Variability and Barriers to Learning: The Perspectives and Practices of Math Teachers in General Education

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Abstract

Despite having disability rights and the benefit of legislation, students with disabilities in the Kingdom of Saudi Arabia (KSA) receive insufficient special education and inclusive support. *A Guide for Ensuring Inclusion and Equity in Education* (UNESCO, 2017) regards learner variability and identification of the barriers to learning as foundational concepts to making progress in inclusive practices that align with the Universal Design for Learning (UDL) approach initiated by Rose and Meyer (2002). This qualitative study explores the perspectives of general education teachers (Ged) from leading expatriate schools in the Kingdom on these core concepts and how they address these issues in their daily practice. This multiple case study examines teachers' engagement in inclusive teaching practices by exploring the underlying mechanisms being employed in the classroom (i.e., the anticipation of variability and barriers and intentional alignment of teaching components/curricula with core components of inclusive education). Face-to-face teachers' interviews (one to three hours long), direct classroom observations (five to seven days during math instructions), participant observations, physical artifacts (educational materials) and documents (i.e., lesson plans, assessment sheets, students reflections on their learning, teaching strategies, and rubrics) were used as methods of data collection. Data were gathered from four elementary-middle school math teachers (one male, three female) from two different school districts: Saudi Aramco Expatriate School (SAES) and International School Groups-Dammam (ISG). Ged teachers in SAES showed in-depth theoretical knowledge and positive, adaptive, and malleable beliefs about variability and barriers, they used flexible instructional approaches, and were more likely to establish a non-traditional model of teaching. In contrast, those in ISG showed a more surface-level understanding of these concepts. The study suggests that teachers in Ged settings do not observe anticipation and intentional alignment

across teaching components. Their curricular planning reflects a tendency to focus on the average students rather than on learner variability and potential barriers. This is the first study to develop evaluation criteria for anticipation and intentional alignment for UDL research. It also provides a universally designed blueprint for educators to practice anticipation and intentional alignment across lesson planning, learning environment, teaching methods, materials, and assessment using the core components of inclusive practices and UDL principles. Finally, the study suggests that participants in private international schools of KSA have a strong basis for initiating inclusive education models as several elements in their current teaching practices are in line with core inclusive practices in research. Recommendations are suggested to private international schools and education policymakers to facilitate inclusive education in the Kingdom.

Résumé

Bien que les étudiants en situation d'handicap vivant en Arabie Saoudite bénéficient des droits humains, ils ne reçoivent pas suffisamment d'éducation spécialisé ou de soutien. L'ouvrage « *A Guide for Ensuring Inclusion and Equity in Education » (UNESCO, 2017)* porte sur la capacité d'apprentissage et l'identification des obstacles à l'apprentissage comme le fondement de la démarche vers les pratiques d'inclusion en adéquation avec la conception universelle de l'apprentissage (UDL en Anglais) initiée par Rose et Meyer (2002). Cette étude qualitative décrypte la conceptualisation de cette approche et la gestion quotidienne de ces problématiques par les professeurs de l'enseignement général des écoles d'expatriées en Arabie Saoudite. L'étude examine l'engagement des professeurs en face à l'enseignement inclusif en explorant les mécanismes sous-jacents utilisés dans les classes (c.à.d. l'anticipation de la capacité d'apprentissage, les obstacles, ainsi que l'alignement intentionnel des volets de l'enseignement avec celles des composants fondamentaux de l'enseignement inclusif). Des rencontres en personne avec les enseignants, des entrevues (d'une durée de 1 à 3 heures), observations directes en classe (5-7 jours pendant l'enseignement des mathématiques), artefacts physiques (matériel pédagogique) et documents (c.-à-d. plans de leçon, feuilles d'évaluation, réflexions des élèves sur leur apprentissage, l'enseignement des stratégies et rubriques) ont été utilisés comme technique d'acquisition de données. Les données ont été recueillies auprès de quatre professeurs de mathématiques (1 homme, 3 femmes) de deux écoles primaires et intermédiaires : « Saudi Aramco Expatriate School (SAES) » et « International School Groups-Dammam (ISG) ». Les professeurs d'éducation générale (SAES) ont fait preuve de connaissance théorique approfondie ainsi que des convictions positives, adaptatives et flexibles sur la capacité d'apprentissage et les nombreux obstacles. Ils ont utilisé une approche d'enseignement flexible et ouvert à l'établissement d'un

modèle d'enseignement non traditionnel. En revanche à l'ISG, ils ont fait preuve d'une compréhension superficielle de ces concepts. L'étude démontre que les professeurs de l'enseignement général ne font pas d'anticipation et d'alignement dans leurs composants pédagogiques.

La planification de leur programme reflète une tendance à se focaliser sur les élèves moyens plutôt que sur leur capacité d'apprentissage et les barrières potentielles. Ceci est la première étude à développer des critères d'évaluation pour l'anticipation et l'alignement intentionnel pour la recherche UDL. Cette étude fournit également un plan conçu universellement pour assister les enseignants dans la pratique d'anticipation et de l'alignement intentionnel pour la planification des enseignements, de l'environnement de travail, des méthodes d'enseignements, du matériel didactique ainsi que de l'évaluation se basant sur les indicateurs des pratiques d'inclusion et des principes de conception universelle de l'apprentissage (UDL en anglais). Finalement, l'étude a conclut que les participants des écoles privées internationales de l'Arabie Saoudite ont de bases solides pour initier le modèle d'éducation inclusive étant donné que plusieurs éléments de leur pratique actuelle d'enseignement sont en adéquation avec les pratiques fondamentales d'inclusion.

Dedication

Bismillah ir-Rahman ir-Rahim (بسم الله الرحمن الرحيم)

In the Name of Allah, the Most Beneficent the Most Merciful

I humbly dedicate my doctoral dissertation to the teacher of mankind, the Holy Prophet Mohammad (Peace Be Upon Him) and his Holy Households.

I also dedicate this thesis to the candles of my life who taught me how to learn lessons from life, my late mother Shama Firdaus, and grandmother Nisar Zahra.

Finally, I lovingly dedicate this thesis to the greatest pillar of my life, my husband Syed Haider, for his incredible support and unconditional love.

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Chapter One: Introduction

History, Evolution, and Recent Trends in Inclusive Education

In 1975, the United States Congress enacted the Education for All Handicapped Children Act (EAHCA) to protect the rights and meet the needs of students with disabilities (SWD). However, teachers were not necessarily prepared to provide individualized support for the needs of all learners across all grade levels to offer quality education to SWD in the same environments as their peers without disabilities. The only recourse was to have SWD learn in self-contained classrooms (Coates, 1985).

In 1990, the EAHCA was superseded by the Individuals with Disabilities Education Act (IDEA) (Turnbull III & Turnbull, 1998). IDEA's goal was to make education more equitable, such that SWD would be provided the same learning opportunities as all of their peers. Moreover, teachers were to be provided with support to promote inclusive education in general classroom settings.

On the global scene, the concept of providing accessible education to all students was recognized by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in the 1990 World Declaration on Education for All: Meeting Basic Learning Needs, which laid the foundation of inclusive education Commission, 1990). (Subsequently, the United Nations made efforts to establish standard rules to encourage equality and full participation of individuals with disabilities in their social, academic, and employment opportunities (Weber & City, 2012). The aim was to ensure that all students with and without disabilities had access to education. Later, in cooperation with UNESCO, the 1994 World Conference in Spain on Special Needs Education presented The Salamanca Statement and Framework for Action on Special Needs Education to inform international policy on education for all. The Statement says:

> The fundamental principle of the inclusive school is that all children should learn together, wherever possible, regardless of any difficulties or differences they may have. Inclusive schools must recognize and respond to the diverse needs of their students, accommodating both different styles and rates of learning and ensuring quality education to all through appropriate curricula, organizational arrangements, teaching strategies, resource use, and partnerships with their communities (UNESCO, 1994, p. 11).

The inclusive education rights for all were further protected by several national, federal, and international organizations, including IDEA (2004), United Nations' Declaration of the Rights of Persons with Disabilities (2006), and Every Student Succeed Act (ESSA) (2012) (Crevecoeur, Sorenson, Mayorga, & Gonzalez, 2014).

Globally, inclusive education appeared to be emerging, complex, and evolving over the last three decades (Potgieter-Groot, Visser, & Lubbe-de Beer, 2012). The current state of inclusive education in schools worldwide varies extensively. Uncertainties abound regarding how educators can create inclusive environments, and a gap exists between the formulation of inclusive education and its implementation.

The evolution of inclusive education began with the concept of mainstreaming, or integration: the physical placement of the SWD with their peers without disabilities in the least restricted environment (LRE) to get the maximum benefit in socialization and academic learning (Avramidis & Norwich, 2002). Later, research determined that SWD had limited access to education and socialization through mainstreaming (i.e., locational mainstreaming in which SWD were placed in segregated classrooms for academic sessions, and social mainstreaming in which the SWD could participate only in social activities with their conventional counterparts). Restricted access to educational and social integration raised questions about social injustice and

ethical issues concerning educational access for SWD (Alquraini & Gut, 2012). In this regard, mainstreaming was then recognized as an assimilationist process that required that either the child be conditioned for full mainstreaming, or the school policies would need to be changed. Subsequently, the concept of inclusive education was restructured, with the introduction of accommodation in mainstreaming (Avramidis & Norwich, 2002).

Mainstreaming and inclusion have common grounds. For instance, they both provide the LRE to SWD and physically place them in regular general education classrooms. However, inclusion extends the concept of mainstreaming by giving access to the broad curriculum and socialization to the greatest possible extent, regardless of the degree of disability and learning differences (Alquraini & Gut, 2012), and promotes the concept of equity in education by exemplifying social justice (UNESCO, 2017). Research indicates that inclusive classrooms do benefit not only the SWD but also students without disabilities in improving their communication, academic, and social-emotional learning. Furthermore, inclusive classrooms that are diligently designed and structured do not hinder the learning process of SWD (Katz, 2013). When inclusive education is well-practiced, all kinds of students can be part of the community, develop a sense of belonging, and be prepared for life in society.

Over the past decade, besides serving SWD, the scope of inclusive education has extended from disability to the promotion of diversity within general classroom settings; this has compelled teachers to consider improving their teaching skills to meet the needs of diverse students – implying better learning opportunities for students. Also, inclusive education has initiated a worldwide restructuring of preservice and in-service teacher training programs (Alquraini & Rao, 2018b; 2020; Katz, 2015).

However, the evolving definitions of inclusion and inclusive education are often debated in the literature as they depend on the context of inclusive education and the scope of the research (Adhabi, 2018; UNESCO, 2017). Despite variations, there is a need to highlight opportunities through which inclusive education can be utilized to fulfill the need for delivering quality education for all. Although diversity was an integral part of inclusive education in the past, the conceptual foundations of inclusive education were still being impacted by gradual expansions in the meaning and scope of the concept of diversity itself (Chamberlain, 2005; Herzig, 2005; Kirmani & Laster, 1999). Additionally, international perspectives on inclusion contributed to the conceptual shift of the inclusive education discourse and practices to incorporate diversity more broadly that are culture, ethnicity, and language (Katz, 2013). Within this context, Kilinc (2018) argues that inclusive education has been a part of international educational policies. Thus, within local and international discourse, global ideas contributed to changes in the meaning of this term. Several states and provinces within a country use varied definitions for inclusive education — variations are even found in the missions, visions, and policies of different educational institutions within the same region (Towle, 2015).

For example, besides endorsing physical access and the learning environment in broader terms, diversity, and equity are integral parts of the inclusion policy of Ontario, Canada. The province of Ontario considers that "the dimensions of diversity include, but are not limited to, ancestry, culture, ethnicity, gender, gender identity, gender expression, language, physical and intellectual ability, race, religion, sex, sexual orientation, and socio-economic status." Ontario defines "equity as a condition or state of fair, inclusive, and respectful treatment of all people. Equity implies equal treatment of all individuals, regardless of their differences" (Towle, 2015, p. 43). The inclusion policy in Quebec, on the other hand, emphasizes the critical components of

inclusive education (i.e., student membership, individualized support, learning goals, and professional collaboration) and the process of obtaining full inclusion in the province (Towle, 2015). Adhabi (2018) contended that the inconsistencies between different definitions of inclusive education might cause confusion and affect research findings, hence causing a "disconnection between the research and practice" (p. 128). However, recently, there was a shift in inclusive research from conceptual debates to broader themes of comparative and international education by focusing micro and macro-level policies, school-society relationship, emphasizing experiences of inclusion, on increasing teacher's skills sets (Schuelka, Braun, & Johnstone, 2020), and collaboration between researchers and identification of several schools of thought shaping inclusive education (Hernández-Torrano, Somerton, & Helmer, 2020).

The contributions of brain research, multiple intelligence theory, and differentiated instruction paradigm (DI) (Tomlinson, 2000; Tomlinson & McTighe, 2006) are also significant in expanding the meaning and scope of inclusive education. The Center for Applied and Special Assistive Technology (CAST) as an originator in individualized instruction and Universal Design for Learning framework (UDL) play critical roles in the conceptual and practical evolution of inclusive education. These paradigms expanded the concept of inclusion from the simple notion of physical access to the more complex notion of cognitive access to learning environments for students with and without disabilities.

UDL is a learning approach that recognizes learning differences within and between individuals. With the UDL approach, teachers are responsible for preparing a learning environment with flexible materials, means, and methods that can meet the needs of all students. It also describes ways in which barriers to learning can be eliminated by adopting multiple and flexible means of presenting learning content regardless of disabilities (Meyer, Rose, & Gordon,

2014; Rose & Meyer, 2000, 2002). With the advancement of the UDL paradigm and differentiated instruction (Tomlinson, 2000), the terms *learner variability* and *student variance* gained popularity among researchers (Venkatesh, 2015). According to Meyer et al. (2014) learner variability is a "dynamic and ever-changing mix of strengths and challenges that makes up a learner" (p. 2), and "every learner approaches tasks with his or her own set of strategies" (p. 17). This definition is used as an umbrella term to represent various related terms that are being used interchangeably in the literature (e.g., individual differences, learning styles, preferences, gender, and linguistic, religion and cultural diversity) (Felder & Brent, 2005; Kunzman, 2006; Pritchard, 2013).

Parallel to the discussion of learner variability, another term, *barriers to learning*, is used in the context of identifying and addressing factors that prevent learning, motivation, and academic achievement (Adelman & Taylor, 1997; Fielding, 1999; Pritchard, 2013). Within the barrier research in education, UDL advanced the notion that obstacles that are situated in curricula (e.g., providing print text to the students with reading deficiencies or instructional barriers caused by poor teaching) should be addressed with the same care as physical barriers to learning (e.g., no ramp at school entrance). The barrier debates further contributed to the extension of the scope of inclusive education from the physical placement of the SWD to their meaningful participation in general education classrooms through cognitive and affective access to curricula, along with learning content to minimize achievement gaps.

By recognizing learner variability and barriers to learning, international communities in inclusive education have been transformed in such a way that the notion of diversity is included in their policies and that barriers to learning are emphasized in their plans to address disparities between people with and without disabilities. For example, in its *Guide for Ensuring Inclusion*

and Equity in Education, UNESCO (2017) considered diversity to be the differences of people concerning their "race, ethnicity, gender, sexual orientation, language, culture, religion, mental and physical ability, class, and immigration status" (p.1). It states, "inclusion is a process that assists teachers in overcoming barriers limiting the presence, participation, and achievement of learners." Further, the guide defines inclusive education as a "process of strengthening the education system's capacity to reach out to all students." Thus, learner variability in terms of diversity and barriers are endorsed by UNESCO to ensure student access through adopting inclusive education policies.

Given the recent trends in and scope of inclusive education, this study defines inclusive education as a philosophy and set of practices that recognize learner variability and address barriers to learning through the adoption of the teaching practices based on the core components of inclusive education that encourage meaningful participation and access, regardless of abilities. The present research is an effort to revisit the conceptual debate on variability and barriers to learning within the framework of inclusive education by examining teachers' beliefs and practices related to these core concepts in the Kingdom of Saudi Arabia.

Inclusive Education in the Middle East

Inclusive education is well established in theory and practice within the Organization for Economic Cooperation and Development (OECD) nations. However, over the past few years, it has caught the attention of the Gulf Cooperation Council (GCC) States— the Arabic-speaking countries of the Gulf (Weber, 2012). Weber states that the situation in these countries is complicated due to the differences in their educational policies, fundamental beliefs, and cultural and traditional approaches towards disability, individuals with disabilities, and their families. Also, there is no universal strategy for addressing SWD within GCC. The lack of a "coherent

compliance procedure" and "standard to serve as a benchmark for inclusion" appeared to result in separate educational systems and laws in dealing with and serving SWD in the Gulf countries (Brown, 2005, p. 254). Generally, within GCC any type of physical placement of SWD with their typically developing peers is considered a type of "inclusion." For example, Brown specified three types of integration in the region that are described under the title of "inclusion:" proximity integration (i.e., full participation of SWD to the general education classrooms-exclusive for the mild learning disabilities or hearing and visually impaired), social integration (i.e., accessing recreational programs, recess, lunchtime, and clubs in the general education schools), and academic integration (i.e., occasional participation of SWD in general education classrooms).

There are three distinct types of educational systems in these countries: government-run elementary to high schools, privately-run Arabic-speaking schools, and foreign international schools serving the needs of expatriate families (Brown, 2005; Weber, 2012). With the growing awareness of inclusive education within global education communities, inclusion is emerging in private international schools (Weber, 2012) since many parents with SWD prefer taking their children where the needs of these children will be addressed. The private international schools offer advanced instructional practices utilizing digital resources to learning as well as they encourage hiring international staff for teaching who show positive attitudes towards diversity and SWD. Therefore, the needs of SWD are catered to an extent within these schools. Brown (2005) states that the "evidence of [inclusive education] is found primarily in the private international school sector [but] only for categories of the disabled who are least likely to be perceived as handicapped" (p. 255).

Overall, inclusive education practices are less common in GCC countries. Qatar, Kuwait, and Bahrain, however, promoted awareness and improved inclusive educational practices over the years. Nonetheless, the level of awareness about disabilities and inclusive education has also increased in other Arabian countries, including Saudi Arabia. This is because many SWD and their parents have been struggling to access equitable learning opportunities. Given the growing number of expatriates in these countries, GCC states are now embracing the theoretical framework of education for all and expanding the scope of mainstreaming by adopting inclusive practices in the region (Alharbri & Madhesh, 2018). The main emphasis is now given to restructuring special education teacher training programs, increasing access to smart devices in the classroom, and recognizing the needs of SWD to access equal learning opportunities. Saudi Arabia is among those countries engaging in the restructuring of educational policies to adopt the inclusion model in the Kingdom.

Special and Inclusive Education in Saudi Arabia

The education of SWD emerged in the Kingdom of Saudi Arabia (KSA) during the late 1950s with the prime focus on students with blindness. Later, during the period of the early 60s to late 70s, the Special Learning Department of the Kingdom supervised the establishment of learning institutions to serve the needs of students with deafness and intellectual disabilities (Afeafe, 2000; Aldabas, 2015). The first formal attempt to place the students with mild disabilities alongside their typically developing peers was initiated in 1984 (Alquraini & Gut, 2012). The country developed disability laws, which include the Legislation of Disabilities (1987), Disability code (2000), and Regulations of Special Education Programs and Institutions (RSEPI) (2001) (Alquraini, 2010; Alquraini & Gut, 2012). These organizations and legislations guaranteed disability rights, provided initial screening and assessment opportunities, defined

disabilities, launched interventions, and built rehabilitation centers. These organizations were further responsible for providing free health care and educational services and introducing relevant teacher training programs in the Kingdom. Despite having disability laws and policies consistent with international models and guidelines, KSA remained unsuccessful in the widespread adoption of inclusive practices (Alharbi & Madhesh, 2018).

In KSA's general education system, students with hearing and visual impairments are accommodated and also offered additional support. Students with mild to moderate learning disabilities are placed in separate classrooms within the general education system, where they get support from the special education teacher. These students share an inclusive environment with their typically developing peers only during non-academic activities such as at recess and lunchtime. Students with mild to moderate disabilities attend elementary and middle school until the age of 18 years. These students have an opportunity to acquire employment skills and vocational training (Alquraini, 2010; Alquraini, 2014; Weber & City, 2012). Students with severe intellectual disabilities, however, are placed in a separate and segregated learning system with special education teachers. Despite having disability rights, laws, and legislation, students learning in a segregated environment do not get inclusive opportunities with their typically developing peers, which decreases the chances of them acquiring cognitive, communication and social-emotional skills through interactions in inclusive settings (Alquraini & Rao, 2018b).

Saudi Arabian schools rarely offer inclusive education. They lack speech-language pathologists, sign language interpreters, school psychologists, and co-teaching practices where public education teachers can collaborate with support resources and special educators to offer inclusive education for all students (Alquraini, 2010; Alsalem, 2015). Hence, the education system does not integrate many standard practices such as response to intervention, evidence-

based practices (EBPs), and positive behavior support (PBS) (Alsalem, 2015). The restructuring of university courses for pre-service teachers and continuous professional development for in-service teachers to promote effective instructional designs, improving teaching strategies, and introducing educational assistive technology are topics that are currently in debate in the Kingdom (Alquraini & Rao, 2018ab; 2020). The problems mentioned above impede inclusive practices in the Kingdom. Needed are systematic planning, professional training, and implementation of the current evidence-based educational practices with high-quality resources and collaboration with the international scholarly community.

The Ministry of Education is emphasizing educational research to restructure the existing curriculum aligned with the country's needs per effective educational frameworks being practiced worldwide. The Kingdom's Tatweer project (2015) is one such effort made by the ministry, which endorses inclusion to improve disability services, recognize students with differences, and promote assistive technology in the classrooms (Alsalem, 2015; Alquraini & Rao, 2020). Despite fostering information communication technology systems and establishing smart schools as part of the Tatweer project, the project remained controversial and such reforms have not benefitted teachers and students. Tayan (2017) argues that this policy was economically driven and power-oriented to prepare a workforce (individuals with disabilities) to serve the kingdom and not to empower teachers and the educational system. Instead, Tayan contends, these reforms were western policies imposed on the current educational system in the Kingdom that was not yet ready for such changes, considering teachers' deep-rooted traditional and fundamental beliefs about disabilities. Aldabas (2015) states that the biggest obstacle facing inclusive education in the Kingdom is the teachers' belief systems.

Currently, the collaborative efforts between the ministry, researchers, special and general educators, academic institutions, and practitioners towards change are encouraging. Recently, with the increasing number of doctoral research projects on inclusive education in the Kingdom, and with the collaboration of the Ministry of Education, Saudi Arabia has revised inclusive policies based on a 10-year plan to serve the needs of gender, disabilities, and teacher training, involving the private education sector and meeting the expectations of contemporary inclusive practices around the globe (Alharbi, 2018; Alqahtani, 2017; Alquraini, & Rao, 2018b; Alshehri, 2018). There is now hope that students with disabilities can be incorporated in the general education classroom. Additionally, the ministry is currently extending the scope of providing educational services to people with moderate and profound intellectual disabilities, autism spectrum, and physical disabilities within general and individual classrooms. Introducing UDL as an instructional framework, within the special classes, is another step towards adopting an inclusive approach in education (Alquraini & Rao, 2018a; Alsalem, 2015). However, the implementation of UDL is still at its infancy, and the related studies are mainly carried out in the city of Riyadh. These gaps in inclusive education are situated in research and practices and warrant further investigation in inclusive education within the other provinces of the Kingdom.

