphone while recording the slides appearing on screen using screencasting software. Several free options for screencasting exist, such as Jing, Open Broadcaster Software (OBS), Screencast-O-Matic, and QuickTime for Mac. Software can also be purchased that may offer more editing options, such as Camtasia, Adobe Captivate, and ScreenFlow (Zappe et al., 2009; Bergmann & Sams, 2012, pp. 37–43; Upchurch, 2013, p. 61).

Because students are expected to engage with course content outside the classroom, many instructors express concern that students may not complete the work before class, which can result in them not understanding the material sufficiently to engage in the in-class activities (Bergmann & Sams, 2012; Aydın & Veysel, 2016). Flipped classroom adopters address this concern by requiring students to complete some form of pre-class online assessment device, ordinarily a review quiz or short assignment, to check whether a student understands the content as they should (Zappe et al., 2009; Papadopoulos & Roman, 2010; Upchurch, 2013, p. 59). Oftentimes these devices are designed to help students assess their understanding of the material and are not graded, making them an additional formative assessment for the course. Adopters of differentiated instruction may choose to create multiple pre-class assessments and provide students a choice, if time permits.

Flipped classrooms have begun to appear in information literacy instruction courses in the past several years (Lemmer, 2013; Arnold-Garza, 2014; Fawley, 2014; Berrio Matamoros, 2015, pp. 123–125; Cohen, 2016). In one undergraduate library instruction session in an English composition course, students completed a tutorial online before class. In class, librarians worked directly with students to help them understand how to evaluate sources and build keyword searches (Fawley, 2014, p. 19). At a different college, flipped classroom was adopted for the information literacy instruction sessions in an undergraduate business course (Cohen, 2016). Students viewed a video tutorial and completed a brief assignment before class that was mandatory in order to incentivize completion. In class, students worked on four assignments in groups while the professor and librarian answered questions and provided assistance. The flipped approach allowed students move “through the research process more effectively than through a standard lecture, strengthen students’ ability to do independent and collaborative work, and involve students sooner in deeper levels of research involving critical thinking.”

Additional case studies describe the adoption of the flipped classroom by law librarians teaching legal research at two U.S. law schools. In one instance, the

instructor of a legal research course for foreign students in a Master of Laws (LL.M.) program created tutorial videos, PowerPoint presentations, quizzes, and short exercises that were all delivered online to students before class (Lemmer, 2013, p. 490). Class sessions were used to briefly review the instructional content the students had already engaged with before class, followed by a fifty-five-minute lab where students worked on legal research hypothetical and the instructor engaged with the students to answer questions and review their progress. The author noted that designing and teaching such a course, even in a traditional format, was challenging because the students came to the U.S. to attend the program and struggled in the course because of language and cultural barriers (p. 467). The flipped classroom encouraged the student to experiment during the labs with different research approaches to gain a deeper understanding of the U.S. legal system (p. 468).

At the other law school, online videos, PowerPoint presentations, and quizzes were also used, with classroom time reserved for brief review and research exercises (Berrio Matamoros, 2015, pp. 124–125). Students had the option of working alone or in groups, with the instructor interacting with them as they worked. Students commented that they appreciated having greater control over their learning because they could determine the time and place of instruction, and also could re-watch lecture videos multiple times to ensure their understanding of the material (p. 124). Instructors found the process of creating new content, especially lecture videos, time consuming, but considered the in-class interaction with students to be very beneficial for monitoring student understanding of the material and the research process, helping ensure that students were developing good research practices.

Conclusion

With several studies supporting the notion that a learner's culture and other diverse traits impact how they learn (Auyeung & Sands, 1996; Yamazaki & Kayes, 2007; Tempelaar et al., 2013; Omidvar & Tan, 2012), it can be challenging for information literacy instructors in urban universities with diverse student populations to create a single lesson plan that accommodates the numerous differences in how students learn. Adopting a differentiated instruction pedagogy helps instructors accommodate many of the differences in student learning dispositions by giving each student the option of choosing which learning and assessment devices best align with how they learn, empowering students to take control of their learning. Employing a critical information literacy approach also helps empower students to critically analyze the information they encounter in light of social, economic, and political frameworks. Combining a flipped classroom approach with differentiated instruction helps free classroom time that can be dedicated to students working on different formative assessments while the instructor is available to answer questions and guide the students' learning. Using these two teaching methods together can maximize the likelihood that students will

achieve the learning objectives for a course using learning and assessment devices that align best with their learning style and culture.

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