According to statistics from 2018, the total population of Saudi Arabia is approximately 33 million. The Gulf News states that 11.1 million among the KSA population are employed as expats with or without families (Oct 28, 2018). Data on disability prevalence are now beginning to emerge. For example, a recent study conducted by Bindawas and Vennu (2018) to estimate the national and regional prevalence rates types, and severity of disabilities in the Kingdom revealed that 1 in 30 citizens has a disability, and that physical disability was the most frequently reported. Also, 2.7% of the total population had disabilities within the school-age range of 19

years and below. The official statistics, however, are not yet available to provide an accurate disability prevalence rate among expats. Given the oil-rich industry in the Kingdom, these expats come from various parts of the world and spend several years serving in the Kingdom. Among them, many experience challenging situations in acquiring appropriate services for their children with disabilities in general education schools. Although various international private schools are serving expat families, still these schools do not accept students with severe levels of disability. There are some debates on the evidence of inclusive practices in the international schools in GCC (Brown, 2005; Weber, 2012); however, to this researchers' knowledge, no study has formally explored the possibilities of inclusion and inclusive practices in private international schools in the Kingdom. An overreaching goal of this present study is to investigate if the international schools have potential to initiate/adopt inclusive learning model in their existing educational structure.

Purpose of the Study

Broadly, this qualitative study aims to serve two purposes. The first purpose is to explore the meanings of the concepts such as learner variability and barriers to learning from the perspective of teachers in general education classrooms. The second purpose is to describe existing teaching practices in the private international schools of KSA (Marshall & Rossman, 1999). Overall, following are the study aims:

- To extend the theoretical bases of the existing theories of UDL and inclusive education by digging deeper into significant concepts of learner variability and barriers to learning.
- To provide an opportunity for general education teachers to reflect on their existing beliefs and practices within the inclusive framework of teaching and learning.

- To explore and document existing levels of inclusive practices in private international schools in the Kingdom.
- To determine how UDL-based inclusive practices can be extended in the Kingdom by focusing on teacher belief systems and practices to fill the gaps in inclusive education.
- To offer a practical UDL-based blueprint (based on the data analysis tool created for this study) to the teachers to facilitate inclusive practices in the classroom by ensuring anticipation and intentional alignment across the teaching components/curricula.

Given these aims, the research objectives are:

- To identify the level of conceptual understanding of the teachers about the core components that set the foundation for inclusive practices.
- To explore if teachers are already addressing the core issues (variability and barriers) and what can potentially be suggested to extend inclusive practices.

Keeping the aims and research objectives in mind this study is guided by two theoretical frameworks throughout in the conceptual formation through the study findings and analysis, and interpretation through the research implications.

Theoretical Frameworks

The constructivists in the educational research state that learners actively build knowledge through meaning-making and building upon the knowledge they already possess through interaction with new information (Carlile, Jordan, & Stack, 2008; Maxwell, 2012). Epistemologically holding an interpretivist position, my research will be shaped by the educational implications of constructivism that emphasize identification of (a) learners' learning styles, (b) learners' strengths, (c) signifying curricular practices, (d) inclusivity, (e) innovations

in teaching strategies, and (f) authentic assessment practices (Carlile et al., 2008). The following section builds on two theories (Constructive Alignment Theory and Universal Design for Learning) to advance the understanding of the proposed topics of discussion.

Constructive Alignment in Teaching System (CATS)

Biggs (2003) and Biggs and Tang (2007) extend the constructivist approach by suggesting that learners ought to construct their knowledge via relevant activities, rather than just depending on what they receive from their teachers. However, the teacher's important task is to create a learning environment that supports learning activities to optimize desired learning outcomes. This suggests that students can construct their knowledge when the learning environment facilitates desired learning outcomes. Biggs (2003) indicates that intended learning outcomes are the composite of content knowledge, the level of the task understanding, engagement, and gaining mastery of the learning task. Biggs contends that learning increases when teaching strategies are in line with student learning needs (Sutton, 2003). Therefore, he emphasizes the systematic alignment of all teaching components (intended learning outcomes, instructions, and assessments) to receive optimized learning outcomes in the classroom setting of diverse learners. Biggs states that "the alignment in constructive alignment reflects the fact that the learning activity in the intended outcomes, expressed as a verb, needs to be activated in the teaching if the outcome is to be achieved and in the assessment task to verify that the outcome has in fact been achieved" (Biggs & Tang, 2007, p. 52). He purports that if teachers consider student learning needs before designing the assessment activity, the process is aligned. Otherwise, an unaligned process leads to poor learning outcomes, hence reducing the learner's cognitive access to the content. Also, poor outcomes will be realized, and it will generate the blame model, with students and teachers being blamed for undesired results. Nor will teachers

succeed in attaining teaching-learning targets and meeting the needs of the students. These factors contribute to under-achievement in learning and limit the scope of inclusion in general education classrooms.

Felder and Brent (2005) later extended Biggs' concept of constructive alignment in teaching components to attain an in-depth approach to learning and to facilitate learners' intellectual development. They suggested that teaching goals and expectations should be conveyed explicitly to the students; for instructions, teachers should adopt a student-centered approach to learning that is related to deep learning. Therefore, teachers should offer a variety of choices in their teaching methods and constructive feedback that explicitly relates to the intended learning outcome. This approach is being applied to K-12 and higher education (Felder & Brent, 2005; Trigwell & Prosser, 2014; Trigwell, Prosser, & Waterhouse, 1999).

CATS' theorists believe that teachers should adopt a "broker role" between the students and a learning environment to facilitate their independent and real learning. Although CATS addresses the learning differences in classroom settings through ensuring constructive alignment among the teaching components, it does not offer much insight into the barriers to learning. Also, it lacks guiding principles across the teaching components, though it assists in ensuring that teachers are designing learning and teaching activities that support students in achieving desirable outcomes. The UDL framework addresses these limitations.

Universal Design for Learning (UDL)

Rose and Myer (2002) state in their book, '*Teaching Every Student in the Digital Age: Universal Design for Learning: Association for Supervision and Curriculum Development'* state that "the concept of UDL is the intersection where all of our best initiatives—integrated units, multi-sensory teaching, multiple intelligences, differentiated instruction, use of computers in

schools, performance-based assessment, and other—come together" (p. 7). The UDL is a combination of the best inclusive practices that focus on the strengths-based model of individuals, not only on persons with disabilities, it is inclusive to all forms of diversity and differences—"thus can be viewed as an inclusive education reform" (Katz, 2015; p. 3) that shifted inclusive education discourse from physical placement of the SWD to cognitive and effective access to the curriculum.

UDL was first derived when CAST established the National Center on Accessing the General Curriculum in 1999 (Spooner, Baker, Harris, Delzell, & Browder, 2007). CAST describes UDL as a blueprint for creating flexible learning goals, teaching methods, instructional materials, and assessment techniques to accommodate learning differences. According to Salend and Whittaker (2017), teachers who have been implementing UDL are educational architects who can create learning structures to support the success of their students (p. 59). Initially, the roots of UDL resided in the architectural principles pioneered by Ronald Mace in the 1980s, which provided equal access to buildings for people with diverse physical needs (Parker, Robinson, & Hannafin, 2008). UDL expands on addressing different learning needs by providing cognitive and physical accommodations to increase learning experiences for students with and without disabilities.

However, during the same period, a few related approaches also emerged in education—such as Universal Design for Instructions (UDI) (Burgstahler, 2009) and Universal Instructional Design (UID) (Higbee & Goff, 2008), alongside UDL (Rose & Meyer, 2002). These approaches share common conceptual grounds, but with different foci (Black, Weinberg, & Brodwin, 2015; Higbee & Goff, 2008; Rao, Ok, & Bryant, 2014). The commonalities among these educational models are the most salient, as the guidelines and principles aim to identify and reduce learning

barriers (Black et al., 2015; Dolan, Hall, Banerjee, Chun, & Strangman, 2005; Hall et al., 2015), address learner variability (McGuire-Schwartz & Arndt, 2007; Hall et al., 2015; Meyer et al., 2014), and suggest strategies and instructional designs (Kortering, McClannon, & Braziel, 2008; Rao, 2015; Schelly, Davies, & Spooner, 2011) that enhance learning outcomes via equal access and usability of resources for all learners (Burgstahler, 2009; Higbee & Goff, 2008; Meyer et al., 2014). Regarding the differences, the UDI and UID approaches are applied in higher education with a focus on instructional design.

UDL is, however, rooted in neuroscience and education research. It emphasizes the flexible means of learning in the digital age from kindergarten to higher education. This learning approach recognizes learning differences within and between individuals and eliminates barriers to learning, believing that "many students –not just students with disabilities–face barriers and impediments that interfere with their ability to make optimal progress" (Meyer et al., 2014, p. 3). Novak (2016) states that eliminating barriers means "proactively and deliberately planning curriculum" that provides embedded options that are relevant, accessible, and challenging for all in the learning environment (p. 14). This proactive planning is a part of the anticipation process that eventually reflects through aligning curriculum and teaching practices to the principles and guidelines suggested by the UDL. By curriculum, UDL means learning goals, teaching methods, materials, and means of assessment.

Contrary to traditional approaches to learner variability that categorically label "different kinds of learners as belonging to distinct groups" (Meyer et al., 2014, p. 49) and offer solutions according to those divisions (i.e., learning disabilities or gifted), the UDL's stance on the systematic and predictable nature of variability is context-dependent. The UDL approach encourages the use of systematic curriculum planning to remove unexpected difficulties that can

be imposed on students by considering individual differences in abilities and skills, hence resulting in academic disengagement. Similar to Biggs' (2003) and Biggs and Tang's (2007) stance, the actual problem is not with the student, but instead with the teaching methods or inappropriate ways of assessment that sometimes are not aligned with the aims of variability anticipation in the classroom, thus showing learners that they cannot attain the learning goals. UDL also believes that the problem exists with the curriculum—for example, unclear learning goals, poor teaching strategies, absence or inaccessibility of learning materials, and unauthentic assessments. These problems hinder student learning and keep them away from becoming expert learners.

Accentuating the concept of the expert learner in UDL, Meyer et al. (2014) believe that being an expert is not a destination but a "continuum of development" and the process of learning itself impacts learners (p. 15). Furthermore, the process of expert learning is not limited to students; it also helps teachers to become expert learners, thus leading to the establishment of an expert learning system. When the teacher becomes an expert learner, students can easily attain the desired learning outcomes since the teacher knows what it takes for them to succeed.

Expert learners are strategic, resourceful, and motivated. This insight is facilitated by the identification of three brain networks in diverse learners (a) *the affective network* accounts for the feelings and emotions that enable learning attitude and strives to answer the "why" of learning; (b) *the recognition network* that identifies and categorizes the information and seeks to answer the "what" of learning; and (c) *the strategic system* that deals with the planning, metacognition, monitoring, and mental-motor coordination and accounts for the "how" of learning. Neuroscience research shows individual differences in brain networks in terms of

learners' "strengths, areas of need, and preferences--affecting the way they learn, engage, and respond" (Meyer et al., 2014; Winter, 2016, p. 22).

Across these brain networks, UDL provides a lens of *three guidelines*–such as multiple means of (engagement, representation, and expression), *nine principles* such as options for (self-regulation, sustaining efforts, recruiting interest, comprehension, language, and symbols, perception, executive functions, expression, and physical actions), and *thirty-one checkpoints* to address learners' variability and barriers to learning in the curriculum and the teaching components (CAST, 2018; Meyer et al., 2014; Winter, 2016). Research indicates that the application of UDL principles, guidelines, and checkpoints in general, along with special and inclusive classrooms settings in K-12 and higher education, relate to improved academic skills, retention, academic engagement, social skills, motivation and collaboration among students (Lieber, Horn, Palmer, & Fleming, 2008; Parker et al., 2008). UDL addresses within-individual variability—such as learning styles and preferences (Dolan et al., 2005) and between individual variability that are language and cultural diversity (Black et al., 2015; Rao, 2015). The concepts of learner variability and addressing barriers to learning are yet to be explored in the UDL literature, by documenting the perspectives of teachers in their daily practices in general classroom settings.

Definitions of the Study Terminology

Accommodation. Providing variation to a standard course, location, test preparation, response time, expectations, scheduling, and learning materials to ensure maximum access to the standard curriculum to students with special learning needs (Alharbi, 2018).

Anticipation. Anticipation can be defined as planning that clearly predicts, identifies and documents the possible variance in learners and barriers that can arise with teaching and learning in contemporary classrooms.

Assistive Technology (AT). AT can be defined as an item, equipment, product, system(s) acquired commercially or modified or customized to increase, maintain, or improve functional skills of learners (Edyburn, 2004).

Barriers to learning. Factors that are considered problematic in learning, motivation, academic achievement, and classroom teaching practices (Adelman & Taylor, 1997).

Constructive Alignment in Teaching System (CATS). According to Biggs (2003) and Biggs and Tang (2007), learning increases when teaching strategies are in line with student learning needs. Therefore, emphasizing the precise alignment of all teaching components (intended learning outcome, instructions, and assessments) is critical to receiving optimized learning outcomes in a classroom setting of diverse learners. One thing to note with CATS is that it can be used to give credits to students; therefore, there is a need for applying it appropriately.

Co-teaching. A collaborative teaching model of service delivery where general education teachers share accountability and responsibility for teaching a group of students alongside special education teachers (Alsalem, 2015).

Curricula. Teaching goals and lesson planning, intended learning outcomes, teaching methods and instructions, instructional material, and assessment are collectively considered as teaching components/curricula/lesson components (Biggs, 2003; Felder, 2005; Meyer et al., 2014; Rao & Meo, 2016; Winter, 2016).

Curricular infirmity. These are construct-irrelevant barriers to learning that are environmentally imposed (i.e., unclear learning goals, poor teaching strategies, absence or inaccessibility of learning materials, and unauthentic assessment) that hinder the learning process (Dolan et al., 2005; Meyer & Rose, 2014).

Differentiated Instructions (DI). DI is a research-based responsive approach to instructions that enables teachers to ensure meaningful curriculum access to all students according to their interests, learning profiles, preferences, and readiness (Tomlinson & McTighe, 2006).

Disability. Disability can be "physical, cognitive, intellectual…developmental, or some combination of these that result in restrictions on an individual's ability to participate in what is considered 'normal' in their everyday society. A disability may be present from birth or occur during a person's life" (Al-Assaf, 2007, p.30). The term 'disabilities' is used as an umbrella term to cover impairments, participation limitations in different activities; and considered as an expression of individual differences in this research.

Diversity. "People's differences based on race, ethnicity, gender, sexual orientation, language, culture, religion, mental and physical ability, class, and immigration status" (UNESCO, 2017, p. 1).

Equity. "Ensuring that there is a concern with fairness, such that the education of all learners is seen as being of equal importance" (UNESCO, 2017, p. 1).

Evidence-Based Practices (EBPs). "Refers to any interventions, teaching programs, instructional strategies, or implementations that provide consistent positive results in an experimental environment" (Alsalem, 2015).

Inclusion. "A process that helps to overcome barriers limiting the presence, participation, and achievement of learners" (UNESCO, 2017, p. 1).

Inclusive education. A philosophy and a vision of recognizing variability and addressing barriers to learning by adopting teaching practices that are core components of inclusive education to ensure meaningful participation and success for all, regardless of abilities.

Inclusive practices. "An approach to teaching that recognizes the diversity of students, enabling all students to access course content, fully participate in learning activities, and demonstrate their knowledge and strengths at assessment" (Al-Assaf, 2007, p.31).

Individualized Education Plan (IEP). "Written plan/program with input from the parents that specifies the student's academic goals and the methods to obtain these goals" (UNESCO, 2017, p. 1).

Individual Student Support Plan (ISSP). ISSP is based on the behavioral support plan that employs behavioral intervention to address targeted behaviors of the student.

Instructional design. A process of systematically designing and developing teaching and learning content and products in multiple ways to support learning differences, including but not limited to technology-rich learning materials. The terms instructional design, curriculum design, and instructional technology are sometimes used interchangeably in research.

Integration. "Learners labeled as having 'special educational needs' are placed in a mainstream education setting with some adaptations and resources, but on condition that they can fit in with pre-existing structures, attitudes, and the unaltered environment" (UNESCO, 2017, p. 1).

Intentional alignment. The present research defines intentional alignment as mindful and proactive planning of the teaching components (learning goals, teaching methods, use of the

learning material, and assessment procedure), in which the lesson plan anticipates and predicts variability and barrier issues, and the teaching components assure that they are in line with the core components of inclusive practices, including but not limited to the UDL guidelines and the state standards.

Kingdom of Saudi Arabia (KSA). The official name of a country located in the Middle East. In this study, the name of the country is used in three ways interchangeably that are the Kingdom of Saudi Arabia, the KSA, and the Kingdom.

Learner variability. Meyers et al. (2014) define learner variability as "the dynamic and ever-changing mix of strengths and challenges that makes up each learner" [and] "every learner approaches tasks with his or her own set of strategies" (p. 2, 17).

Least Restrictive Environment (LRE). A learning environment where students with disabilities have opportunities to get an education with their typically developing peers to the greatest extent possible (Al-Assaf, 2007).

Mainstreaming. "This involves educating students with learning challenges in regular classes during specific periods based on their skills" (UNESCO, 2017, p. 1).

Modifications. Simplifying learning content, providing additional instructional support, designing alternatively, and adapting learning materials to ensure maximum opportunities to access learning content (Lieber, 2008).

Scaffolded instructions. An instructional technique in which teachers provide support for students learning new skills by systematically building on their experiences and knowledge until they can apply the new skills independently (IRIS, 2017).

Teaching components. These include teaching goals and lesson planning, intended learning outcomes, teaching methods and instructions, instructional material, and assessment (Biggs, 2003; Felder, 2005; Meyer et al., 2014; Rao & Meo, 2016; Winter, 2016).

Universal Design for Learning (UDL). UDL is an approach in teaching and learning literature that recognizes learning differences within and between students in terms of learner variability and describes ways through which barriers to learning can be eliminated by adopting multiple and flexible means of presenting learning content, acquiring and expressing knowledge in diverse classrooms regardless of disabilities (Meyer, Rose, & Gordon, 2014; Rose & Meyer, 2002). This study views UDL as "an inclusive education reform" (Katz, 2015; p. 3) and a lens to analyze underlying research concepts and mechanisms.

Chapter Summary

In sum, the international education communities prioritize the need for inclusive education beyond physical placement to provide cognitive and social-emotional access to learning, regardless of differences and disabilities. Given the recent trends of inclusive education around the globe, the Kingdom of Saudi Arabia is restructuring its educational system to meet the requirements of students with and without disabilities. The educational reforms and restructuring processes require additional research to investigate the potential of introducing and promoting inclusive education in different parts of the country.

Adhering to the Universal Design for learning as an inclusive education perspective and Constructive Alignment theory, the current research explores and documents recent practices of private international schools in the Kingdom. This qualitative research presents general education teachers' beliefs and understanding about the core inclusive education components, (i.e., learner variability and barriers to learning) by investigating how teachers address these

issues in their daily practices. These objectives are achieved by examining teachers' thought processes and daily teaching practices in anticipating and intentionally aligning the teaching components in addressing variability and barrier issues in the classroom. Face-to-face teachers' interviews, classroom observations, participant observations, document analysis, and physical artifacts are used as major sources of data collection for this multiple case qualitative research.

Chapter Two: Literature Review

This chapter summarizes and analyzes the existing literature on the inclusive education that was collected from a wide range of studies conducted internationally, including in the KSA. The chapter is divided into two sections. The first section provides an overview of the existing research on the *benefits of inclusive education, teachers' beliefs and attitudes towards inclusive practices, and teachers' preparation and professional development programs*. It explains different instances where the application of inclusive education was successful. The second section provides an overview of the research base that informs *the core components of inclusive education practices in the classroom*. This section speaks about what is needed for the implementation of inclusive education to be effective in the general classroom.

Overview of the Inclusive Education Research

Benefits of Inclusive Education

Researchers highlight advantages of inclusive practices for students with mild to severe disabilities (Alqahtani, 2017; Alquraini & Gut, 2012; Lieber et al., 2008; Rea, McLaughlin, & Walther-Thomas, 2002) and for SWD regardless of disability type (Black et al., 2015; Dymond et al., 2006; Hall et al., 2015).

The current concept of inclusive education goes beyond the notion of disability to address diverse physical and cognitive learning needs, and multicultural and linguistic backgrounds. Inclusion encourages typically developing students to better understand their peers with disabilities and to reduce their negative perceptions about them. It enables the teachers to gain skills that can assist them in handling both students with and without disabilities in their classrooms. Doyle and Giangreco (2013) reported that inclusive education helps to minimize the stigma associated with receiving special educational services. Shogren et al. (2015) noted that

inclusive education provides a learning environment where a sense of belonging is developed among diverse learners. This sense of belonging is associated with improving the feelings of self-worth of the SWD and the feelings that they are not being excluded and are an integral part of the community (Wormeli, 2007).

Literature indicates that UDL appeared to positively impact interpersonal relationships and academic engagement in learning in inclusive classrooms. Dymond et al. (2006) noted that after restructuring the curriculum based on the UDL framework for inclusive practices, the SWD in the classes improved, in terms of their social skills and interpersonal relationships. Students without disabilities, on the other hand, depicted personal responsibilities and improved academic scores. The results of Dymond et al. (2006) are in line with the previous studies in inclusive settings, for example, Cole and Meyer (1991) identified the progress of students with severe developmental disabilities in the inclusive classrooms on a measure of social competence compared to the peers in segregated classroom settings. Feelings of belonging, improved self-worth, and positive interpersonal relationships and education serve as precursors and collectively facilitate students' motivation and engagement to learning.

Similarly, Katz (2013) implemented the Three-Block Model of UDL in an inclusive Canadian school with students from diverse language backgrounds (60 languages) and mild to moderate disabilities. She found evidence of highly engaged behavior in learning tasks among the treatment groups. The Three-Block Model of UDL in Katz's study was based on the core inclusive practices and the UDL principles.

Communication skills are considered vital in establishing social and academic skills for learners, regardless of disabilities. However, studies indicate that students with cognitive disabilities may develop better communication skills through interaction with typically

developing peers, compared to placing them in self-contained classrooms (Foreman, Arthur-Kelly, Pascoe, & King, 2004). Research indicates that inclusive classrooms increase expectations for both the teachers and the students, in addition to improving motivation in the learning tasks (Alqahtani, 2017). Additionally, the academic achievements of the SWD increase with their interactions with typically developing peers in inclusive classrooms (Cole, Waldron, & Majd, 2004). These improvements have been noted because parents and communities are supporting the rights of SWD to learn by their free interaction with all children. Cole et al. (2004) identified that the math and reading achievement test scores of the SWD in general classroom settings were higher than that of the SWD in the special classrooms.

Besides reporting the benefits for the students with and without disabilities, inclusive education literature values diversity and variability in the classrooms (UNESCO, 2017). It is through this that the contributions of each student and parents can be incorporated in learning. However, to attain the goals of meeting the needs of the increasingly diverse student population in inclusive classrooms, it is crucial to know the teachers' perspectives and attitudes about inclusive education.

Teachers' Beliefs and Attitudes toward Inclusive Practices

A growing body of international research in inclusive education indicates that teachers' positive beliefs and attitudes towards inclusion are vital in governing the success of an inclusive model of education (Adhabi, 2018; Alasim & Paul, 2019; Avramidis & Norwich, 2002; McGhie-Richmond et al., 2013). Beliefs and attitudes about inclusion vary between general and special education teachers (McGhie-Richmond et al., 2013), because of some factors associated with teachers' experiences with SWDs and a perceived lack of resources. Special education teachers, for instance, due to specialized training and exposure to SWD, emphasize positive perspectives

about the abilities of children with special needs, thus show more positive attitudes toward inclusion than general education teachers (Alqahtani, 2017; Woolfson, Grant, & Campbell, 2007). The general education teachers' negative beliefs and attitudes toward inclusive practices exist due to several reasons, such as classroom distractions caused by the presence of students with different types of disabilities and teachers having less effective classroom management techniques (Avramidis & Norwich, 2002; Kilinc, 2018). Tiwari, Das, and Sharma (2015) showed that the general education teachers in inclusive classrooms did not consider the SWD their responsibility; hence, depending more on the special education teacher, in terms of students' academic support and behavior management. Furthermore, general education teachers are concerned about additional training, extending instructions preparation time, and the provision of resources (Katz, 2015).

In their review on the international literature on teachers' attitudes towards integration and inclusion, Avramidis and Norwich (2002) came up with a range of research indicating teacher-related, student-related (needs, type, and severity level of the disability), and school system-related (resources and physical support) factors that impact teachers' beliefs and attitudes. Specifically, teacher-related variables included inconsistent evidence of gender differences towards inclusive views, supportive attitudes of young teachers towards integration, and positive attitudes of high school teachers towards integration compared to the elementary teachers. American studies included in the review; however, revealed converse findings; elementary teachers reported positive attitudes, unlike their secondary teacher counterparts. Worldwide variations in the adoption of the inclusive education model, its definition, and ways of model implementation, and differences in the teachers' preparation programs, provision of the resources, and social support might account for such variations. McGhie-Richmond et al.

(2013), for instance, found that despite a positive reputation regarding inclusive practices, some teachers in one Canadian school district reported negative attitudes about inclusion with complaints of insufficient resources and difficulties in classroom management. Similarly, the work of Fuchs (2010) identified some problems that general education teachers encounter in inclusive classrooms, (i.e., unable to meet the demands and expectations, insufficient training during their teacher preparation programs on inclusive education, and inadequate support provided by the school district).

Despite variations in the adoption of the inclusive education model, there are socio-cultural differences among teachers' belief systems in shaping their practices about inclusive education. Some teachers who come from cultures that consider students with disabilities to be outcasts remain unsuccessful in providing an equitable education to all students in the classrooms. To examine teachers' conceptualization and experiences of inclusive education for the SWD in Turkey, Kilinc (2018) identified the injustices based on the misdistribution of learning opportunities for the SWD in general education classrooms. Kilinc accentuated that the teachers' expectations regarding being 'able to fit' and predetermined ideology about being 'normal or average' are grounded in teachers' belief systems that are associated with their decisions for the inclusion and exclusion of the students in the general education classrooms (p. 15).

Similarly, Tiwari et al. (2015) reported that the socio-cultural ideologies about the SWD and systematic institutional barriers limit inclusive education only at the theoretical level and deprive teachers to implement inclusive practices in their classrooms despite having policies to promote and implement inclusive education systems in India. They purported that the more favorable attitudes towards disability traits and learning outcomes lead to higher perceived

control regarding the implementation of inclusive education that eventually guides teachers' intentions to perform inclusive practices in the classroom—these were found lacking in their study, and the teachers were found overall dissatisfied with their existing inclusive education practices. The comparative literature review of Jordanian, Middle Eastern and international research on inclusive education recently published by Benson (2020) identifies that the generally negative beliefs of Middle Eastern teachers toward inclusion is due to the inadequacy of resources, cultural and traditional disability views of disability, and an overall lack of training. These factors were reported to impede teachers' understanding of their roles and impacted their perceptions about whether students with disabilities belonged in inclusive classrooms.

In the Saudi Arabian context, most of the studies investigating teachers' beliefs and attitudes about inclusive education are in line with the international literature discussed above. Alquraini (2012) examined teachers' perspectives on the inclusion of students with intellectual disabilities (ID). The quantitative analysis of the study indicated that teachers showed slightly negative attitudes regarding the inclusion of students with ID. Additionally, the teaching position, previous teaching experience with students with any disability, and gender were significant factors impacting teachers' perceptions towards inclusive education. The experience in teaching students with disabilities determines how effective a teacher will implement inclusive education in the general classroom.

Stemming from the work of Alsalem (2015), there is a line of research investigating the implementation, use, and efficacy of the UDL for general and special education teachers in Saudi Arabia (i.e., Al-Assaf, 2017; Alquraini & Rao, 2018a). Al-Assaf (2017) measured teachers' beliefs in the use of UDL in general and special education classroom, the significance of inclusive practices, and teachers' attitude and expectation towards students' learning and

engagement in the pilot schools (teachers with inclusive education and UDL training) and public schools (teachers without training) in Riyadh. The quantitative analysis showed that the groups of general and special education teachers with comprehensive education training showed favorable attitudes towards the implementation of inclusive education. Such teachers understand how to incorporate students with disabilities in their classrooms. However, the younger teachers showed more positive attitudes towards inclusion; this can be because of the integration of the inclusive training programs that they went through. Conversely, the quantitative analysis of Alqahtani's (2017) study in Riyadh indicated that the older teachers had more positive attitudes about inclusive education for students with learning disabilities. The study also revealed that the teachers' level of education (master's degree), years of teaching experience, and gender (specifically, males) showed positive attitudes towards integration.

Adhabi (2018) investigated the perception of 402 elementary school special and general education teachers about the full inclusion of students with an autism spectrum disorder in Jazan, KSA. This quantitative study investigated four areas for example, the benefits of full integration, inclusive classroom management, ability to teach students with autism spectrum disorder (ASD), and special versus inclusive general education. Mixed perceptions of the teachers were found regarding full inclusion. The results show that general education teachers do not have sufficient training to teach students with ASD. Contrary to the previous research, Adhabi's study does not confirm that the teachers' age, level of education, gender, year of experience, position type, and the course they took on disability are related to teachers' perceptions of the benefits of full inclusion.

Furthermore, they found weak relationships between the mentioned factors with teachers' perceptions of general classroom management. Alshehri (2018) conducted another similar study

in Jeddah with 314 middle and high school teachers to investigate their attitudes about including students with autism. The quantitative analysis indicated that the teachers showed a less negative attitude towards the inclusion of students with autism in general education classrooms. Also, gender and level of education did not have significance in the integration, though teachers with less than five years of teaching experience had a more positive attitude about the inclusion of students with autism. It can be due to the inclusive teaching programs offered in the most recent learning institutions at KSA.

Given the teachers' overall reluctant beliefs and attitudes toward inclusive education, it is essential to identify research that offers a solution to the teachers' reported challenges in inclusive classrooms. Many studies indicate that teachers working in inclusive education settings are not certified to manage classroom behavior and to engage diverse learners in academic activities (Potgieter-Groot et al., 2012). Research on in-service and pre-service teacher training, professional development programs, and administrative support that significantly improve teachers' curriculum planning, lesson delivery, and the classroom management skills within inclusive education is reviewed in the next section.

Teachers' Preparation and UDL-based Professional Development Programs

The vision of improving and restructuring inclusive education has expanded over the last decade. The worldwide push towards inclusive education to address students' diverse learning needs places a high value on the redesigned competencies-based teacher training programs (Alquraini & Rao, 2018b). The Council for Exceptional Children (CEC) is the largest international professional organization for teachers specializing in disabilities and marginalized and exceptional needs of learners. The CEC programs emphasize standards in the preparation of special education professionals and specifically underscores "foundations, development and

characteristics of learners, individual learning differences, instructional strategies, learning environments and social interactions, language, instructional planning, assessment, professional and ethical practices, and collaboration" (Alquraini & Rao, 2018b, p. 111; Children, 2009). The work of Alquraini and Rao (2017) on investigating the competencies in teachers' preparation programs in 30 Saudi Arabian colleges and universities is a step towards adopting an inclusive approach in education. They investigated four observable behavioral capabilities, along with 27 different knowledge and skills, adapted from the CEC (2008) that are currently in practice at KSA teachers' preparation programs. They found that the new programs in the Kingdom are offering updated courses compared to the programs started 15 years ago. However, faculty members with foreign qualifications perceive that the current programs need improvements in many areas, such as professional development, fieldwork, and practicum experience.

More recently, special educators are making efforts to promote inclusive practices by introducing and adopting the Universal Design for Learning (UDL) framework in the Kingdom (Al-Assaf, 2017; Alquraini & Rao, 2018a; Alsalem, 2015). Alsalem (2015) introduced UDL in the professional development training of teachers for students with hearing impairments and deafness in the city of Riyadh. He found that the teachers in the Kingdom are interested in adopting a UDL approach. However, they have insufficient resources and collaboration among the educational community. He recommended UDL-based research to be conducted in different parts of the country, professional learning communities (PLCs) to be developed, and UDL introduced to general schools in K-12.

Alquraini and Rao (2018a) investigated special education teachers' readiness, perceived UDL-based knowledge, and needs to implement UDL. The results are congruent with the previous research at KSA that indicates a lack of flexible resources, collaboration and planning;

language barriers; and personnel shortage in the academic institutions. The authors suggested that targeted teachers' training programs, access to the current UDL-based research, and theoretical and practical knowledge on the instructional strategies are required to improve the current status of inclusive education in the KSA.

Within the United States, the Department of Education provides grants to incorporate UDL in the Teacher Quality Enhancement program for the special and general education pre-service teachers to ensure UDL-based instructional training and lesson planning (Winter, 2016). Vitelli (2015), in a quantitative inquiry conducted in the US, with 580 instructors from 58 general education teacher preparation programs in 22 states, was interested in identifying if the UDL model was practiced in the general education preservice coursework. Out of 580 survey participants, 350 indicated that they were aware of the UDL, 353 reflected basic knowledge about the UDL, and only 140 participant instructors mentioned that they taught UDL in their preservice teacher courses. Research indicates that the UDL-based preservice and in-service training enables teachers to effectively plan the curriculum according to the diverse needs of the learners in inclusive classrooms (Ammons, 2015; Winter, 2016).

Courey et al. (2013), in their quantitative study, examined the effectiveness of a 3-hour UDL training session to help special education credential candidates to learn how to incorporate the UDL principles in the lesson planning by showing innovative, and novel ways of delivering contents, engaging learners and assessing the learning. Since this is a new concept to most teachers, the results indicate that the credential candidates struggled to implement activities that adequately addressed the learning objectives in real middle school mathematics classrooms—the UDL training, however, maintained over time, and teachers benefited through the UDL-based training.

Winter (2016) provided UDL-based in-service professional development training to teachers to evaluate the improvement in their lesson planning—before training, right after the training, and following up after two months. The quantitative analysis showed significant improvement in the lesson planning in pre-to-post tests. Also, the learning was sustained, and the teachers enhanced their skills to design a lesson for a wide range of students in inclusive classrooms. The study of Spooner et al. (2007) and the study of Goldthwait-Fowles (2015) indicated that one-hour UDL-based professional development with the in-service teachers led to the development of lesson plans that integrated UDL principles in pre to post-test scores. However, Goldthwait-Fowles identified that a transfer of learning occurred to show gain differences in the scores from the pretest and intervention condition; this component was not identified by Spooner et al. (2007).

Spooner et al. (2007) noted that the UDL principles not only rely on the use of technology but also special and general education teachers to replace traditional instructions with alternative and innovative teaching techniques that adhere to the UDL guidelines. Using the UDL guidelines and special education teachers, students with disabilities can be embraced into the general education classroom. Smith Canter, King, Williams, Metcalf, and Myrick Potts (2017) investigated a professional development program's effect on general and special education teachers' perceptions, conceptualization, and implementation of UDL principles in elementary to high school inclusive classrooms. The participants reported that the intervention of the professional development program provided familiarity with the UDL, sufficient training, and increased understanding in implementing the UDL approach in teaching. Teachers, however, relied more on technology and innovative planning procedures and identified challenges that make them hard in adopting flexible, creative, and new ways of designing

lessons. These challenges include limited time, lack of workdays, larger caseloads, and high demands and expectations from the general classroom teachers.

Another study conducted by Anstead (2016), investigating teachers' perceptions of barriers to UDL, reported that the PLCs provide a platform to develop, share, exchange, and facilitate innovative course planning. They stated that the UDL- based professional development that occurs during PLCs gives teachers sufficient time to think, reflect on the shared ideas, and collaborate to replace the traditional ways of teaching and learning to meet the diverse learning needs in inclusive classrooms. Avramidis and Norwich (2002) concluded in their review that initially, teachers expressed resistance to any innovative policy regarding inclusion, but collectively exhibited a positive change in their perspectives following the training sessions.

In sum, the reviewed literature in this section identifies the advantages of inclusive education for students with diverse learning needs included, but not limited to SWD. The review also recognized the commonly reported factors that either positively or negatively contribute to teachers' beliefs, perspectives, and attitudes towards inclusive education. The common factors are student-related (disability type and severity) and teachers-related (grade level, background experience with SWD, socio-cultural factor, level of qualification, age, and years of teaching). The review of Saudi Arabian studies identifies explicitly a gap in theoretical discussions about teachers' formulation of a belief system that is grounded in their conceptual understanding about disabilities and inclusive education, and significantly influenced by the unique cultural and traditional education system of the country. Such theoretical discussions should be initiated with the recent adoption of advanced policies and initiatives taken in the Kingdom within the framework of inclusion. These initiatives include teachers' professional development, in-service and pre-service teachers training programs, collaborative teaching, and introducing assistive

technology to facilitate inclusive education in the Kingdom (Alquraini & Rao, 2018a; Alquraini & Rao, 2018b; Alsalem, 2015). The following section sheds light on the identification and discussion of the foundational components underlying inclusive education.

Core Components of Inclusive Education Practices in the Classroom

Over the years, efforts have been made to identify the components that improve the educational, personal, and social lives of students. In this regard, the main emphasis has been given to the SWD within inclusive education research. Alquraini and Gut (2012), for instance, identified an array of components after reviewing 72 studies conducted within the US between the years (2000-2010). These components are grouped as accommodations (modifications and curriculum adaptation), instructional strategies (cooperative learning, inquiry learning, UDL, response prompting, embedded instruction), assistive technology (augmentative and alternative communication, switches, alternative keyboards, touch screens), pre-service/in-service professional developments (teachers' training and PLCs), collaborations (professional, para-educators, and administrative support), and support groups (family and typically developing peers).

UDL advocates, however, believe that the benefits of the core components are not limited to the SWD, but they can be extended to other students with diverse needs. The effectiveness of the core components exists in the way teachers understand and implement them. Recognizing variability in the classroom and identifying and addressing barriers are considered fundamental to the core components of inclusive education in the UDL stance. Concerning the UDL framework, the following discussion highlights studies of the following core components: recognizing learners' variability, removing barriers to learning, learning environment, and the teaching components (see Figure 3).

Recognizing Learner Variability

Historically, researchers have been interested in identifying and addressing individual differences and learning styles of students to optimize their learning experiences. Learning styles refer to ways in which an individual "concentrates on processes, internalizes, and remembers difficult academic information or skills" (Shaughnessy, 1998; p. 141). Although emerging from the various disciplines of learning sciences, learning style research, however, has deep roots in the constructs of psychology literature, for example, personality and individualistic traits. Commonly, learning style researchers use various terminologies to refer to the learning style concept, such as learning strategies (Riding & Sadler-Smith, 1997), cognitive styles (Cuthbert, 2005; Sadler-Smith, 2001), and learning preferences (Loo, 2004; Sadler-Smith, 1997), emphasizing on a range of personal differences (Keefe, 1979; Perry, 1985), and contextual differences (Lee, Williams, & Kilaberia, 2012; Pritchard, 2013) in the discussion of the variations in the ways students approach learning (Cassidy, 2004; Felder & Brent, 2005) and how they have been acquiring information.

There exist conceptual variations among researchers in using the terms. These variations are (a) due to the loose distinctions between the terms, such as learning styles, differences, strategies, preferences, and cognitive techniques (b) due to the wide variations in the scale and the scope of learning (Curry, 1990). The fact that some people cannot appropriately distinguish the terms, they can be used in the wrong context; hence, bring about false interpretation. The interchangeable use of various terminologies sometimes appears with overlapping concepts and sometimes with distinct definitions in the learning style literature (Cassidy, 2004). For example, Keefe (1979) defines *learning styles* as "characteristics, cognitive, affective and psychological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and

respond to the learning environment" (Felder & Brent, 2005, p. 58). The term *individual differences* also referred to the "relatively stable characteristics of a person, such as academic ability, special talents or disabilities, or the more esoteric dispositions called learning style" (Perry, 1985, p. 1), whereas Pritchard (2013) defines *learning preferences* as "the conditions, encompassing environmental, emotional, sociological and physical, that an individual learner chooses if [he/she is] in a position to choose" (p. 42). The origins of cognitive styles share the same roots with those of individual differences and learning techniques research in the field of psychology. However, Riding (1997) and Saddler-Smith (2001) referred to *cognitive styles* as inbuilt "ways of gathering, processing, and storing information and experiences." They are a fusion of particular methods of thinking and personality that is acquired at a young age and considered as pervasive and fixed (Cuthbert, 2005, p. 236).

The concepts of individual differences and learning styles appear controversial in the teaching and learning literature and are not universally accepted (Curry, 1990; Felder & Brent, 2005) because they encourage positivistic and individualistic perspectives of researchers on learning (Cuthbert, 2005). Ridding (1997) warned about the possibility of confusing the term styles with the term ability and suggested not to consider learning techniques as "fixed" traits and isolated from the context because it is "habitual" and influenced by the background of the individuals (Cuthbert, 2005, p.236). The learning style ought to be defined appropriately for its purpose to be attained. Furthermore, Reynolds (1997) criticized learning style research by citing that it encourages labeling, stereotyping, and ignores individuals' historical and learning context: thus, promoting the idea of decontextualization. Decontextualization helps teachers in omitting details in their teaching that they feel are less significant to make it possible for the learner to comprehend particular ideas and concepts. Sadler-Smith (2001) further extended this debate

rejecting the notion of decontextualization by pointing out related terminologies as mutually exclusive that causes misunderstanding at the conceptual level for practitioners.

The definitions mentioned above, among several others, show discrepancies in featuring personal learning predispositions and environmental interaction in the learning experience. Some researchers argued on commonalities and differences among various associated concepts related to learning styles about the construct validity threats to learning style assessment tools (see Sadler-Smith, 2001), while others discussed the distinctions and similarities between the learning styles constructs and the learning style approaches (Cuthbert, 2005). The main focus, however, remained on the different approaches to learning and related measuring instruments with a little emphasis on the teachers' understanding of these concepts in the classroom practices. These conceptual variations can misguide teachers; they should have a clear understanding of the related topics/terminologies mentioned above to prepare and provide appropriate instructions to the students (Pritchard, 2013).

Research indicates that focusing on the specific learning styles of the students and in turn, adopting a particular teaching approach produces successful results in some students but causes disengagement in others (Curry, 1990; Pritchard, 2013). Therefore, the researchers suggested frugal ways of addressing this problem via adopting flexible approaches to instruction by focusing on the dynamic characteristics of the learners (Curry, 1990; Meyer et al., 2014) because, in the classroom, students have varied learning styles and differences.

Traditionally, learning style and individual differences research focused on the categorization of learners into groupings depending on predispositions, strengths, disabilities, and preferences. Such classifications triggered research on learning styles to increase student success in classrooms by providing instructions that matched with their learning styles, and that

promoted standardized personality testing (Curry, 1990; Meyer et al., 2014; Pashler, McDaniel, Rohrer, & Bjork, 2008). Reynolds (1997) pointed out flaws in the learning style categorization theory that placed and confined individuals with dynamic characteristics in distinct groupings: "those who fit the model and those who deviate from them need remedial action" (Cuthbert, 2005, p. 242). The term "model" in Cuthbert's perspective refers to the standards of normality that enable individuals to be placed in the group of "normal"; otherwise, grouping among those who are deviating the model is considered as "deficient" or "abnormal". Further, research indicates that the categorization oversimplifies learner differences and fails to accurately represent the diversity of today's classrooms (Meo, 2008). Classification can be unkind in addition to damaging the morale of students to attain the intended learning goals. Nevertheless, others believe that the categorization partially addressed variability issues in classrooms by providing targeted support and treating learners as individual cases (i.e., relying only on the Individualized Education Practices) (Meyer et al., 2014), and shows a need for identifying holistic ways of addressing variability issues for all learners.

With the advancement of brain research, identification of brain networks, multiple intelligence theory (Gardner, 2000), and the growth mindset approach (Dweck, 2015), differentiation (Tomlinson, 2000) and the UDL framework (Meyer, Rose, & Gordon, 2014; Rose & Meyer, 2002), the terms "learners variability" and "student variance" have gained popularity in research (i.e., Venkatesh, 2015). These theories agree on the malleability of individual learning traits and consider learning behavior as a product of the interaction of environmental agents with distinctive traits. Contrary to the traditional stance to learning style research, UDL researchers believe that every learner is unique because they have different background

knowledge, sets of expertise, languages and cultures, preferences, and choices in the process of learning (see Table 1 for more comparisons) (Black et al., 2015).

Table 1

Comparison Between the Traditional Literature on Learning Differences and UDL-Based Research

Components	Traditional literature	UDL/Non-traditional literature
Concepts and terminologies	Frequent conceptual variations among varied terminologies and definitions, such as learning styles, learning strategies, cognitive styles, learning preferences, individual differences.	Consistent use of the terminology "learner variability/student variance" that encompasses individual and personal traits of learning differences, ethnic and cultural diversity, linguistic variations, learning/cognitive styles, and disability.
Nature of the traits	Fixed, static.	Malleable, dynamic.
Learner disposition	Categorical labeling and distinct grouping of individuals.	Systematic, predictable and context dependent.
Instructional approaches	The targeted group of individuals, targeted skills, targeted support	Universally designed approach for *all* regardless of individual strengths and weaknesses.
Addressing learning differences	Partial solutions.	Maximized/Universal solutions.
Academic implications	Elementary to high school — mainly Post-secondary focused.	K-12 and higher education.
Research Implications	Learning style, assessment tools, approaches to learning.	Inclusive education, instructional planning, digital learning environment, UDL implementation, teachers training, and professional development programs.

The concepts of learner variability and student variance share common theoretical and conceptual grounds in the UDL framework and DI, respectively. Meyer et al. (2014) believe that the "individual varies over time and responses across individuals to the same environment also varies" (p. 45). How students respond to their learning environment is not the same. They define learner variability as "the dynamic and ever-changing mix of strengths and challenges that makes up each learner" (p. 2). Thus, UDL research addresses the needs of a range of learners through the use of guidelines and principles (McGuire-Schwartz & Arndt, 2007; Meyer et al., 2014) and shows promising results in promoting motivated, resourceful, and goal-directed learners.

The concept of student variance in the differentiated instruction framework relates to the UDL concept of variability in terms of the temporal, experiential, and contextual components (Tomlinson, 2000). UDL researchers, however, use the term learner variability to incorporate individual and personal attributes of the students, and multiple ways of accessing, processing, and internalizing information (Rao & Meo, 2016). Representing the non-traditional educational framework, Tomlinson (2006) grouped diverse factors of student variance across categories of biological characteristics, the degree of privilege, positioning for learning, and preferences. The list provides a comprehensive overview of learner variability/student variance with some suggestions on how to use individual differences as students' learning strengths in the classroom. Thus, the list extends and complements the concept of learner variability in the teaching practice.

The term learner variability is associated with inclusive education and inclusive teaching practices. Therefore, besides encompassing the traditional concepts of differences and styles, the scope of the term learner variability is now expanding with the global variations in the definitions of the inclusive education to serve students with vast differences (Salend &

Whittaker, 2017) and diversity on cultural, linguistic, (Bennett, 2001; Chamberlain, 2005; Herzig, 2005; Modiba & Van Rensburg, 2009; Rao, 2015) and religious grounds (Kunzman, 2006). Thus, UDL researchers consider a broad spectrum of student variations, including but not limited to disabilities, marginalization, multi-ethnicity, linguistic diversity, learning preferences, age and grade level, and the level of content understanding (see Table 1). Through incorporating a wide range of individual differences (personal traits) and environmental differences (cultural and linguistic variations), the UDL research endorses a developmentally appropriate set of practices applied in various settings to serve the needs of a diverse group of learning individual in general, inclusive and special education classrooms. Given the variations in defining inclusive education throughout the literature due to the context and interest of the researchers (Adhabi, 2018), there is a need to clarify the underlying concepts, which are linked with inclusive education.

Xu and Cooper (2000) argue that research on individual differences lacks teachers' perspectives and portray teachers as "mere implementers of policy or delivery of knowledge rather than active participants" in social construction research. Gaining deep insight into the underlying concepts in inclusive education from teachers' perspectives and practices is one of the primary goals of the present research adhering to the UDL paradigm—because no study has precisely identified teachers' perspectives on learner variability in UDL and inclusive education research.

Recognizing variability is an essential component in the inclusive classrooms, particularly for teachers to make decisions in restructuring and redesigning curriculum and in the lesson planning for diverse learners with different levels of strengths, through anticipating differences, as Rao and Meo (2016) state that, "UDL-based lesson development does not compel

the teacher to develop unique paths for each student's needs. Because learner variability is both systematic and predictable, teachers can reasonably predict some of how their students will vary and include flexible options that will support a range of learners in any given class" (p. 1). There are some debates among researchers regarding the adoption of UDL principles and guidelines. King-Sears (2020) for example states that although educators adopt strategies and instructions that may align with UDL guidelines and principles, they are "not proactively designed with learner variability and UDL framework in mind" (p. 1).

In conclusion, UDL researchers believe that recognizing variability is particularly important for teachers in inclusive classrooms when it comes to predicting strengths and learning trends. Predicting variability is related explicitly to teachers' proactive planning of classroom instruction to obtain an inclusive learning environment in which students will benefit regardless of whether they have disabilities or not. Proactive planning, according to the needs of diverse learners, is then related to the teachers' understanding of these concepts since their beliefs, and predetermined perspectives shape their practices. Thus, the current research intends to identify these relationships and to unveil the thinking patterns and attitudes of teachers in general education classrooms. Further discussion on these topics is carried out in the conceptual framework of this study. The next section provides information on identification and planning to remove barriers to learning, which is a core component of inclusive education.

Removing Barriers to Learning

Parallel to the discussion of learner variability, 'barriers to learning' is another term used in the context of identifying and addressing factors that are problematic in learning, motivation, academic achievement, and classroom teaching practices (Adelman & Taylor, 1997; Fielding, 1999; Pritchard, 2013). These are factors that prevent active learning in classrooms.

Traditionally, in the teaching and learning literature, there are three perspectives of barriers to learning: (a) *environment-oriented* that focuses on external factors (racial community, family conflicts, economic conditions or lack of family support, poorly structured school programs, and high-risk peer influence); (b) *person-oriented* internal factors (individual differences, vulnerability, disabilities, learning deficiencies and internal weakness) (Montgomery, 2006; Nelson & Soli, 2000); and (c) *transactional view* that emphasizes on the "reciprocal interplay of the environment and individual" (Adelman & Taylor, 1997, p. 8). Specifically, person-oriented research that emphasizes on the student-related components show learning and individual differences as barriers within the classroom context and deals with them through labeling and grouping of learners based on their learning needs and assessment reports (i.e., students with special needs or gifted learners) (Fielding, 1999; Pritchard, 2013). UDL researchers, however, consider learner variability as a strength, "not a liability within and between individuals" (Meyer et al., 2014, p. 45) and since they know and understand the individual needs of the students, they suggest multiple ways to address variability that is otherwise considered as a barrier to learning in general and inclusive classrooms.

Barriers experienced by students with disabilities are frequently reported in the literature from elementary through higher education (Black et al., 2015; Dolan et al., 2005; Hall et al., 2015). Within an inclusive classroom context, a discussion on barriers to learning is usually associated with the terms 'special needs and disabilities.' The work of Booth and Ainscow (2002, 2016) remains instrumental to inclusive research through the notion of "barriers to learning and participation as an alternative to the concept of special educational needs" (2002, p. 4).

Traditionally, the medical model of disability defines the person as inheriting the problems and challenges, while the social model of disability defines how a person's experience of disability is shaped by the surroundings and context (Towle, 2015). Some educators and practitioners refer to the medical model for describing students' learning difficulties in the "person-oriented" barrier research (Fielding, 1999; Pritchard, 2013; Adelman & Taylor, 1994). Based on the person-oriented approach, "student-related" barriers can be classified as (a) *physical barriers* (physical impairment, sensory and motor deficiencies including a wide range of disabilities) (Black et al., 2015; Dolan et al., 2005; Fuller, Healey, Bradley, & Hall, 2004; Nelson & Soli, 2000; Pritchard, 2013), (b*) cognitive barriers* (information integration and memory output related deficiencies, i.e., learning and developmental disabilities) (Montgomery, 2006; Pritchard, 2013), and (c) *affective barriers* (emotional, behavioral, attentional, organizational, engagement and motivational problems) (Fielding, 1999; Potgieter-Groot et al., 2012). In general classroom settings, however, cognitive and affective barriers are considered problematic and are obstacles to learning (Black et al., 2015; Kortering et al., 2008). Literature shows student-related challenges to learning are supported majorly via disability identification and provision of accommodations, along with the use of individualized, personalized, and differentiated teaching instructions appropriate to the learner's needs (Heald, 2016; Tomlinson, 2000; Tomlinson & McTighe, 2006).

Physical inaccessibility of classrooms for students using wheelchairs got popular as barriers to learning in the late twentieth century when Ronald Mace came up with the concept of designing the universally designed (UD) buildings to provide equal access to people with diverse physical needs in 1980s (Parker et al., 2008). UDL was introduced in K-12 and higher education to eliminate physical and cognitive barriers to learning and to serve the diverse learning needs of

students. UDL research shows promising results in providing physical access to learning and in addressing cognitive and affective barriers in inclusive and general classroom settings in K-12 and postsecondary education (Browder, Mims, Spooner, Ahlgrim-Delzell, & Lee, 2008; Dymond et al., 2006; Kennedy, Thomas, Meyer, Alves, & Lloyd, 2014; King-Sears et al., 2015; Lieber et al., 2008; Rao, Edelen-Smith, & Wailehua, 2015; Rao & Meo, 2016).

UDL researchers emphasize cognitive access to address *cognitive barriers* to learning. In their article, Meyer et al. (2014) stated that contrary to generating physical access in education that enables environmental admittance (space and equipment), lack of cognitive access relates to the learning networks in the brain (affective, recognition, and strategic) cause problems in comprehending information and core ideas in learning. Using multiple representation options and cognitive tools in education provide ways of creating cognitive access via various modalities to address learner variability and reducing barriers to learning. For example, using voice recognition software, as a tool of notes-taking, will help a learner to focus more on critical thinking, instead of focusing attention on diverting tasks (i.e., writing, memorizing information) (Marino, 2009). In a study, Kennedy et al. (2014) used Content Acquisition Podcasts (CAPs) for vocabulary instruction with the high school students with and without disabilities as a cognitive access tool. Based on the results, there were significant learning differences for vocabulary and science concepts in the SWD who were instructed through CAPs. These students learned vocabulary, terms, and concepts faster, unlike the comparison group.

Through utilizing electronic devices and programs as cognitive tools, the Universally Designed Science Notebook (UDSN) was developed via a progressive refinement process using a design-based research methodology for the middle school students to have an in-depth understanding of science concepts (Rappolt-Schlichtmann et al., 2013). The UDSN significantly

contributed to the improvement of science content learning outcomes, as compared to traditional paper-and-pencil science notebooks for learners with various reading and writing proficiencies and motivation levels. Similarly, the results of Hall et al. (2015) indicated that middle school students with learning disabilities gained significantly higher scores on a reading assessment, unlike their conventional counterparts after using a strategic reading tool in online condition compared to their offline condition fellows. In other words, students with learning disabilities gained more from the online digital environment compared to the regular education students exposed to the digital environment in an offline condition. However, the effectiveness of the cognitive tools on the learning outcomes is based on multiple factors, such as individual needs, type of tool, academic contents, and implementation instructions.

The studies mentioned above emphasize students' academic achievement in various areas after cognitive barriers were identified and addressed. However, research indicates that success is related to academic engagement, reengagement, intrinsic motivation, self-regulation, and social-emotional components (Adelman & Taylor, 1997; Skinner, Kindermann, Connell, & Wellborn, 2009). Thus, these components are critical in addressing *affective barriers*. Duffy and Elwood (2013) identified disengaged students' perspectives on a lack of motivation and barriers to learning within the classroom context. The thematic scheme indicates that relationships with teachers, lack of personalization, feelings of being labeled, lack of belongingness, and poor peer relationships, and teaching styles are barriers to learning. In another study, according to Potgieter-Groot et al. (2012), weak interaction between teaching strategies and learners cause emotional and behavioral barriers to learning at multiple levels within inclusive education settings. They concluded that many in-service teachers in inclusive classrooms are not trained enough to deal with the emotional and behavioral barriers. They,

therefore, need specific knowledge and skills to remove barriers caused by poor teaching and lack of classroom management skills. They also need to attend inclusive teaching programs and awareness to assist in developing skills that can enable them to remove emotional and behavioral barriers.

Rappolt-Schlichtmann et al. (2013) consider academic engagement as an emotional and cognitive skill that can be attained via the application of developmentally appropriate challenges that are calibrated to the learners' specific strengths and weaknesses. In their study, once they reduced unnecessary barriers, using embedded support through UDSN, they introduced a concept of "desired difficulty," to shape a purposeful learning design that could challenge students' levels of expertise in related science concepts (p. 1221). This strategy appeared highly involving and engaging for the students to meet the new challenging tasks, which required them to master such tasks. Considering self-regulation, a key component of motivation in learners, Rappolt -Schlichtmann et al. (2013) identified four essential constructs at the elementary level that are self-efficacy, interest, desire for challenge, and social behavior. These constructs can be discussed within the context of affective barriers in classrooms.

Moreover, Dymond et al. (2006) reported that teachers observed a powerful impact of UDL on relationships and interactions among students with disabilities (SWD) and typically developing students. SWD developed social skills, learned appropriate means for interacting with others; they wanted to communicate more with their peers and improve their interpersonal relationships. Students without disabilities learned to effectively collaborate, regardless of groupings with students with or without disabilities. Also, they grew in socialization and friendships because they were exposed to the structured opportunities that allowed them to work

in teams during the class. They started developing their sense of belongingness in addition to improving their academic performances.

In their article, Coleman and Webber (2002) referred to Bronfenbrenner's ecological model (2005) in viewing behavior as "disturbing rather than inherently disturbed, and the emphasis is placed not only on the child but also on the interaction with factors in the child's ecosystem" (p. 135). Adhering this perspective, besides addressing physical, cognitive and affective barriers in various fields of education research, the UDL theorists emphasized the concept of environmentally generated unintended barriers or construct-irrelevant barriers to learning (Dolan et al., 2005; Meyer et al., 2014; Salend & Whittaker, 2017). Delays in providing accommodations and alternative format textbooks based on individual needs in elementary through postsecondary education are regarded as environmentally imposed unintentional barriers. These curricular infirmities add on more obstacles to learning, because retrofitting is sometimes considered to be expensive, time-consuming, and ineffective (Black et al., 2015; Meyer et al., 2014); and it needs advanced planning to get fixed during the curriculum designing phase, instead of retrofitting later on (Dolan et al., 2005; Spooner et al., 2007). Moreover, administering a traditional paper-and-pencil assessment appeared as a curricular infirmity to the students' content knowledge (Rappolt-Schlichtmann et al., 2013). For instance, presenting long descriptive questions to students who have reading difficulties and administering a paper-pencil test to students with motor and physical challenges are examples of curricular infirmity (Dolan et al., 2005). These roadblocks reduce engagement and curiosity of learning in students and induce feelings of incompetence, discouragement, and disengagement, and as a result, it becomes impossible to attain learning goals and objectives.

In conclusion, UDL research provides promising results in addressing *student-related barriers* and *curricular infirmities* in the inclusive classrooms by applying and practicing three principles, guidelines, and checkpoints to the curriculum and teaching instructions and by suggesting various ways of presenting learning materials (i.e., digital and smart technology) that provide options for self-regulation, comprehension, and sustaining effort to enhance classroom engagement, motivation and academic success. The researchers need to restructure the scope of barriers to learning with the curricular infirmities alongside addressing the student-related barriers in education in mind. The next section showcases the learning environment as another core component of inclusive practices.

Learning Environment

The concept of the Least Restrictive Environment (LRE) is discussed frequently in the inclusive and special education literature (Alquraini & Gut, 2012). Since 1975 this concept is recognized by the Individuals with Disabilities Education Act (IDEA, 2004) (Al-Assaf, 2017). IDEA states that the SWD should be placed with typically developing students. Also, IDEA indicated "that special classes, separate schooling, or other removals of children with disabilities from the regular educational environment should occur only when the nature or severity of the disability is in such way that education in the regular classes and use of supplementary aids and services cannot be achieved satisfactory" (Al-Assaf, 2017, p. 38). Separation of students with disabilities should be the last option. The first part of the condition of the federal law about LRE opens the doors for the physical placement of students with diverse learning needs in the mainstream classrooms. The second part provides an option of removal to teachers, who appear to apply this condition to prevent unfavorable classroom conditions that have been raising questions on the fidelity of the inclusive practices. Towel (2015) stated that "as long as an

option for alternative programs and segregated classrooms are available, school staff can place the students with disabilities into these classrooms, especially when an educator believes that the support that they are providing is inadequate" (p. 39). The fact that there are insufficient supports for students with disabilities makes it difficult for them to be incorporated in the general education classroom.

Recently, the concept of a modern learning environment or the innovative learning environment (ILE) is replacing the idea of LRE (Mitchell, 2018). Considering the diverse learning needs and variability in the classrooms, ILE suggests flexibility, openness, and access to resources. The flexibility and openness components ensure that the physical structure of the classroom is different from the traditional classroom settings, where tables and chairs face the teacher who is lecturing. Instead, it should be accessible to both teachers and learners with diverse physical, cognitive, and emotional needs by using various types of sitting and learning arrangements. The openness characteristic allows learners to share their learning place with other classes, which also facilitates co-teaching practices and collaboration with educational professionals and volunteers.

Furthermore, these components provide real-time opportunities for teachers to adopt effective practices from their colleagues. By using different means of engagements for students (for technological resources) and teacher (for continuous professional development), access to resources featured in ILE ensures break-out space for a variety of learning opportunities. ILE concepts align with the UDL-based learning environment that suggests physical and cognitive access to learning to meet the needs in diverse classrooms. UNESCO's (2017) Sustainable Development Goal (SDG 4) on education also calls for the upgraded building structures of

education facilities that should be child and disability sensitive in addition to providing a safe and productive learning environment.

Beyond the physical characteristics of the learning environment, the role of the teacher as facilitator and moderator minimizes the power threats in the classroom and is critical for overcoming barriers to learning and establishing caring, supportive, and safe learning environment (Adelman &Taylor, 1997; Pedersen & Liu, 2003). Further, classroom restructuring in terms of the physical placement of students and innovative lesson restructuring also serve variability and barrier issues in the inclusive classrooms (Basham, Israel, Graden, Poth, & Winston, 2010; Basham, Meyer, & Perry, 2010; Browder et al., 2008; Kortering et al., 2008). In their research, Pedersen and Liu (2003) provided similar arguments on the student and teacher-centered learning, teachers' roles, assessment, and student interaction. They concluded that the teachers' supervised student-centered learning environment appeared beneficial to learners with diverse needs. A variety of approaches fit underneath the broad umbrella of student-centered learning, such as case-based, goal-based learning by design, project-based, and problem-based learning (Pedersen & Liu, 2003).

For the design of learning environments that improve student engagement, Turner (2011) described four approaches to learning in his review. These learning approaches are knowledge-centered, learner-centered, assessment-centered, and community-centered. These approaches are found effective for disengaged learners in the classrooms. Daniels, Kalkman, and McCombs (2001) investigated students' perceptions of the teaching practices and learning in the learner-centered and non-learner-centered elementary classrooms. Regardless of the grade levels and classroom contexts, students reported that excellent teaching characteristics are being caring, responsive, and stimulating. Additionally, students perceived teachers in the non-learner-

centered classrooms as being non-supportive; thus, they depicted decreased interest in learning. Some non-learner-centered classes do not have resources and support that encourage active learning. However, in addition to the learning environment and mentioned teaching-learning approaches, several other instructional strategies are found significant in an inclusive setting. The next section sheds light on how these approaches and strategies can be used to minimize barriers and to serve learner variability through adopting proactive planning of teaching components.

Teaching Components

Researchers believe that the establishment of a continuous process of curriculum development can encourage inclusive education (Alquraini, 2012). Commonly, learning goals and lesson planning, intended learning outcomes, teaching methods and instructions, instructional material, and assessments are teaching components or curricula (Biggs, 2003; Felder & Brent, 2005; Meyer et al., 2014; Winter, 2016) that every teacher ought to take into consideration. When adhering to the UDL principles, teachers use/focus on (a) *learning goals* that include embedded methods (clearly stated, observable, measurable and aligned with the grade-level standards), (b) *instructional materials* (flexible i.e., scaffolded digital media, format, and text that can be manipulated in different ways by learners' preferences) to present learning contents, (c) *instructional methods,* (applying multiple means of engagement, representation and actions) these are "decisions, approaches, procedures, or routines to accelerate learning" and (d) *assessment* that is "an expression of student learning" (Navok, 2017, p. 3, 5) removing construct-irrelevant barriers in assessment through scaffolded instructions and using flexible materials, and providing ways of multiple means of action and expressions (IRIS, 2017).

Learning Goals. UDL research shows how learning goals and academic and content learning, social skills and group membership, engagement and class participation, and independent responses in students are linked in both special and general education classrooms (Browder et al., 2008; Dymond et al., 2006; King-Sears et al., 2015; Lieber et al., 2008). UDL researchers emphasize on the pre-service, and the in-service UDL-based teachers' training in the development of lesson plans for diversity to be achieved in learning and to enhance strategies in the inclusive classroom teaching practices (Goldthwait-Fowles, 2015; Winter, 2016). A substantial amount of research signified the relationship between the teaching components (including learning goals) and teaching approaches to the students' learning approaches and desired learning outcomes (Felder & Brent, 2005; Mutch-Jones, Puttick, & Minner, 2012; Timperley & Parr, 2009; Vermunt & Verloop, 1999) and many others. For example, Timperley and Parr (2009) found that precise alignment between lesson aims, mastery criteria, and lesson activities was associated with the in-depth learning approach in students.

Biggs and Tang (2007) stated that the intended learning outcomes "are statements, written from the students' perspective that indicates the level of understanding and performance students are expected to achieve, because of engaging in the teaching and learning experience" (p. 55). He suggested that the intended learning outcomes are stated at three levels of goal setting. These levels can be interpreted and applied to the inclusive education to maximize the learning outcomes, such as, (a) at the institutional level (meeting the objectives of the inclusive education by serving learning needs of all learners), (b) the program level (goal setting to meet the grade-level standards and expectations), and (c) the course/subject level (goal-setting aligned to the content standards). Rose and Meyer (2002), however, suggested not to mix up means (the ways of achieving the goals) to the ends (the intended goals) when stating the learning goals in

the lesson planning for inclusive classrooms. Salend and Whittaker (2017) distinguished the difference between the goals and objectives. The goals can be individualized for each learner based on their strengths and challenges (IEPs and plans for gifted and talented learners), whereas the objectives may vary in the amount of the content to be learned or taught, the difficulty, level, and pace, and the ways to achieve the goals.

UDL researchers believe in empowering learners in setting their personal learning goals and consider the goal-setting process as an active part of student learning. Further, inclusive education researchers encourage teachers' reflective practices, collaboration, and consideration of background information of the learners during the process of goals setting and that the goals should be accessible to both the teachers and the students (Alsalem, 2015; Mutch-Jones et al., 2012; Novak, 2016). Besides, anticipating the possible barriers that can hinder the learning process is an essential component in UDL lesson planning and procedures (Meo, 2008). UDL researchers provide checklists and blueprints to be considered while planning lessons in the inclusive settings to foresee variability and barriers (Garderen & Whittaker, 2006; Novak, 2016; Rose & Meyer, 2002; Salend & Whittaker, 2017). The anticipation practices potentially minimize barriers to cognitive, affective, and physical access to learning by adopting appropriate instructional methods and materials.

Instructional Methods and Materials. The inclusive education literature reports low efficacy of general education teachers, challenges, stress, the degree of burnout, and perceived inability to meet the needs of diverse learners in the contemporary classrooms (Avramidis & Norwich, 2002; Talmor, Reiter, & Feigin, 2005). There appears, however, a body of research in inclusive pedagogy that accentuates improving teaching and learning experiences and enhancing engagement in diverse classrooms by implementing UDL principles (Katz, 2012, 2013, 2015).

Katz (2013), for example, implemented the Three-Block Model in an inclusive Canadian school that was grounded by the UDL approach and synthesized decades of research investigating the critical components of inclusive classrooms. The model improved students' learning engagement and reduced challenging behavior. For the teachers, it led to improved self-efficacy related to inclusive practices, reduced workload, and enhanced job satisfaction.

UDL research indicates that in the expert teaching and learning system, the desired learning outcomes are strongly related to effective lesson planning that is obtained by anticipating the variability and barriers, then proactively designing instructions by intentionally aligning them to the UDL principles, guidelines, and checkpoints. In their quantitative study, Abell et al. (2011) found that UDL-aligned teaching strategies in high school increased positive perception of the classroom environment, meaningful participation, and attitudes of personalization in early adolescent learners. Likewise, in their review, Crevecouer et al. (2014) concluded that the studies related to the UDL guidelines and principles demonstrated active learning experiences, accessible and useful apprenticeship environments, and contextual support for students with and without disabilities. Rao and Tanners (2011) mapped UDL principles across course materials and instructional strategies in a higher education setting and found improved comprehension and engagement in students. Similarly, a recent study by Root, Cox, Saunders, and Gilley (2019) presents alignment of mathematical instruction across UDL principles, guidelines, and checkpoints for three students with extensive support needs. In their multiple probe design, they found a functional relationship between mathematical intervention and an overall increase in student's problem-solving skills.

Furthermore, in a case study conducted by McGuire-Schwartz and Arndt (2007), teachers' positive perception of applying UDL principles in classroom instructions was related to

improvement in students' literacy skills, for example, English language, grammar, and spelling. In other words, when the UDL principles are applied in inclusive education, positive results are attained. Likewise, the elementary grades students with learning disabilities improved reading comprehension skills once UDL-based instructional techniques were employed to the story-mapping strategy in the study of Narkon and Wells (2013). Capp (2017) concluded in a meta-analysis that the UDL-aligned studies improve the learning process for all learners. However, more empirical evidence across research designs and varied research populations to maximize the effectiveness of this approach are required.

Incorporating UDL aligned instruction and course restructuring appears to be time-consuming and effortful (Rao et al., 2015; Rao & Tanners, 2011). Rao et al. (2015) suggest planning, anticipating a broad range of students, and gradual integration of UD components into the course, such as converting text material into Mp3, conversation or speech files using software to create a collection of accessible course material in advance. Similarly, Dymond et al. (2006) suggest redesigning in the summer and collecting and receiving student assessment data so that planning will be active and timesaving. Besides adhering to UDL guidelines and principles, researchers signify the alignment of teaching instructions with the Common Core State Standards (CCSS) as an essential component of the UDL framework (Goldthwait-Fowles, 2015; Novak, 2016). Rao and Meo (2016), however, argued that the language of the CCSS is usually broadly presented without considering how to achieve the objectives stated within it; they illustrated techniques to unwrap the texts using the coding method suggested by Ainsworth (2003) and then developed standard-based lessons by applying UDL guidelines. They, therefore, presented ways to align lessons both to the CCSS and UDL guidelines to ensure content accessibility and easy instructions for the diverse learners in inclusive classrooms, including students with English as a

second language needs (ESL). Table 2 in this chapter highlights reviewed literature representing alignment with UDL across the teaching components.

The significant role of feedback and scaffolded instructions in the inclusive practices is affirmed and has frequently been reported by UDL researchers (Hall et al., 2015). Dalton et al. (2011) noted that electronic corrective feedback was able to offer models and think-aloud input to the reader but was unable to analyze and collaborate with students with readily available support that could facilitate students' learning. Teachers cannot use electronic corrective feedback to facilitate students' learning effectively. The absence of combined feedback (that includes teachers' face-to-face feedback and instant digital/electronic feedback) resulted in non-significant effects of instructional scaffolding on students' comprehension. Scaffolded instructions are embedded support systematically provided by the teachers to build on skills based on learners' background knowledge and experiences. UDL encourages employing scaffolded guidelines, peer tutoring, and a continuous progress monitoring for both teachers and the students in maximizing learning experiences (Dymond et al., 2006; Hall et al., 2015; King-Sears et al., 2015; Mitchell, 2018; Novak, 2016).

Inclusive literature encourages using cooperative teaching practices due to their synergistic effects—learning from each other's strengths and sharing the workload in contemporary classrooms. Through this, teachers can learn from student's strengths and weaknesses in a way that they will eventually come up with the learning instructions that favor all students. However, in the study of Tiwari et al. (2015), general education teachers reported that they do not agree with co-teaching practices. Tiwari et al. (2015) suggest that these discrepancies are due to the lack of content knowledge in the special education teachers' training and the lack of specialized knowledge and specific strategies for classroom management in

general education teachers' training programs. These gaps can be challenged by exposing in-service general and special education teachers to continuous professional development programs, and by restructuring programs for pre-service teacher candidates. UNESCO (2017) suggests that developing skills and expertise as mainstream teachers should be followed by specialized training — where the definition of specialization should be broadly presented to encounter challenges in diversified classrooms.

In the inclusive education literature, several instructional approaches to lesson planning and delivery appear that widely recognize learning differences and provide a blueprint for the inclusive teaching practices, for instance, Response to Intervention (RtI) (Basham, et al., 2010), Multi-Tiered System of Support (MTSS), Differentiated Instructions (DI) (Tomlinson, 2006), and Understanding by Design (UbD) (Wiggins & McTighe, 2001) with an underlying focus on providing developmentally appropriate individualized instructions (Dixon, Yssel, McConnell, & Hardin, 2014; Turner, 2011). There are some debates on commonalities (Goldthwait-Fowles, 2015; Tomlinson & McTighe, 2006) and differences among these approaches and UDL — where the underlying focus of UDL is proactive lesson planning and personalized approach of instruction for all students, regardless of diversity, disability and abilities (Novak, 2017; Novak & Rose, 2016). Nonetheless, some scholars suggest using these approaches in combination with UDL to maximize targeted and individualized literacy support for students with and without disabilities (i.e., Ammons, 2015; Basham, et al., 2010; Garderen & Whittaker, 2006). The UDL approach is interested in delivering an education that benefits all students regardless of their disabilities.

Within the inclusive education research, the practices of curriculum adaptation, modification, and accommodations are widely discussed and recognized as interventions for

removing barriers and improving learning engagement (Alquraini & Gut, 2012; Alquraini, 2012; Mutch-Jones et al., 2012). Alquraini and Gut (2012) define curricular adaptations as changing or altering the teaching methods and ways in which the course materials are taught; for example, by using multiple forms of presenting learning materials or offering alternative tasks to meet the specific learning goals of the students. Modifications are considered as an interpretation of the learning objectives in the curriculum to make content accessible for diverse learners, whereas, Mutch-Jones et al. (2012) define accommodations as "techniques and materials that help students engage in the learning process, complete assignments, and demonstrate their knowledge without altering the level or amount of content students are expected to learn" (p. 1014). UDL researchers endorse these interventions, however, recommend anticipating variability and barriers before starting the actual instruction, rather than retrofitting modifications later in the curriculum as they are considered time-consuming and cause distractions in the teaching and learning process (Capp, 2017; Meyer et al., 2014).

The effectiveness of assistive technology (AT) is established in the inclusive education literature on teaching instructions and materials (Alharbi, 2018; Alquraini & Gut, 2012; Alquraini, 2012). The role of AT is well-recognized specifically by the US federal policies on disabilities (i.e., IDEA), CAST, and UDL in developing literacy and communication skills for students with and without disabilities and removing barriers to learning (Anstead, 2016; King-Sears, 2009; Messinger-Willman & Marino, 2010; Zascavage & Winterman, 2009). Edyburn (2004) states that AT can be defined as an item, equipment, product, or the system(s), acquired commercially or modified/customized, that can be used to increase, maintain, or improve functional skills of the learners. In their review, Alquraini and Gut (2012) identified assistive augmentative and alternative communication, switches, alternative keyboards, and touch screens

systems as critical AT components in inclusive education. Within the universally designed instructional frameworks (UDL, UDI, UID), learning in the cloud such as synchronous and asynchronous delivery (Novak & Thibodeau, 2016; Parker et al., 2008; Rao et al., 2015; Rao & Tanners, 2011), web browsing networks (Smith & Harvey, 2014), and technology integration (Basham et al., 2010; Kennedy et al., 2014; McMohan et al., 2016), AT is widely spreading as a facilitating agent to flexible teaching and learning for the inclusive settings. It is making work easier for the teachers as far as meeting the needs of the students with and without disabilities is concerned.

Recently, Basham, Gardner, and Smith (2020) introduced the UDL Observation Measurement Tool (UDL-OMT) to measure UDL implementation in classrooms. The UDL-OMT can be used to evaluate alignment to UDL (a) introducing and framing new materials, (b) content representation and delivery, and (c) activity and student engagement. This tool can be useful to support practitioners in the identification of the effective teaching methods, and strategies and materials that are aligned with the UDL framework. The UDL framework suggests that to achieve the objectives in expert teaching, teachers are needed to reflect on growth mindset, mastery-oriented tasks, sustainability, and organizational support that are acquirable using multi-media projects, software, and provide a digital learning environment to address variability, including linguistic and cultural diversity of the students (Rao, 2015; Rao et al., 2015). The component of flexibility in the AT is particularly essential, specifically for those with physical and cognitive deficiencies, during assessment procedures. The following discussion on assessment sheds light on how the AT facilitates the learning process and expression of learning.

Assessment. Research indicates that students with learning disabilities encounter problems at a cognitive level, such as decoding, reading fluency and comprehension, phonics/word recognition, and vocabulary (Black et al., 2015; Dolan et al., 2005) that are considered barriers to the learning. If these learning barriers are not eradicated via appropriate instructional and assessment techniques, they may impose unintended construct-irrelevant restrictions to the content knowledge and the learning expression (Marino, 2009). For instance, presenting lengthy descriptive questions to students who have reading difficulties and administering a paper-pencil test to the students with motor and physical difficulties (Dolan et al., 2005) are the examples of curricular infirmities. The research suggests the UDL alignment in the assessment procedures (Wilson, 2015), and using multiple assistive tools for accommodations to address roadblocks that minimize engagement and curiosity of learning in students and induce feelings of incompetence, discouragement, and disengagement (Marino et al., 2014). These tools include CAST eReader™ (Dolan et al., 2005) and "alternate format textbooks, test proctoring for students needing extra time for exams, note-taking, tape or digital recorders, [sign language] interpreters, tele-captioning, use of screen readers, and other assistive software on campus or for exams" (Black et al., 2015, p. 6).

In a mixed-method study, Dolan et al. (2005) reported that using computer-based text-to-speech read-aloud software during the assessment of the high school students with learning difficulties assisted in reducing construct irrelevancy and improved the students' test performance. In another study, Wilson (2015) examined the perspectives of eighth-grade students with mild disabilities about the effect of a universally designed computer-based assessment of their math performance. The qualitative analysis revealed that the students' performance was based on their perceptions about the accessibility of the evaluation instruments.

With effective assessment, it becomes possible to improve the students' performance. In other words, students scored high on the assessment techniques that they perceived were accessible to them both physically and cognitively. The findings of this study and others (i.e., Marion et al., 2009; Marino, 2014) allow caution while administering the computer-based assessment in general and inclusive settings due to the mixed reports where mediating/moderating factors should also be considered while interpreting the research findings. Researchers, however, believe that stating clear assessment goals and expectations (Marino et al., 2014) to students and focusing on assessment "as a unit" in a curriculum can reduce test anxiety and increase performance on standardized testing (Novak, 2016, p. 196).

Adelman and Tylor (1994) suggest that "within the context of a personalized learning environment, the goal of assessment should be concerned with eliciting learners' perceptions of how well teaching and learning environments match both their interests and abilities" (p. 113). Furthermore, Sutton (2003) states that the purpose of evaluation should not be making a final judgment about the students' performance, instead of considering it as an ongoing progress tracking system to check the efficacy of the lesson plans, goals, and the teaching methods.

Some scholars refer to formative assessment as a diagnostic tool to evaluate the effectiveness of the curricula to re-design teaching and to rectify the existing problem (Mitchell, 2018; Novak, 2016). Formative assessment may include formal and informal ways of evaluation, such as quizzes, classroom observations, presentations, portfolios, and assignments. Summative assessment, on the other hand, is a predetermined collection of challenges to evaluating learners' levels of understanding the content areas after the accomplishment of a unit or at the end of a semester and is traditionally presented in formal ways under a controlled environment. Regardless of disabilities, the research indicates that students' level of

performance on assessments is based on the teachers' level of expectations (Rosenthal & Jacobson, 1968) and effective lesson planning.

In conclusion, the reviewed literature regarding the core components of inclusive education brings forth a criticism on the traditional ways of approaching variability and barrier issues by categorizing individuals with dynamic characteristics in groupings. Thus, the conventional ways of teaching and learning demonstrate flaws in addressing the needs of diverse learners in the inclusive and contemporary education system. In a debate on the congruence and friction between teaching and learning theories, Vermunt and Verloop (1999) concluded that tasks, assignments, and exam questions that teachers give to students often reveal "teachers' personal styles [more] than students need" (p. 277). Further, in an ethnographic study on expert teachers' thinking, Moallem (1998) states that the literature indicates a discrepancy between teachers' favorable attitudes towards instructional design models and failure to systematically use them in classroom practices and that teachers' personal experiences, previously learned knowledge, and context are the standard explanations.

Winter (2016) suggests that transdisciplinary efforts are required in learning sciences research to teach teachers ways to remove barriers and to create a learning environment accessible for diverse learners. These efforts should be made, regardless of "philosophical, methodological, and epistemological differences" in the learning sciences (p. 20). I conclude this discussion by reflecting on the reviewed literature and gaps in the research, theoretical frameworks, and personal assumptions in a conceptual framework for the present study (Maxwell, 2012; Miles & Huberman, 1994) presented in chapter 3.

Table 2

Reviewed Literature Representing Alignment with UDL Across the Teaching Components

Teaching components	Study	Alignment with UDL	Research Methods & Learners' diversity	Instructional/Learning Strategies, Effective UD practices, Learning tools	Outcomes
Lesson Planning	Dymond et al. (2006)	Administered a checklist of questions to the teachers, focusing curriculum, instructional delivery, students' participation, materials, and assessment. The questions were reflecting course redesigning preferences based on UDL principles	Qualitative (case study) 101 high school (grade 9-12) students from an inclusive science class with 20% disabilities (LDs, MR, HI, OHI, Pd, vision and autism), diverse multiethnic (67% W, 24.2% B, 1.2% A, 1.2% H, 2% NA)	Effective practices: for inclusive settings, the authors suggested "(a) clearly define the roles of the instructors in the classroom so that everyone understands their responsibilities, (b) provide regular training, guidance, and supervision to paraprofessionals, and (c) involve paraprofessionals in the redesign planning process from the very beginning" p. 300	The highest change was reported in materials used and options for student participation and engagement. Students' predetermined group membership decreased and the amount of non-task related talking increased. Students with disabilities developed social skills, improved interpersonal relationships, and progress on IEP goals. Students without disabilities shown personal responsibility and improved academic scores
	Browder et al. (2008)	Illustrated operational definitions of three UDL principles and how they applied them in teachers training, developing learning materials and in the individualized task analysis	Single subject multiple-probe design across participants 3 elementary students (2 M, 1 F) with Intellectual disabilities from a special education classroom	Effective practices: the researchers used systematic prompting and feedback for each step of the task analysis to provide step-by-step guidance to the elementary school students with ID. Learning tools: the authors used UDL and augmentative and alternative communication devices in combination when shared stories were introduced to eliminate the learning barriers	All students increased their independent responses after being engaged through task analysis, prompting and feedback when UDL employed shared stories were presented. Targeted outcomes were foundational such as, choosing a book and pointing the desired object in the story

	Lieber et al. (2008)	In the curriculum development, the authors described UDL principles across the activities and instructional strategies in two core areas, such as academic competence and social competence for preschool children with disabilities	Mixed method (one group pre-test-post-test and case study) 58 pre-school students (42M, 16 F) with Disability (29 SLI,19 DD,1 ED,1 OHI, 1 ID, 1 Autism) and 29 without disabilities, belonged to the multiethnic community (17 H, 6 AA, 29 W, 2 A, 3 others), of 58 English learners are 24%	Effective practices: the authors emphasized two areas during curriculum development. Academic competences incorporated research-based learning activities of the large group, book reading, and phonics. Social competence included evidence-based practices for promoting positive social skills and conflict management. Additionally, individualization component was provided further accommodations to the preschoolers with special needs	Children showed significant improvement in academic skills (word identification, writing, letter naming, math skills, number series) and marginally significant scores on social skills (peer interaction and communication)
Instructional Methods	Spooner (2007)	Discussed how UDL principles were introduced to the teachers and illustrated inclusion of the principles of the lesson planning through a rubric	Experimental (pre-test-post- test) 72 Post-sec students from special Ed (2) and Gen Ed(2) classes, 17 M, 55 F, reported ethnicity (60 W, 9 AA, 3 others)	Effective practices: One-hour UDL-based training to the teachers enabled them to create lesson plans that include UDL-based modifications in the course objectives, materials, procedures, guided practice, independent practice, and assessment for inclusive post-secondary classrooms	Authors reported that UDL principles do not rely only on the use of technology, rather even without using it, special and general education teachers can replace traditional instructions with alternative and innovative teaching techniques adhering UDL guidelines
	Kortering, et al. (2008)	Aligned UDL principles in teachers' PD and in two types of themes that emerged in teachers created lessons of algebra and biology	Mixed methods (survey) 290 high school students with and without disabilities (37 LDs, 6 BD, 2 ID, 12 ADD) with ethnic minorities (12%AA, H 4%, A 2% in school A and 6% in school 22 teachers	Effective strategies: teachers developed a set of instructions, learning strategies and activities that were categorized into two themes, such as technology integration-based activities and novel instructional activities. Students reported strong agreement with the effectiveness of the teachers created the lesson plan	On self-reported engagement scale, students reported high rated of engagement, strong levels of agreements with the effectiveness and satisfaction with the UDL-based instructions as compared to their other academic classes

Abell et al. (2011)	Discussed how UDL principles can be generated, presented, and applied at the upper-elementary through high school	Quantitative (survey) 867 grade (5-12) students from 3 schools 15 teachers	Effective practices: "(1) Personalisation: extent to which individual students are offered opportunities to interact with the teacher, (2) Participation: extent to which students are encouraged to participate, (3) Independence: extent to which students are allowed to make decisions and assume leadership, (4) Investigation: extent of development of inquiry-based skills, and (5) Differentiation: extent to which instruction is differentiated on the basis of ability, learning style, interests, and rate of working" p. 183	High school students showed a high perception of personalization and class participation as compared to upper elementary and middle school students. However, no significant differences were found for personalization between upper elementary and middle school students. The authors suggested introducing UDL aligned strategies in early adolescents will increase the positive perception of the classroom environment
Schelly et al. (2011)	Applied UDL principles in teachers' training, development of accessible course material and in developing a survey reflecting students' perception on the teacher's use of UDL at post-sec level.	Quantitative (one group pre-test-post-test survey) 1,362 students completed pre-survey 1,233 students completed pre and post-survey with reported disabilities 8%	Effective strategies: students endorsed reading assignments online, consulting accessible videos, receiving prompt feedback, and supplementing lectures and reading materials with visual aids	The study reports that in students' perceptions teachers improved in applying UDL-based instructions in the classroom regarding presenting ideas and information, engaging students and encouraging varied ways of expressing course contents
Katz (2013)	Referenced UDL principles in the context of designing Three-Block Model of UDL that is a set of EBPs in instructions and assessment	Mixed Methods (quasi-experiment and observations) 531 students, grade (1-12) from 2 rural and 3 urban inclusive schools with 60 multi-languages (20% students with ESL)	Effective practices: the author suggested incorporating EBPs in teachers training such as (understanding by design, differentiated instructions, curriculum integration, inquiry and assessment for learning) Instructional tool: in Three-Block Model of UDL, the author introduced diversity and valuing programs in block one, integrated inclusive instructional practices and EBPs in the second	The author reports overall significantly engaged behavior between treatment and control groups in the post-test. No significant differences in the levels of inclusiveness or student autonomy, and no significant interaction effects for gender, language, place of birth and

		with mild to moderate disabilities, 58 educators, class teachers, resource teachers and school administrators	block and suggested structural practices at a policy level in block three	grade. This study, however, does not specifically address academic achievements
Black et al. (2015)	Referenced the application of UDL and UDI-based instructional methods	Qualitative 15 Post-sec students with disabilities 12 (LD, with and without CI, sensory, psychiatric and MI) and 3 without disabilities	Instructions: based on nine UDI principles and three UDL principles, guidelines and corresponding checkpoints, the article provides a set of instructions to foster UD-based practice in education Learning tools: the author suggests multiple assistive tools for accommodations for example, “alternate format textbooks, test proctoring for students needing extra time for exams, note-taking, tape or digital recorders, [sign language] interpreters, tele-captioning, use of screen readers, and other assistive software on campus or for exams" p. 6	Students’ responses on UDI principles reflect themes such as engagement, self - regulation, optimizing motivation, time management, receiving feedback, physical accommodations and effective use of counselors on a required basis. Strong UD aspects in students’ opinion are novel activities, collaborating other students, and successful learning
Root et al. (2019)	Alignment of intervention (instructional strategies) to UDL framework, principles, guidelines and checkpoints	A multiple probe across participant design (baseline, intervention, and generalization) 3 middle school students. 2 girls (B, 12, 13 yrs. grades 6 & 8, ID), 1 girl (W, 15 yrs. grade 8, ID & ASD)	Effective tools/materials: researcher created video anchors, the electronic grid of themes and worksheets (*GoWorkshee*t *App*), word problem, graphic organizer, calculator on iPhone, a self-graphing template on excel workbook	The visual analysis of the multiple probe design across participants showed a functional relation between the mathematic intervention and overall an increase in problem-solving skills. Implications for the application of the UDL framework for mathematical instructions is provided in detail

	King-Sears & Johnson (2020)	UDL-based instructional materials were designed to align with UDL principles, guidelines, and checkpoints	Quantitative (pretest-post-tests) 2 studies Treatment group: 16 without disabilities & 9 with LD Comparison group: 11 without disabilities & 1 with LD	Effective tools: IDEAS and Mole Equality Organizer, Chemistry Mole Module Fidelity Manual for teachers' self-monitoring, Mole Student Workbook, session videotaping. Graphical procedural facilitator, featuring patterned boxes, PowerPoint presentations, 6 videos	Study 1: UDL-based co-teaching class significantly higher scores on the molar conversion posttest compared to the business-as-usual group Study 2: students in the self-contained classroom had a higher mean, some students however required additional time to learn. Overall all students in the UDL treatment scored high. Results are different than their previous study in 2015. The authors stated fidelity check might be positively impacting the findings
	Ellen McGuire-Schwartz and Arndt (2007)	Introduced UDL to the preservice teachers, later teachers applied UDL principles to the early childhood classes	Qualitative (action research) 41 preservice teachers for grades (pre-K-3)	Effective tools: for teachers training, the authors used the educational material for teachers developed by CAST (2002), such as ABAW to examine potential barriers in the teaching methods and materials. Additionally, exploring CAST website, software, and readings on UDL	Study 1: Teachers reported improvements in students' performance, spelling scores, English language learning and grammar improvement Study 2: Teachers commented on enhanced engagement reflections in students
Teaching Materials (Digital and Assistive Technology)	Basham et al. (2010)	Used UDL principles as the theoretical framework to guide the digital backpack (intervention) used to facilitate technology integration into the curriculum.	Qualitative (case study: design-based research) 35 high school students from grade (7-11), (13 M,22 F) and 1 participant with LD, among them (27 AA, 1 W)	Instructional support: the researchers suggested to include any material (digital or otherwise) that provides structural support for the learning experience Learning tools: included in the digital backpack were, MacBook Pro and standard Macintosh digital media software, apps of video making, audio editing, web access, camcorder, still camera, iPod, and USB,	Students with less technology experience were able to do the required project using scaffolded instructions, internalized understanding and self-regulating strategies. Digital backpacks appeared to engage students in the learning experience and

				fostered ownership of what and why they were learning
Dalton et al. (2011)	Aligned features of online e-text designs (vocabulary and reading comprehension strategy) with UDL principles and applied this intervention on English and bilingual students	Experimental design (treatment conditions) 106 mono and bilingual students from 5th grade (boys 62, girls 44), EM (68), SEB (21) and others bilingual (17)	Instructional scaffolding: interactive vocabulary and reading appear effective when combined with a live conversation with the teacher and structured feedback. Scaffolded digital reading offers embedded instructions for vocabulary and comprehension for bilingual students	Both bilingual and monolingual students benefited from digital reading and enhanced vocabulary learning but did not differentially affect comprehension. Elements of metacognition were identified through student responses. Students' self-regulation and feedback appeared facilitating in learning
Rao and Tanners (2011)	Presented UID/UDL principles by mapping them across course elements such as course material and instructional strategies that they introduced in a higher education course.	Qualitative (case study) Learners/participants information is not reported	Instructional strategies: assigned short weekly assignments with instructions and choice of writing a traditional paper or creating a multimedia project Learning tools: Synchronized (Elluminate Live) and asynchronized (CMS, Voicethread, and e-mail) tools for instructions and interaction were used	Improved comprehension and engagement in students. UDL inspired post-secondary special education course students, and they took initiatives to apply UDL in their individual teaching practices
Coyne et al. (2012)	Presented UDL principles to align with the features of one of the story e-books used in their study called Literacy by Design (LBD)	Quasi-Experiment 23 grade (K-2) students from inclusive and separate classroom settings with significant ID (DD, ASD, WS, DS. FX, PDD)and only 16 were verbal	Instructional strategies: UDL-based literacy instructions that emphasize reading for understanding and develop contextual reading skills address all aspects of reading development Learning tool: the digital scaffolded storybook focuses "balanced literacy instruction: phonemic awareness, phonics, vocabulary, fluency, and comprehension."p.162	Design based instructional approach with UDL context shown significantly promising improvement in reading comprehension in the experimental group as compared to the control group
Rappolt-Schlichtmann et al. (2013)	Stated UDL principles in the context of developing a Universally Designed	Mixed methods (experimental and focus groups) 621 4th grade students from 28 classes with	Effective practice: "with strong teaching experience and embedded support for construct-irrelevant skills and strategies, technology can provide consistent gains for a variety of learners" p. 1223	UDSN appeared equally effective for students regardless of reading skills and motivation levels. Specifically, they identified

	Science Notebook (UDSN)	ethnicity 35% and disability status 10% and 22 teachers	Learning tool: UDSN was developed through a process of progressive refinement using design-based research methodology by CAST	feedback necessary for self-regulated and persistent learning; motivational levels; age-appropriate challenges; and ownership to enhance academic engagement and achievement
Kennedy et al. (2014)	Capitalized UDL principles in Multimedia Design Framework (MDF)- an intervention production checklist- a set of questions to be asked to identify the reasons of integrating specific instructions in the study	Quantitative (quasi-experiment) 141 high school students grade 10 among them 32 students with disabilities (27 LDs, 3BD, 2 ID) and 109 S without D	Instructional tool: based on multimedia instructions and integrating EBPs, UDL principles, instructional design principles and Mayer's (2008, 2009) cognitive theory, Content Acquisition Podcasts for vocabulary instruction were developed for LDs. Features include word consciousness, instructions of word meanings, guided practice and scaffolding, instructions of related terms, keyword mnemonic strategy and rationale for using a term/concept https://vimeo.com/49191997	Students with disabilities (SWD) with CAPs were significantly different from SWD in the comparison group. They learned vocabulary, terms and concepts faster than the comparison group. However, the author stated to interpret results with caution due to the small sample size and lack of standardized tests.
Hall et al. (2015)	Considered UDL principles and CBM (a type of formative assessment) in the development of web-based tool for reading	Experimental design (treatment conditions) 284 middle schools students (grades 6-8), 144 boys, 140 girls from inclusive settings (64 LDs, 8 HC, 8 LDs with ADHD, 3 SLD, 2 MS) among them 66%W, 20% AA, 12% H, 2% Asian and Gen Ed teachers (7), Special Ed (3)	Effective practice: electronic logs facilitates teachers to organize, analyze and monitor student data Learning tool: in a digital learning environment, the authors used a strategic reader tool under curriculum-based measure (CBM) instructions that include three critical components. UDL principles and elements from previous research, teacher-student topical discussion, embedded CBM formative assessment to keep students record	Students with LDs gained reading skills from the strategic reader as compared to the typical students significantly in online conditions. Technology appeared facilitating in managing teachers' daily activities, scoring, and analyzing student data. Digital features of reading enabled students to be self-reflective and enhance learning motivation

King-Sears et al. (2015)	Provided UDL principles followed by the related guidelines and stating 3-5 corresponding checkpoints along with narrating examples from the intervention (IDEAS) used in the study	Quantitative (pre-post-test and a 4-week follow-up/retention effects) 60 high school students with HID (19, LDs, BD, OHI) and without HID (41) Special Ed and Gen Ed teachers	Learning tool: using Camtasia™ software and PowerPoint animations, chemistry lessons-based videos were developed considering self-regulation and independent student learning with fading prompts http://www.youtube.com/watch?v=ysoVWF0vDQfor Video Clip 5a	UDL module was not more effective compared to typical instructions in group average per condition. Disaggregated scores show Gen Ed group gained more than HID and a significant interaction effect. HID of UDL condition gained more than HID comparison condition. Retention sustained for both groups
Rao et al. (2015)	Presented UID/UDL principles by mapping them across course elements such as course material and instructional strategies that they introduced in a higher education online course.	Qualitative (Case study) 77 Post-sec students with diverse age range (52%20-29, 32% 30-39, 10% 40-49,6%50-59) with no reported disabilities	Effective practices: students prefer to be informed about assignments many weeks in advance of the due date. Information about students' background knowledge and learning experiences, flexibility in assignments, organizing course contents on a weekly bases are considered effective practices Instructional tools: Blackboard Collaborate, the web-conferencing system, Voice thread, IRIS UDL training module	44% students reported the effectiveness of the course redesigning, usefulness and engaging way to interact with peers (21.4), strong feelings of connecting with class fellows (27.1%), effective way of learning from class fellows (39%) and feelings of connection with the instructor (15.3%)
McMahon et al. (2016)	A relationship between UDL principles and Augmented Reality (AR) was established to support their study of teaching science vocabulary to the college students with ID and autism	Single-subject multiple-probe design across participants 4 Post-sec students (3 ID, 1 ASD) among them (1 M, 3 F) with age range (19-25)	Instructional tool: the authors introduced a self-progressing monitor application AR that assimilates a live view of the physical world along with the digital content, i.e., pictures text, audio, and video. This application provides effective instructions to individuals with ID and ASD to teach them identifying food allergies, pedestrian navigation, and matching skills to elementary school children. For their study, the authors used it to teach science vocabulary to students with ID	AR appeared to be effective in improving science vocabulary, defining and labeling knowledge for the new science terms in all post-secondary students with intellectual disabilities

	Smith Canter, King, Williams, Metcalf, & Myrick Potts (2017)	Used UDL framework, principles and guidelines in the professional development program used to facilitate technology integration into the curriculum.	Mixed methods study using pre-post intervention techniques 14 inclusive, Spe Ed and Gen Ed teachers from elementary, middle, and high schools inclusive and self-contained classrooms of English/language arts, and math	Effective tools: for professional development include smart devices, interactive boards, document cameras. Collecting post-intervention data through using UDL Guidelines Educator Checklist Version 2 (2011) and a pre-test and post-test survey. Effective strategies: for professional development include introducing UDL framework, differences, and similarities between UDL and differential instructions, accommodations, modification, concrete examples of applying UDL-based learning using smart technology	The overall effects of teacher's perceptions, conceptualization, and implementation of UDL principles and practices in the classroom increased for all teachers. The inclusive classroom teachers and co-teaching partners showed the highest gains in understanding UDL principles, planning and integrating technology compared to the Spe Ed teachers. The authors suggested Spe Ed teachers require more planning, differentiation, and training due to the diverse range of student's needs.
Assessment	Dolan et al. (2005)	Referenced UDL in the context of using computer-based text-to-speech (CBT-TTS) read-aloud software during the assessment of high school students with LDs.	Mixed methods (quasi-experiment and case study) 10 high school students in social studies with LDs	Assessment strategies that reduce construct-irrelevancy can improve the validity of the test results for students Assessment tool: CBT-TTS was developed using accessible hypertext markup language and CAST eReader™. Students preferred using flexible options (audio test passage, adjusting font size and proceeding through the test in any order)	Results show slightly improved performance on CBT-TTS as compared to PPT. However, students' performance was significantly improved for long paragraphs on CBT-TTS and low readers performed higher in comparison with others.
	Marino (2009)	Illustrated UDL principles and aligned cognitive tool (technology-based science curriculum of a middle school) with the three principles	Mixed method (one group pre-test-post-test) 1, 153 Middle school students (grade 6-8) inclusive science classes with 126 students(severe	Effective practice: incorporating technology-based medium for LDs in assessment to reduce content related barriers in learning. Also, Anchored instructions provide a context to use cognitive tools Learning tools: Astro-engineering room for science students, Alien Rescue by CILAT (2005) is a technology-based astronomy curriculum with embedded UDL principles	Low ability readers did not benefit from the cognitive tools as compare to the proficient reader, even though they obtained more benefit on reading gains (.792 unit increase on post-test) as

		reading difficulties and poor readers), belonging to a diverse group of a multiethnic community (91% W, 1% AA, 5% A, 3% H)		compare to the proficient readers (.33 unit increase). The author discusses the effectiveness of cognitive load in students' comprehension facilitation by accessing supplemental material according to their needs
Marino et al. (2014)	Mapped science games feature with the selected UDL checkpoints and principles to enhance engagement and learning in students with LDs	Mixed methods (pre-test-post-test and focus groups) 100 students 16 from fifth grade and 84 from seventh- grade with 57 LDs, 41 PR, 23 AR, 2 % ELL 1 fifth-grade and 4 seventh- grade teachers	Instructional strategies: describing clear course expectations and rubrics to the students. Students prefer doing short assignments with a low point value and learn more. Timely and in-depth instructor's feedback increase engagement Effective assessment method: authors referred to modeling methods by Timms et al. (2012). 'Other assessment options include learning progressions in science, learning trajectories in mathematics, developmental continuums in reading, or learning maps' (p.99)	The study shows no significant difference in improvements from pre-test to post-test between units with UDL aligned and traditional curriculum instructions. They refer to effective assessment methods. However, UDL-aligned curricula increased knowledge transfer between virtual and classroom learning and engagement

Note. A = Asian; ABAW = A Barrier Analysis Worksheet; ADD = attention deficits disorder; AR = advanced readers ; App = Application; ASD = autism spectrum disorder; B = Blacks; BD = behavioral disorder, CAST = Center for Applied Special Technology; CD = cognitive disabilities; CI = cognitive impairment; CILAT = Center for Innovative Learning and Assessment Technologies; DD = developmental disability; DS = Down syndrome; EBPs = evidence based practices; ED = emotional disturbance; ELL = English language learners; EM = English monolinguals; ESL = English as second language; FX, Fragile X and pervasive; Gen Ed = general education; H = Hispanic; HC = health conditions; HI = hearing impairment; HID = high incidence disabilities; ID = intellectual difficulties; IDEAS = identify, draw, enter, answer, solve; LDs = learning disabilities; MD = mild disabilities; MOE = Mole Equality Organizer; MR = mild-moderate mental retardation; MS = mobility support, MID = mobility impairment development; NA = Natives Americans; OHI = other health impairment; PD = professional development; PDD = Pervasive developmental disabilities; Pd = physical disabilities; PR = proficient readers; Post-sec ed = post-secondary education; SEB = Spanish-English bilingual; SLD = speech and language difficulties; SLI = speech language impairment; Spe Ed = special education; UDI = universal design for instructions; UDL = universal design for learning; UID = universal instructional design; W = Whites; WS = Willi syndrome

Chapter Summary

Given the need for research on these topics in the inclusive education literature, specifically within the UDL literature, the present study intends to examine the general education teachers' anticipation, beliefs, and perspectives on the core components, and intentional alignment across teaching curricula. The research in inclusive education reports the need to address the learning differences in today's diverse classrooms and shows that the emphasis should be given to identifying and eliminating barriers. By adopting a backward approach of inquiry, this study examines the roots of teachers' practices in their beliefs about the core concepts of variability and barriers; and then evaluates if their methods are aligned with the core inclusive education components found in the literature. The UDL framework and research base address topics related to variability and barriers by focusing on the implementation of the principles, guidelines, and checkpoints. However, the present research explores the perspectives and practices of general education teachers in comprehending, anticipating, and addressing these topics.

Biggs (2003) states that teaching and learning activities should be in line with the same goal to accomplish the desired learning outcomes or being an expert learner, as the UDL framework suggests. In an expert learning system, both the teacher and the student are the learners and need momentum in establishing the equilibrium in the teaching and learning system trajectory. One component in maintaining the balance in the inclusive education system can be practicing the systematic, intentional alignment by anticipating variability and finding ways and effective strategies in eliminating barriers to learning in all teaching components suggested in the literature. Additionally, if teachers practice intentional alignment in the general education settings, their attitudes towards inclusion will be improved, and the teaching practices can be

inclusive, regardless of disabilities. The teacher will consider the disabilities of the students as an opportunity to provide a quality education that will students' needs. This multiple case study is an effort to initiate scholarly discussions around these topics and to explore possibilities of inclusive education in the private international schools in KSA.

The subsequent chapter highlights the conceptual framework of the study, the procedures of participant recruitment, data collection methods, and analyses to examine anticipation and intentional alignment in daily teaching practices.

Chapter Three: Methodology

Conceptual Framework

The conceptual framework of this study is guided by two learning theories, an extensive literature review, an epistemological position, and personal assumptions (Maxwell, 2012). The learning theories that are Universal Design for Learning (UDL) (Rose & Meyer, 2002) and Constructive Alignment Theory in the teaching system (CATS) (Biggs, 2003; Biggs & Tang, 2007) lay the foundations for this research. These theories complement each other and relate to the major concepts of the study. Additionally, these frameworks were adopted to evaluate the existing teaching practices in the Kingdom because the country's special education policies are based on international special and inclusive education regulations. Further, the Kingdom is currently adopting western models within inclusive education; specifically, it is starting to introduce UDL-based teacher training programs. Therefore, the epistemological adopting of constructivist and interpretivist positions, as Ponterotto (2005) suggested, situates this research inquiry:

(a) within my beliefs and assumptions about ontology that considers the inclusive education as an achievable reality for the educators, and approachable beyond their physical placement for the learners

(b) epistemologically, understanding my positionality of being a knowledgeable researcher and the relationship with the "knower"— the teachers

(c) our mutual connection to construct the study of knowledge — thus, endorsing the axiological roots of the study

(d) considering the critical role of the rhetorical structure at various levels during the study such as gaining the conceptual comprehension of the underlying phenomena by reviewing

the literature, and by examining the language of the participants to explore the truth found within the context and the current educational writings.

The teachers' belief systems and their lived experiences in terms of their everyday practices serve as the proponents of the constructivist-interpretivist approach of the present research and are discussed in the subsequent section (Ponterotto, 2005).

Teachers' Belief System and the Process of Anticipation and Intentional Alignment

Brown (2005) differentiates the concept of "inclusive thinking and inclusive practices" (p. 256). Inclusive thinking refers to the educators' internalized beliefs to remove non-essential barriers in the participation of marginalized individuals in the natural learning environment whereas, considers inclusive practices as a product of inclusive thinking, which refers to the actual demonstration of teaching and learning activities, events, and arrangements to ensure inclusive rational/beliefs/ideology. This philosophical trajectory is linked to the teachers' initial understandings about the inclusive approach. These understandings are formed by their personal, traditional, and cultural beliefs and experiences with disabilities and diverse individuals in society. These factors collectively establish a set of pre-determined ideologies that are reflected via teachers' demonstrations of acceptance, rejection, or neutral attitudes toward inclusive practices. Windschitl (2002) considers the factors mentioned above as teachers' aspects of intellectual and living experiences that resist the construction of theoretical understanding in their daily practices. Alternatively, teachers interpret their classroom experiences with a pre-established mindset/past experiences, relate their present skills with their background knowledge/experience and then formulate and associate favorable or unfavorable attitudes towards specific practices (i.e., inclusion or disabilities). Windschitl named the stated

factors as conceptual, pedagogical, cultural, and political dilemmas that are active agents in conceptualizing teachers' belief systems under a constructivist approach.

Researchers with a constructivist approach to education discussed various types of belief systems that deter effective teaching methodologies, though they are considered essential for inclusive practices. Turner, Christensen, and Meyer (2009), for example, stated two types of beliefs that cause barriers in teaching practices: considering learners and the learning content as "fixed, rather than interactive and malleable" (p. 362). Teachers with fixed or firm beliefs, approach the learning material in transmission way or struggle to fit the learners' styles and preferences according to teachers' pace and teaching style. Such beliefs prevent the teacher from adopting new strategies that can be utilized to advance student learning and teacher training activities to achieve positive results. Conversely, teachers with malleable beliefs tend to embrace interactive, flexible, and learning-focused pedagogy. Given these beliefs, teachers either consider the curriculum as "a product" (static or unmodifiable) or as a "dynamic process" (continuous and a collaborative effort of learning for both teachers and the students) (Trigwell & Prosser, 2014, p. 143). Turner et al. (2009) found that after transforming their beliefs from stable to malleable, teachers were able to adapt their roles from authoritative figures to facilitators in their classrooms, and they were more mindful of the students' learning needs.

Within the inclusive education literature, there are three types of belief systems in addition to the medical and social model of disability, for example, ableism, and pathognomonic and interventionist perspectives (Avramidis & Norwich, 2002; Kilinc, 2018). "Ableism is a set of beliefs that guide cultural and institutional practices, ascribing negative values to individuals with disabilities while deeming able-bodied and able-minded individuals as normal; therefore, superior to their disabled counterparts" (Gabel, 2005; as cited in Kilinc, 2018, p. 9). Klinic

explored the placement of the SWD in the inclusive education settings and found that the SWD experienced different forms of exclusion within their classrooms. The author argued that placing students in classes and the level of their learning opportunities were related to the teachers' preset ideology of ableism and normalcy that determined the possibility of physical and content access for the SWD in an inclusive setting. Students, in Kilinc's study, who were considered to fit into the "average" or "normal" abilities (in teachers' perceptions) were included in the learning activities while others faced exclusion within the inclusive settings—hence, the students experienced injustices based on misdistribution of resources and misrecognition of their abilities. The students with disabilities did not have the same privileges as those of students without disabilities. Teachers with a pathognomonic perspective believe in the medical model of disability and do not feel any responsibility for serving students with different learning needs in the classroom (Tiwari et al., 2015). Teachers with the interventionist approach, on the other hand, adopt teaching methodologies similar to the teachers with the malleable ideology discussed earlier (Avramidis & Norwich, 2002).

The above discussion about teachers' beliefs regarding the learners, learning content, and learning process relates to the teachers' level of understanding these core concepts; teachers' general beliefs about these concepts are critical for accepting and adopting an inclusive approach to education. For example, the learners — in terms of dynamic individuals, their ways of internalizing and externalizing learning, along with other types of variability components, including cultural and linguistic diversity, their strengths and weaknesses, and disabilities — thus, recognizing variability. The learning content — as a means to continue designing and creating an approachable content — consequently, a continuous process of growing and learning new skills. The learning process — as the trajectory of conceptualized inclusive beliefs based on

the growth mindset, recognized variability, malleable curricula with advanced planning to remove barriers, and collaborated practices within a classroom context.

UDL researchers usually emphasize the concept of advanced planning or anticipation in teaching practices. Anticipation can be defined as planning that predicts, identifies, and documents the possible variance in learners and barriers that can get in the way of teaching and learning in contemporary classrooms. The concept of anticipation is strongly associated with the teachers' positive and inclusive belief systems. These systems allow for the readiness to adopt the process of anticipation by recognizing learning differences at the first level, then predicting possible variance, and finally planning lessons and designing curricula keeping variability and barriers in mind. Capp (2017) commented that the change in teachers' mindsets is essential before adopting the approach of proactively planning for all learners. It is crucial to consider teachers' general beliefs as a prerequisite to the anticipation process, to identify how teachers think, understand, and perceive variability and barriers in their classrooms and in terms of how they handle students.

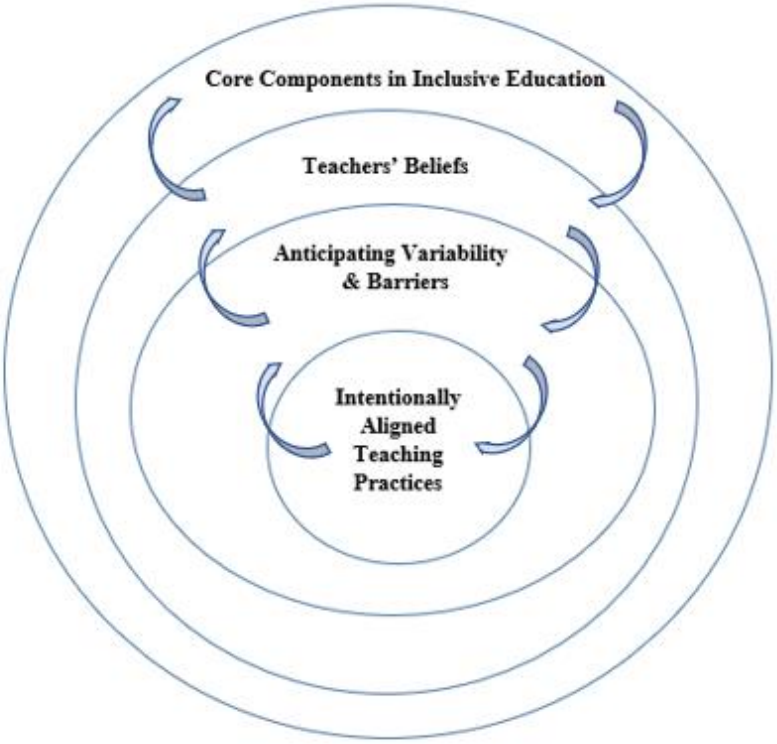

Figure 1.The multilayered concepts of the study within the context of inclusive education.

Besides serving as a prerequisite to anticipation, teachers' inclusive beliefs are also considered to be the determinants of the inclusive practices. Practices that are based on intentional planning for addressing variability and removing barriers are among the core components in inclusive education. UDL research emphasizes the alignment of the lesson planning and delivery with the suggested principles, guidelines, and checkpoints. This process of intentional alignment enables teachers to target the students' recognition, affective, and strategic neurological networks — regardless of variability and disability. Thus, these concepts are multilayered, interact with each other, and are mutually exhaustive (see Figure 1).

The present research defines intentional alignment as mindful and proactive planning of the teaching components (learning goals, teaching methods, use of the learning material and assessment procedure), where the lesson plan anticipates and predicts variability and barrier

issues, and the teaching components assure that they are in line with the core components of the inclusive practices, including but not limited to UDL guidelines and the state standards.

The cyclical process of the intentional alignment initiates with the general beliefs and is depicted through the language of intentionality in the defined learning goals and lesson plans as a part of the anticipation process. The positive outcomes of the process (i.e., learners' motivation, engagement, improved literacy skills, and successful inclusion) reconstruct teachers' beliefs system and regenerate the cycle (see Figure 1). Thus, the cycle expands the concept of integration from the physical placement of the individuals with special needs to their meaningful participation and achievement in learning, both at the academic and social-emotional levels.

Lowrey, Hollingshead, and Howery (2017) examined general education teachers' language around UDL, inclusive classrooms, and intellectual disabilities. Alongside identifying other themes (the language of membership, i.e., belongingness and difference), they explored the language depicting teachers' intentionality and unintentionality in designing lesson plans and teaching instructions. The language was exhibited through words, phrases, and verbs that represented either teachers' thoughtful planning or recognizing learning differences and UDL principles, or their indifferent beliefs about UDL practices and disability.

Despite many rhetorical discussions on the topic within the UDL research, the concept of intentional alignment has not been inquired yet in the actual teaching practices. However, this concept is widely studied within the constructive alignment theory with a slightly different perspective within teaching and learning theories (Biggs, 2003; Biggs & Tang, 2007). Biggs and Tang (2007) stated that the failure in achieving constructive alignment initiated a blame-the-student theory of teaching—that the students are responsible for poor learning outcomes, and the teachers do not own responsibility for the failure—which facilitates power dynamics in the

teaching and learning process. The UDL lens considers this process as curricular infirmity or a barrier to learning since teachers play a significant role as far as the success of the students is concerned.

Based on Biggs' constructive alignment theory, Trigwell and Prosser (2014) developed a model for curriculum design by identifying qualitative variations in teachers' intentional alignment between lesson goals and intended learning outcomes. They concluded that teachers who intentionally adopted the student-focused approaches to teaching found that students achieved the desired learning outcomes more, as compared to those teachers who deliberately adopted transfer information using a teacher-focused method that related to a surface approach to learning. In learning style literature, Curry (1999) argues that instructional alignment might account for increasing learning outcomes rather than "matching" instructions and learning styles (p. 54). Congruently, Snow and Lohman's (1984) concept of systematic matching and mismatching of instructions with learning styles was also considered as a flexible approach to teaching and learning in the complex and changing environment and diverse learning roles of students.

Personal Assumptions

The present study is grounded on some assumptions by considering anticipation and intentional alignment as underlying coexisting phenomena of the core components of inclusive education. The first assumption is that teachers in the general education system do not anticipate variability and barriers. Thus, their practices are not intentionally aligned to meet the needs of the students with and without disabilities. The second assumption is that teachers who have clear, and in-depth conceptual knowledge and understanding about variability and barriers are more likely to verbally express and articulate their experience that increases the likelihood of

addressing these issues in their classroom, being more aware and intentional rather than exhibiting automatized practices in their everyday routine. The third assumption is that if teachers practice anticipation and intentional alignment in the general classrooms, general classrooms may be transformed into inclusive settings, regardless of regional and educational variations. The general classroom teachers will begin incorporating inclusive practices in their teaching techniques. The study objectives and questions are derived from the conceptual framework of this research.

Research Objectives

The present research defines its objectives as (a) exploring teachers' beliefs and understanding about the meanings of the concepts "learner variability and barriers to learning" and (b) examining the intentional alignment (teachers' ways of anticipating, planning, and addressing variability and barriers) across all teaching components (lesson planning and goals, instructional methods, materials, and assessment) with the core inclusive practices.

Research Questions

This qualitative study addresses two main questions followed by sub-questions:

Q 1. What are the salient themes and patterns of meaning associated with the concepts of *learner variability and barriers to learning* that emerge from general education teachers' perspectives and beliefs, and how are the patterns of these concepts linked with each other?

Q 1.1. How do teachers define and understand the term *learner variability* in the general education classroom setting?

Q 1.2. How do teachers define and understand the term *barriers to learning* in general education classroom settings?

Q 1.3. Do these two constructs link with each other in the teachers' perspectives?

Q 2. How do general education teachers anticipate and address *variability and barriers* in their daily practices, and do they obtain and maintain intentional alignment across all teaching components when addressing *variability and barriers*?

Q 2.1. How do teachers anticipate *variability and barriers* while designing a lesson plan and learning goals?

Q 2.2. Do teachers practice intentional alignment in addressing *variability and barriers* across the teaching components (choice of teaching methods, use of materials, and assessment procedures)?

Methodological Approach

The multiple case study design is selected to gain a deep comprehension of the understudied issues (Gillham, 2000; Yin, 2003). Miles and Huberman (1994) define cases as "a phenomenon of some sort occurring in a bounded context [is in fact] your unit of analysis" (Baxter & Jack, 2008, p. 545). Thus, in this multiple case study, the actual phenomenon is exploring and documenting if teachers' current beliefs and practices in the private international schools of KSA are in line with the core inclusive components identified in the literature. Teachers' beliefs about learner variability and barriers to learning (understanding the concepts and thinking patterns) and practices (evidence of anticipation and intentional alignment across teaching components) are considered as the unit of analysis or cases of the study-hence a multiple case study design (see Figure 2 for a pictorial representation of the study design). In correspondence with Yin (2009), multiple sources of data collection are used in this study: face-to-face interviews (1 to 3 hrs. long), documents (lesson plans, teaching strategies, assessments sheets, student assessment, and reflection sheets), observations (direct and participant), and physical artifacts (classroom educational technology and materials).

Since the study intends to examine the links between patterns of meanings related to the understudied concepts and practices within and across the participant teachers, the teachers are regarded as the case study units within their unique contexts. Thus, the study adopts multiple case-study designs by analyzing cases/units of analysis by recruiting teacher participants from varied school districts and classrooms (Baxter & Jack, 2008; Yin, 2009). A case study approach enables investigations within the participants' context (Baxter & Jack, 2008; Gillham, 2000; Starman, 2013). Thus, the unique context of each case, for example, school districts, administrative structure, classrooms, as well as teachers' personal experiences and practices in each class, are binding the study cases. The definitions provided for the related core concepts underlying the phenomenon of inclusive education are further delimiting the present research. Bowen (2005) states that a formal theory is developed for "a conceptual area of inquiry," and a substantive theory is designed for "an empirical area of inquiry" (p. 218). Thus, the present research provides empirical data on both conceptual and practical grounds to establish formal and substantive theories; and the methodological approach fits with the constructive-interpretive paradigm that produces substantive-formal theory grounded in the research.

The next sections provide further details regarding the context of the study (i.e., sampling procedures of the school districts), case study units/units of data collection (i.e., recruitment of the study participant teachers), sources of data collections, research rigor, and data analysis procedures. This study adopts multiple approaches for data analysis given the wide range of understudied concepts explored and considering the study aims described earlier. For example, novel evaluation criteria and a universal design blueprint were developed to evaluate the presence or absence of the components of anticipation of variability and barriers in teachers'

lesson planning and to analyze the intentional alignment of teaching practices across the core components of inclusive education in general education classrooms.

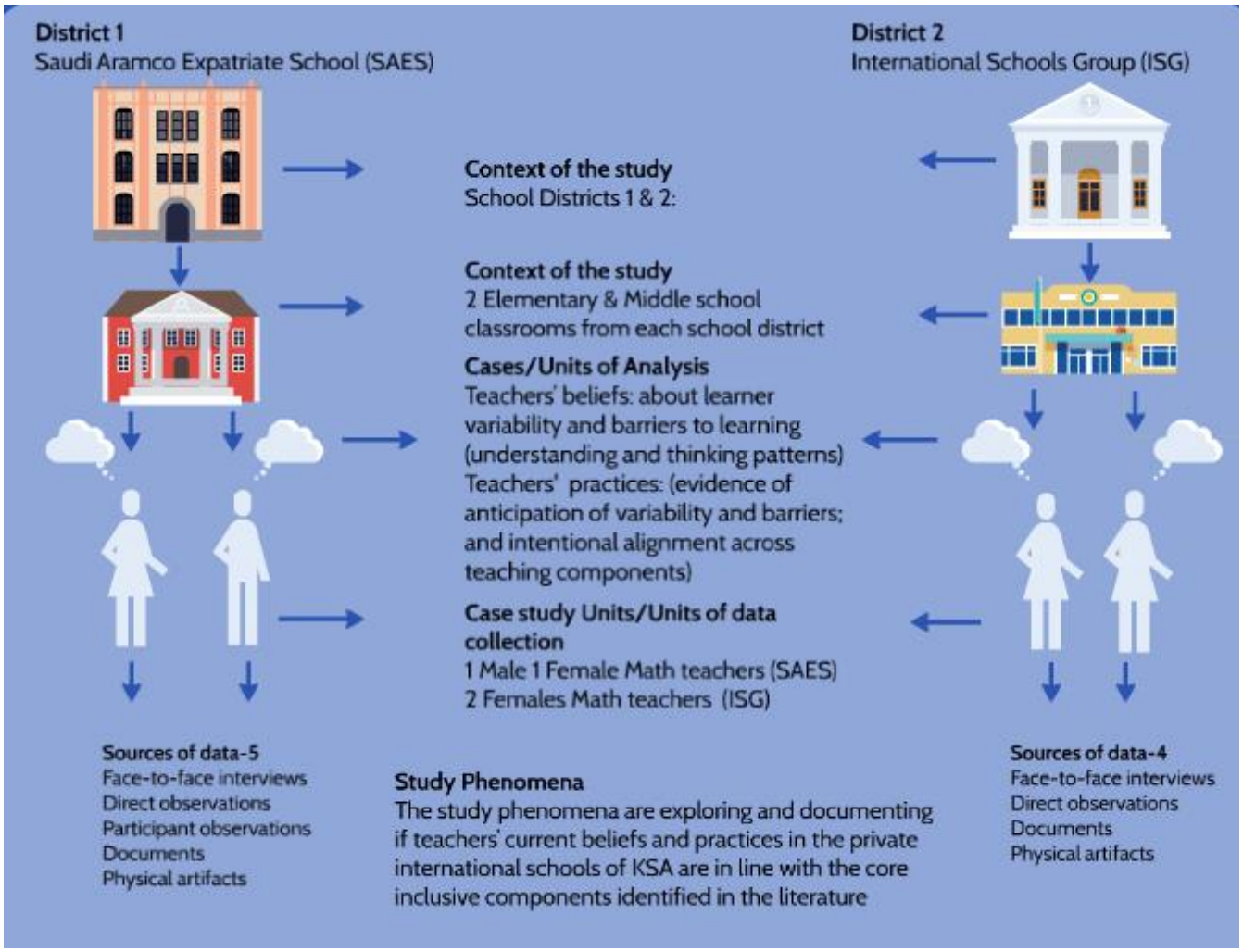

Figure 2. A pictorial view of the multiple case study design for this research

Sampling Methods

The literature indicates discussions on the presence of the inclusive practices in private international schools in the Gulf countries and shows a need for investigating such schools to promote inclusive education in the Middle Eastern region (Weber, 2012; Brown, 2005). Purposive sampling is adopted in the selection of these schools districts as they meet the study

inclusionary criteria (i.e., offer English language as the core medium of instruction, promote diverse student population, hire internationally qualified teachers, and high funded schools), which are components considered as baseline agents to initiate inclusive practices. First, Saudi Aramco Expatriate School (SAES) and second, International School Groups-Dammam (ISG). These are American schools located in KSA, and the school districts have separate accreditations, boards of education, organizational structures, and instructional and curriculum designs, therefore they are considered as different contexts for this multiple case study design. The participants representing each context, thus, provide a range of information needed for the study to allow broad comparisons and sets of patterns for the understudied concepts (beliefs about variability and barriers, anticipation, and intentional alignment) and the underlying phenomena (inclusive practices).

Saudi Aramco Expatriate School (SAES) is a group of schools operating in four Eastern Province communities. Within SAES, more than 2100 students from 62 different nationalities in K3 through grade 9 were being served. SAES recruits certified teachers mostly from North America and the USA. However, at the time of data collection, no teachers with special education training were serving in these schools. The mission statement of the school signifies attracting and retaining workforce, and diversity and inclusion are not apparent in the statement as it states: “Saudi Aramco Expatriate Schools provide each student with an excellent education in support of attracting and retaining an international workforce” (SAES, n.d). They preferred hiring general education teachers with experience in the current program of study for all grade levels. Teachers at SAES were found to be practicing; understanding by design, and differentiating models of instruction (Tomlinson, 2000; Tomlinson & McTighe, 2006). SAES had an 18:1 inclusion ratio for students with mild to moderate levels of learning difficulties.

Among SAES, one elementary and one middle school participant teachers were recruited based on study inclusionary criteria and considered as case study units 1 and 2 in this multiple case study design (Miles & Huberman, 1994). More details about the study participants and recruitment procedures are provided in the next section.

Second, International School Groups-Dammam (ISG) is part of an American-accredited group of schools focusing on an American curriculum serving more than 1300 multiethnic expatriate student population from Pre-Kindergarten through grade 12. ISG schools are licensed by the Saudi Ministry of Education. ISG schools did not have students with special needs. However, there were students with mild to moderate learning deficiencies, and some programs were offered in English as an Additional Language (EAL), and some afterschool activities. Further details were not available about the types of afterschool activities. ISG-Dammam's mission statement does not mention inclusion and diversity; it states: "We Inspire Innovation and Compassionate Action." However, they endorse professional development and aligned practices as reflected through this statement mentioned on the school webpage: "As a school, we are committed to increasing academic rigor by implementing: aligned curriculum, instruction, and assessments through professional collaboration, student agency, literacy, and compassionate action" (ISG-Dammam, 2018). The total number of general education teachers were 115 in the school with no teachers with training in special education at the time of data collection. They had multiethnic teachers qualified from India, Pakistan, the Philippines, and Lebanon. Teachers followed CCSS along with the Columbia Teachers College Writers/Reader workshop and Eureka Math Inquiry base. Teachers recruited from this school are considered as case study units 3 and 4 (one elementary and one middle school teacher).

The lead researcher initially approached these schools by sending e-mails, and later a research agreement for participation in the study had been signed by the school authorities and the researcher (see Appendix A). The proposed study posed no severe ethical problems to the participants; however, before starting data collection, the researchers received McGill Research Ethics Board (REB) approval for conducting this research with human participants (see Appendix E). Later, the teachers' recruitment process was initiated by emailing an informed consent form to the school authorities, who were responsible for sending consent forms to the potential participants to confirm their participation in the study — the form provided information about the purpose and nature of the research. The timeline and procedures of data collection were provided, and permission was requested for the data collection procedure (see Appendix G).

Study Participants. Yin (2003) and Stake (1995) suggest binding the case by defining the boundaries to remain within the achievable objectives of the study (Baxter & Jake, 2008). The purposive sampling strategy was adopted in the selection of the teachers to obtain a "structured" set of information on the understudied topics through their voluntary participation (Padgett, 1998, p. 52). Therefore, "manageability" in the selection of sites, "accessibility" of the schools, and "willingness" of the respondents are considered as inclusionary criteria for the participants (Bowen, 2005, p. 217). School administration was preferred in the identification of the potential teachers suitable to the purpose of the study. The study participant criteria were provided to the school administration: (a) Math/English Language Art/science/social studies for grades 4-8, (b) more than 5 years of teaching experience, (c) no recruitment from the class of the lead researcher's children. The information collected from the school administrators prior to the study participant recruitment indicated that this was the first experience for the teachers to

participate in any research-related activity, therefore, the expected number of the participants may be limited. Therefore, only two participants from each school volunteered for this research and interestingly they were all math teachers. The participating elementary and middle school teachers are the main sources of information in this study. The literature indicates that highly differentiated practices are observed in elementary and early middle school classrooms (Heald, 2016). Therefore, the participants from these grade levels were preferred for recruitment who provided a rich source of information for the study. Overall, two teachers from SAES (one female from grade five and one male from grade eight), and two from ISG-Dammam (one female from grade five and one female from grade six) were recruited. Each participant teacher had more than five years of teaching experience. Data obtained from these participants enabled robust within-and cross-case analyses for the multiple case study design and minimized the validity threats to the study by observing participant triangulation techniques (Baxter & Jack, 2008; Krefting, 1991). Teachers' qualifications, certification, and demographic information were obtained during the interview process (see Table 3 for detailed information about the participants).

The REB consent form guaranteed the participants' rights such as voluntary participation, the right to withdraw from the study anytime, asking questions, and keeping a copy of the transcripts (see Appendix B). Their anonymity and confidentiality were ensured throughout the data collection process and during the dissemination of the data and results in scholarly publications and conferences by changing their actual names. Procedures of the data collection were also explained, and permission was requested for audio recording interviews and to collect documents such as lesson plans for the research analysis purposes. Parents of the children for the selected classroom were sent a letter to inform them about the classroom observations

activity (see Appendix F). The researcher did not intend to interact with the children directly; therefore, their general responses or behaviors were recorded manually.

Moreover, the participants were guaranteed the safety of the data by providing them with information on the system of data storage. The participants were also informed about the expected benefits of participating in the research. The research participants, context, and settings were well respected, and the physical presence of the researcher caused minimum disruptions. Adopting a role of a "good enough" researcher as recommended by Luttrell (2010) allowed for addressing potential research biases, reflexivity to the research field, and minimizing power dynamics in the data collection process (p. 273). Luttrell states that a good enough researcher can differentiate personal feelings, emotions, priorities, and errors from "others" including participants, researchers in the field, and theorists.

The lead researchers' children were enrolled in grades (K.G, 5, and 6) at SAES at the time of data collection. The following measures were taken to avoid possible conflict of interest: (a) the school authorities were informed about the placement of the researchers' children in the school, (b) teachers of the researchers' children were not approached for participation in this research. The participants of this study were not given monetary compensation for participating in this research. However, their participation in the advancement of knowledge was verbally recognized throughout during the meetings and in writing. The lead researcher visited the schools a few times to meet and contact the research participants to establish rapport and to familiarize herself with them before the actual data collection process began. This approach was adopted to achieve the quality of disclosure that is essential during the interview and data collection procedure (Myers & Newman, 2007).

Table 3

Demographical Information of the Study Participants and Corresponding Data Resources

School Districts	Participants (pseudonyms)	Gender	Nationality	Qualifications	Teaching Experience	Grade levels-Teaching areas	Data Resources
SAES	Katei Heath (Case study unit 1)	Female	Canadian	Bachelor of Education Bachelor of Science Teachers' Certification (Canada) Master of Education (USA)	17 years of teaching in Canada, South Korea, Middle East, and Saudi Arabia	G-5 Math and Science	Face-to-face interviews Direct observations in the classroom Participant observations Documents: • Teachers' created Lesson plans • CCSS provided lesson plans • Web access to Everyday Mathematics Connect Ed McGraw Hills-unit 5: Operations with Fractions • Unit planning sheet • Students' previous records (math work and progress data) • Formative assessment planning sheet • Assessment rubric • Unit 5 Self-Assessment sheet • Unit 5 Assessment • SST Sub Team Referral Process sheet • SIOP manual Physical artifacts: • Classroom educational materials (high-tech digital devices i.e., Promethean board, document camera, chrome books, and educational apps, and low-tech materials i.e., graphic organizers, etc.) • PSL student webpage access
	Mac Kalvin (Case study unit 2)	Male	American	Bachelors' degree Teachers' certifications (USA) Master's degree in high school math and	25 years of high school teaching in the USA, South Korea, Burma, Morocco, and Saudi Arabia	G-8 Math and Science	Face-to-face interviews Direct observations in the classroom Participant observations Documents: • TLPG based on CCSS

				science programs (USA)			• Unit-4 book "Connect Ed Mathematics" • Personal note for daily classroom activities • Student's reflection sheets • Student's self-assessment sheets • Summative assessment point sheet • Unit-4 review sheet • Unit-4 assessment sheet • Email exchange with students • PLC meeting agenda Physical artifacts: • Classroom educational materials (high-tech digital devices i.e., Promethean board, document camera, students' laptops, and educational apps, and low-tech materials i.e., graphic organizers, etc.) • PSL teacher's webpage access
ISG	Naila Fahad (Case study unit 3)	Female	India	Bachelor of Education and Teaching Master's in mathematics (India)	18 years in India and Saudi Arabia	G-6 Math	Face-to-face interviews Direct observations in the classroom Documents: • Teacher's created lesson plan • Module 3 Unit assessment sheet-Eureka Math • Bell sheet-formative assessment Physical artifacts: • Classroom educational materials (high-tech digital device i.e., Promethean board, and Low-tech educational materials i.e., sticky notes, notebooks)
	Analyn Sylvia (Case study unit 4)	Female	Philippines	Bachelor's degree in computer sciences (Philippines)	12 years in the Philippines and Saudi Arabia	G-5 Math	Face-to-face interviews Direct observations in the classroom Documents: • Teacher's created lesson plan • Module 26 at Eureka Math (Decimal division) • Unit assessment sheet • Bell sheet-formative assessment

	Physical artifacts: • Classroom educational materials (high-tech digital device i.e., Promethean board, student's laptops, and educational app, and Low-tech educational materials i.e., sticky notes, notebooks)

Note. CCSS = Common Core State Standards; SST = Special Services Team; SIOP = Sheltered Instruction Observation Protocol; PSL = PowerSchool Learning; TLPG = Teachers' Lesson Planning Guide; USA = United States of America

Methods of Data Collection

Three principles of data collections suggested by Yin (2009) were considered for this multiple case study to establish the construct validity and reliability of the case study findings. First, the multiple sources of evidence were collected through face-to-face interviews, document analysis, direct and participant observations, and physical artifacts. These resources facilitated the triangulation of the research findings. Second, a digital database for organizing and documenting the collected data was developed to keep track of all the stages from data collection through analysis. Finally, a chain of evidence is established through maintaining the relationship between research components such as deriving research questions from the conceptual framework of the study then linking it to the study questionnaire protocol. These principles ensured quality control during the data collection procedures**.**

Face-to-Face Interviews

Interviews were conducted with all participants of the study using semi-structured open-ended questions (Koro-Ljungberg, Yendol-Hoppey, Smith, & Hayes, 2009; Myers & Newman, 2007). The semi-structured questions investigated the meanings of the understudied concepts regarding teachers' beliefs and opinions and how they anticipate and address variability and barriers-related issues in their daily practices (see Teachers' Interview Protocol in Appendix C). The questionnaire protocol was reviewed by an expert in the field of qualitative inquiry to ensure the alignment of the questions with the proposed conceptual framework and research questions of the study (Maxwell, 2012). The questionnaire was piloted with two nonparticipant teachers from SAES to address the ambiguity of the language (Myers & Newman, 2007).

The first few questions were introductory and were close-ended with entirely written descriptions, while in the questions (5-9), some blanks were kept intentionally to adopt a

mirroring technique where appropriate (Myers & Newman, 2007). This technique allows a researcher to focus on the participants' perspectives and to mirror their language to avoid using the jargon. This technique was utilized here to keep a record of the terminologies that they preferred to use to describe learner variability. Many probes were added during the interview process to expand on any relevant information or to clarify ambiguous statements. Since the medium of language was English in the participant schools, no Arabic translations were needed. The interviews were carried out in English, during, and after school time when it was convenient for the teachers. The interviews were audio-recorded with prior permission from the participants. The interview length varied from forty-five minutes to one hour except for one interview that lasted more than three hours (with one of the SAES participant teachers). Once the interview was transcribed verbatim, it was then e-mailed to the participants for member checking that allowed them to review and update their input; this practice facilitated the credibility of the study (Merriam, 2009), specifically the construct validity of the research.

Document Analysis

Initially, teacher-created written samples of lesson plans were collected as evidence of the teachers' intentions in anticipating learner variability and planning ways to remove barriers through defined teaching goals. However, several other document sources were also gathered during the data collection process from the teachers, including CCSS-based lesson planning, assessment sheets, rubrics, effective teaching strategies, students' active learning reflections, and many others (see Table 3). Therefore, all such documents were considered in the data analysis procedure and in making inferences. It should be noted that more documents received were from SAES participants than from ISG participants for the document analysis. Documents provide a hidden set of context-rich data resources to elicit meaning, generate understanding, and develop

empirical knowledge. They further provide a lead for asking additional questions that were missed initially in follow-up interview sessions (Bowen, 2005, 2009). All these methods complement each other by providing rich information and minimizing the error of bias by maintaining data triangulation and corroborating findings across data sets and case study units (Gillham, 2000; Jonsen & Jehn, 2009; Krefting, 1991; Patton, 1990). The collection of lesson plans was received after the completion of the interview sessions and before classroom observations.

Physical Artifacts

The classroom educational materials were considered as physical artifacts in this study. Yin (2009) considers such artifacts as a significant source of case study data collection. The high-tech digital devices in the classroom, for example, Promethean boards, document cameras, students' laptops, chrome books, educational apps, and access to the PowerSchool Learning (PSL for SAES) portal provided rich sources of information. Similarly, low-tech educational materials such as graphic organizers, sticky notes, and learning materials were of particular interest in this study. The educational materials are part of the teaching components identified in the literature review that provide a deep insight into lesson planning, lesson delivery, and utilizing the teaching materials to maximize student learning. These artifacts are directly observed in the classrooms that enrich the study data in various ways.

Observations

Direct Observations were conducted during class time with the participant teachers to record their practices in addressing variability issues and instructional strategies in removing barriers to learning through methods, materials, and assessment procedures (Yin, 2009). The observation method was adopted because it allows rich sources of information to be obtained

(Gillham, 2000; Jonsen & Jehn, 2009; Ostrower, 1998). However, the researcher ensured the minimal influence of being an outsider in the natural classroom setting (Creswell, 2013). For example, by assuming a sitting place away from students' sight to avoid their distracting behavior and by not interrupting verbally and physically during class time. These observations were primarily focusing on teachers' instructional strategies, teaching methods and materials, and assessment techniques; student observations were also focused on responses to the teaching methods. Direct observations were recorded in the written field notes in an excel table (see Appendix D) (Bowen, 2005). This observation checklist was created considering elements of a comprehensive observation tool suggested by Merriam (1988). Elements included "attention to the setting, participants, activities, and interactions, and frequency and duration of situations" (French, 1994, p. 51). The classroom observations were carried out for 5-7 days in a row with each participant teacher separately from the beginning of a new lesson until the day of assessment in each classroom. The observations were done diligently to enrich the analysis procedure for each participant and triangulate the data collection procedures.

Participant Observations. Yin (2009) suggests participant observation as a rare opportunity for the observer to obtain information about the insider's role for in-depth analysis. The lead researcher being a parent of her children enrolled at SAES found this unique opportunity to obtain those sources of information that could remain otherwise hard to access such as, having access to the parent accounts of PowerSchool Learning (PSL) portal, receiving more pieces of documents for data analysis, and attending the school's year-long programs for families. The opportunity of being a participant observer was however limited to the SAES school for the lead researcher and this source of data was not obtained possible in the ISG

school. The next section highlights the lead researchers' experiences being an insider and outsider at SAES and ISG schools.

Reflexivity

The lead researcher journaled throughout all phases of the research to keep a record of biases, reactivity, expectations, emotions, field experiences, and assumptions (Birks, Chapman, & Francis, 2008). The experience of a lead researcher was particularly significant when encountering the researchers' positionality at the time of approaching the research sites (Merriam et al., 2001). The private international schools in KSA were hard to approach due to several challenges at the organizational and community level. A lead researcher's positionality in SAES as an insider-outsider impacted the decisions of the ways to inquire about the study phenomena. For example, as an insider, being an expat and a mother of young children enrolled in SAES allowed the lead researcher to approach the research field and allowed the opportunity to access information as a participant-observer. However, the positionality of being an outsider and being a researcher created obstacles to reaching the relevant information required for the research project from the administration such as the archival data of student's records or school policies.

Similarly, the positionality factor at the teachers' level was also apparent at ISG. The positionality of a lead researcher as an outsider hindered access to information from the ISG teachers compared to the SAES teachers, as reflected through the number of received documents from the teachers and the analysis of the interviews. However, adopting peer debriefing strategies such as discussions with the supervisor appeared effective in addressing biases and reflectivity that increased trustworthiness in the research (Birks, Chapman, & Francis, 2008). Confidentiality was assured to the participants throughout in the data collection procedure (Cresswell, 2013) and the role of the researchers was an instrument of inquiry (Yeh & Inman,

2007), while the participants were considered as the chief source of knowledge generated during the entire research process (Koro-Ljungberg et al., 2009).

The following section provides detailed information on the tools and methods of data analysis for this multiple case study.

Tools for Data Analysis

As described earlier, the concepts of anticipation and intentional alignment are interwoven with the concepts of learner variability and barriers to learning in UDL and inclusive education research. To ensure the construct validity of the findings and a deep conceptual analysis, evaluation criteria, and a universally designed blueprint were developed as tools for data analysis in this study. The evaluation criteria describe parameters to evaluate the presence or absence of anticipation and intentional alignment in the teaching components. Further, the universally design blueprint facilitates a deep understanding of the mechanisms of understudied concepts across the core components of inclusive education identified in this study.

Evaluation Criteria

UDL researchers emphasize on the anticipation of variability and barriers in the classroom at the start of a new school session and throughout the year, before launching a new lesson (Novak, 2016; Rao, 2015; Rao et al., 2015; Rao, Smith, & Lowrey, 2017). They promote planning that predicts, identifies, and documents the possible variance in the learners and barriers that can get in the way—thus, endorse intentionality during the process of the lesson and instructional planning. Lowrey et al. (2017), for example, analyzed general education teachers' language during lesson planning that reflected intentionality and inclusiveness, such as anticipating variability, offering many choices, and proactively offering solutions to resolve barriers, across the teaching components. A proactive approach to reducing barriers that can be

identified in the descriptions of Lowrey et al. (2017)'s research participants depicts a process starting from imagining the inclusive classroom, such as making student profiles in the start of an academic year, proceeding with providing physical access and ensuring learning access, followed by the lesson planning. They intentionally plan and then deliberately practice what they intended. There appear, however, unintentional descriptions and vocabulary in Lowrey and colleague's research as well. The authors disregarded teachers' statements reflecting their conventional ways of teaching and grouped these thoughts as 'unintentional' in instructional planning. For example: "UDL is just a name for good teaching. We've been doing it for years, but now it has a name…" (p. 20). In other words, Lowery et al. (2017) strictly grouped those teaching and instructional practices as "intentional" that are proactively planned considering the students' diversity and potential barriers in mind.

The author's stance was to consider UDL as exceptionally different compared to other good teaching practices (i.e., differential instructions, accommodations, among others) and criticized labeling such practices as part of intentional planning. Nonetheless, inclusive education research supports these practices in the classroom. Within UDL research, however, some authors recommend the blend of these practices with UDL instructional approaches (i.e., Ammons, 2015; Basham et al., 2010; Garderen & Whittaker, 2006) while others emphasize the differences among these approaches (i.e., Lowrey et al., 2017; Novak, 2016).

Recently, Rao, Ok, Smith, Evmenova, and Edyburn (2019) provided UDL reporting criteria (RC) as a tool to enhance the clarity of reporting and establishing effective models of UDL implementation in research. The UDL RC provides three guiding tents (1) learner variability and environment, (2) proactive and intentional design, (3) implementation and outcomes. The criteria for each guiding tent facilitate flexible and nonprescriptive interpretation

of reporting. The work of Biggs & Tang (2007), Lowrey et al. (2017), and Rao et al. (2019) provide adequate foundations for establishing evaluation criteria for this present study to gain a deep insight into teacher's perspectives and practices. The evaluation criteria of this study are based on the reviewed literature and the KSA context, particularly in consideration of the Eastern region where teachers are not yet exposed to the UDL paradigm and inclusive practices.

The criteria describe parameters to evaluate the "anticipation" and the "intentional alignment" in the present study. The criteria recognize the effective teaching practices outlined by the inclusive literature that are evident in the KSA teachers' practices but may or may not be implemented as part of the intentional practices during the instructional planning. Regarding alignment, CATS theorists believe that "the alignment is achieved by ensuring that the intended verb in the outcome statement is present in the teaching/learning activity and the assessment task" (Biggs & Tang, 2007, p. 52). CATS researchers evaluate constructive alignment in their studies by focusing on the words, verbs, and phrases depicting teachers' intentional effort in aligning learning outcomes to the assessment planning (Biggs & Tang, 2007; Trigwell & Prosser, 2014).

As discussed in the conceptual framework of the study, the teachers' general beliefs about variability and barriers serve as a precursor to the process of anticipation. Similarly, the general ideas and expectations serve as prerequisites to the intentional alignment procedure. Therefore, these relationships are apparent in the criteria of anticipation and intentional alignment developed for this study. The *criteria for anticipation* is stated as (a) evaluating participants' background knowledge, beliefs, and understanding of the concepts of *variability and barriers*, (b) evaluating the terminologies participants used to describe the "anticipation" component such as "expect," "foresee," "think," "assume," and "reflect" during the interview,

and in the document analysis of the lesson plans, and (c) presence and absence of the embedded resources or strategies for English language learners (ELL)/English as a second language (ESL) and differentiation in the lesson planning.

The present research defines intentional alignment as mindful and proactive planning of the teaching components where the lesson plan anticipates and predicts variability and barrier issues; and the teaching methods, use of the learning material, and assessment procedures are ensured to be in line with the UDL guidelines, state standards, and core components of inclusive practices. The *criteria used to evaluate the intentional alignment* include (a) analyzing the presence or absence of the "anticipation" component in the data obtained from each case, (b) evaluating the amount of information the participant has provided on alignment and clarity of the relevant concepts, (c) if the criteria (a and b) are met, evaluating the presence or absence of the aligned component through all data resources, and (d) if the criteria (a and b) are not fulfilled, evaluating the overall practices in addressing the variability and barriers in accordance to the beliefs and understanding of the teacher. Based on these criteria, the study identifies full, partial, or no evidence for anticipation and alignment of the teaching practices.

Universally Designed Blueprint

Grounded in the previous literature of individual differences and learning styles, barriers research, instructional design, learning environment, inclusive education, and UDL research, the present research also developed a universally designed blueprint for anticipation and intentional alignment that is utilized as a benchmark during the data analysis process (see Figure 3). Table 4 provides information on how universally designed blueprint was utilized during the analysis procedure. This blueprint is guiding this research and can be used as a roadmap for teachers in general and inclusive settings to improve their practices based on the core components of

inclusive education identified in this research. This comprehensive process of identifying teaching practices guided by teachers' belief system leads to unveiling the status of inclusive practices using these tools and other methods of data analysis described in the next section, thus addressing the aims and overreaching goal of the study.

<table>
<tr><td colspan="2">Anticipation of Variability</td><td colspan="3">Anticipation of Barriers</td></tr>
<tr><td colspan="2">Individual differences, learning styles, preferences, strategies, motivation, interests, and linguistic, religious, and cultural diversity</td><td>Student-related barriers (Medical Model)

(physical, cognitive, affective, behavioral, vulnerability, and exceptionality)</td><td>Environment-oriented barriers (Social Model)

(parents and family, peers, routines, time, and settings)</td><td>Construct-irrelevant barriers (Curricular Infirmity)

(Instructional, materials, and assessment barriers)</td></tr>
<tr><td>Strengths</td><td></td><td></td><td></td><td></td></tr>
<tr><td>challenges</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Intended Learning Goals (expert learning)
☐ Unique to the variate learners
☐ IEP/ISSP</td></tr>
<tr><td colspan="5">Aligned Lesson Objectives
☐ Alignment with the content standards
☐ Aligned with the learning outcomes
☐ Clearly defined and distinct from means and ends
☐ Understandable, approachable for the students, and measurable for the teacher
☐ Declarative (content-based, level of understanding)
☐ Functional (mastery-oriented)</td></tr>
<tr><td colspan="5">Intentional Alignment in Innovative Learning environment/LRE</td></tr>
<tr><td colspan="2">Flexibility</td><td colspan="2">Openness</td><td>Access to resources</td></tr>
</table>

☐ **Physical:** Combining more than one classes, team-teaching, small groups, considering visual-special (place, space, time) preferences	☐ **Physical:** Fewer walls, opportunities to observe and learn from other students/classes/ Instructors Caring, supportive, safe, and distraction-free climate	☐ **Physical:** Learning common for reading, group work, projects, reflection, educational and low/high-tech assistive technology (i.e., AAC, SWT, AK, TS, audio-video captioning, educational software)
☐ **Practical:** Student-oriented and teachers' facilitating NOT transmitting	☐ **Practical:** Teachers are allowed to open classroom doors for assistance from the school support resources (i.e., psychologists, counselors, resource teacher, nurse), and outsiders (i.e., parents, volunteers, specialists, trainers)	☐ **Practical:** Teachers' continuous professional development training on research/evidence-based instructional approaches and assistive technology and regular PLC
Intentional Alignment in Instructional Methods/Materials-UDL Framework		
Multiple Means of Engagement	**Multiple Means of Representation**	**Multiple Means of Action and Expression**
☐ **Options for recruiting interest** (choices and autonomy; authenticity; minimizing threats) ☐ **Options for sustaining efforts and persistence** (understandable and accessible goals; optimizing challenge; fostering collaboration; mastery-oriented feedback) ☐ **Options for self-regulation** (high expectations; emotional regulation; self-assessment and reflection)	☐ **Options for perceptions** (customizing information display; alternative displays for auditory and visual information) ☐ **Options for language, mathematical expressions, and symbols** (clarify vocabulary, symbols, syntax, and structure; support decoding; encourage understanding across languages; multiple media resources; embedded scaffolds) ☐ **Options for comprehension** (building on background knowledge; spot themes, relationships, and patterns; multiple sensory modalities-based manipulatives; applied skills and knowledge)	☐ **Options for physical actions** (varied methods for navigating learning; assistive technology) ☐ **Options for expression and communication** (multiple tools and media to compose, construct, present, and communicate) ☐ **Options for executive functions** (goal and expectation setup; enhance planning and strategies; promote techniques to organize information and resources; cultivating self-progress monitoring skills)
Alignment in Assessments		

☐ Plan authentic assessment keeping intended learning goals, content standards, and objectives in mind ☐ Deliberate planning of standard-based diagnostic, formative, and summative assessment considering variability and barriers ☐ Multiple means of engagement (expectation rubrics; choices in paper-pencil and digital assessment; minimizing threats; timely corrective feedback; self-assessments) ☐ Multiple means of representation (optimal language and content access through embedded scaffolds; manipulative sensory access; auditory/visual display of problems) ☐ Multiple means of action and expression (S (show/display), M (make/build), A (act/perform), R (report/write), T (talk/present); self-progress tracking)
Reflections and Fidelity (Expert teaching) ☐ Reflections about anticipation in lesson planning (inclusive approach and language) ☐ Reflections about obtaining and maintaining intentional alignment across instructional methods and materials ☐ Reflections about sustaining intentional alignment during assessments ☐ Reflections and feedback from the students ☐ Reflections on to what extent variability and barriers were addressed; alignment was achieved, and identifying and building on gaps

Note. AAC = augmentative and alternative communication; AK = alternative keyboard; IEP = Individual Education Plan; ISSP = Individual Student Support Plan; LRE = Least restrictive environment; PLC = Professional Learning Communities; SWT = switches; TS = touch screens; UDL = Universal Design for Learning

Figure 3. Universally designed blueprint for anticipation and intentional alignment for general and inclusive classrooms and reflects core components of inclusive education

Methods of Data Analysis

For the multiple case study data analysis and interpretation, strategies recommended by Yeh and Inman (2007) were adopted by focusing on the ethics and rigor throughout the analyses across (a) self—by addressing the roles of the researcher and resolving issues related to the power dynamics and positionality, (b) culture—by making contextual analyses within and across cases, (c) collaborations—by analyzing research relationships, (d) circularity—by examining relations between theory and field experiences, (e) trustworthiness—by ensuring neutrality between the researcher and the participants, and triangulations, and (f) deconstruction—through providing a detailed description and discussion of themes (p. 372).

Sources of Data Collection Across Research Questions and Organization of the Results

The research question 1 and sub-questions 1.1, 1.2, 1.3 were analyzed by asking question number 4, 5, 10, 11, 16 in the teacher interview protocol. The research question 2 and sub-questions 2.1, 2.2 were analyzed by asking question number 6, 7, 8, 9, 12, 13, 14, 15 in the protocol as well as through the direct observations, participant observations, physical artifacts, and conducting document analysis. The results are presented at three levels. Firstly, in chapter 4, a within-case analysis was done for each case study unit (teacher participant) separately that was based on the analysis of the sub-questions 1.1, 1.2, 1.3, 2.1, 2.2. Secondly, the main questions 1 and 2 were then answered by providing the cross-case analysis (e.g., comparing and contrasting the within-case analysis of 2 case study units within each school district). Alternatively, data obtained through within-case study unit analysis was utilized to perform cross-case study unit analysis for each school district in chapter 4. Finally, the cross-case study unit findings for each school district were further analyzed to find out a consolidated picture of the research findings that are presented in chapter 5. As discussed earlier, the study evaluation criteria and universally designed blueprint for anticipation and intentional alignment were referred throughout during the analysis process (see Table 4 for the organization of the research questions, salient thematic categories, data resources, research evaluation criteria, and analysis methods).

Table 4

Organization of the Research Questions, Salient Thematic Categories, Data Resources, Research Evaluation Criteria, and Analysis Methods

Research Questions	Salient Thematic Categories Across Four Case Study Units (teacher participants)	Data Resources	Research Evaluation Criteria	Analyses (Chapter 4)	Discussion (Chapter 5)
Q 1. What are the salient themes and patterns of meaning associated with the concepts *learner variability and barriers to learning* that emerge from general education teachers' perspectives and beliefs, and how are the patterns of these concepts linked with each other?	Teacher's Beliefs Understanding and Perspectives	Analysis of the findings of sub-questions (1.1, 1.2, 1.3) • The concept of learner variability • The concept of barriers to learning • Concept links	Served as prerequisites of the research evaluation criteria	Cross-case study unit analysis in each school district individually • Compilation and Conceptualization • Consulting Universally designed blueprint for anticipation and intentional alignment extracted from the previous research and learning theories • Thick description of data received from the salient thematic categories through sub-questions after completing within-case study unit analysis • Revisiting research and theory	• Analysis of a combined set of data obtained from the cross-case study unit analyses for each school district • Revisiting research and theory • Finding inferences and drawing conclusions
Q 1.1. How do teachers define and understand the term *learner variability* in a general education classroom setting?	The concept of learner variability	• Face-to-face interview protocol Q # 4, 5, 10, 11, 16	Served as prerequisites of the research evaluation criteria	Within-case study unit analysis • Case narrative analysis • Systematic analysis procedures • Decontextualization, Recontextualization, Categorization, Compilation	

Q 1.2. How do teachers define and understand the term *barriers to learning* in general education classroom settings?	The concept of barriers to learning	• Face-to-face interview protocol Q # 10, 11	Served as prerequisites of the research evaluation criteria	Within-case study unit analysis • Case narrative analysis • Systematic analysis procedures • Decontextualization, Recontextualization, Categorization, Compilation	
Q 1.3. Do these two constructs link with each other in the teachers' perspectives?	Concept links	• Face-to-face interview protocol Q # 16	Served as prerequisites of the research evaluation criteria	Within-case study unit analysis • Case narrative analysis • Systematic analysis procedures • Decontextualization, Recontextualization, Categorization, Compilation	
Q 2. How do general education teachers anticipate and address *variability and barriers* in their daily practices, and do they obtain and maintain intentional alignment across all teaching components when addressing *variability and barriers*?	Daily Teaching Practices	Analysis of the findings of sub-questions (2.1, 2.2) • Anticipating variability and barriers in the classroom • Intentional alignment in addressing variability and barriers	Combined • Criteria for anticipation • Criteria used to evaluate intentional alignment	Cross-case study unit analysis in each school district individually • Consulting Universally designed blueprint for anticipation and intentional alignment across all teaching components, extracted from the previous research and learning theories • Thick description of data received from the salient thematic categories through sub-questions using research criteria after completing within-case study unit analysis • Revisiting research and theory • Consolidated conceptualization of findings	• Analysis of a combined set of data obtained from the cross-case study unit analyses for each school district • Revisiting research and theory • Finding inferences and drawing conclusions
Q 2.1. How do teachers anticipate *variability and*	Anticipating variability and	• Face-to-face interview protocol Q # 6, 7, 8, 9 • Direct observations	Criteria for *anticipation*	Within-case study unit analysis	

barriers while designing a lesson plan and learning goals?	barriers in the classroom	• Participant observations • Physical artifacts • Document analysis	(a) evaluating participants' background knowledge, beliefs, and understanding of the concepts of *variability and barriers* (b) evaluating the terminologies participants used to describe the "anticipation" component such as "expect," "foresee," "think," "assume," and "reflect" during the interview, and in the document analysis of the lesson plans (c) presence and absence of the embedded resources or strategies for English language learners (ELL)/English as a second language (ESL) and differentiation in the lesson planning	• Case narrative analysis across lesson planning • Systematic analysis procedures • Decontextualization, Recontextualization, Categorization, Compilation
Q 2.2. Do teachers practice intentional alignment in addressing *variability and barriers* across the teaching components (choice of teaching methods, use of materials, and assessment procedures)?	Intentional alignment in addressing variability and barriers	• Face-to-face interview protocol Q # 12, 13, 14, 15 • Direct observations • Participant observations • Physical artifacts • Document analysis	Criteria used to evaluate the *intentional alignment* (a) analyzing the presence or absence of the "anticipation" component in the data obtained from each case (b) evaluating the amount of information, the participant has provided on alignment and clarity of the relevant concepts (c) if the criteria (a and b) are met, evaluating the presence or absence of the aligned component through all data resources	Within-case study unit analysis • Case narrative analysis across methods, materials, and assessments • Systematic analysis procedures • Decontextualization, Recontextualization, Categorization, Compilation

		(d) if the criteria (a and b) are not fulfilled, evaluating the overall practices in addressing the *variability and barriers* in accordance with the beliefs and understanding of the teacher.

Data Analysis

A detailed process of analyzing data is provided below that were gathered through multiple resources such as interview transcripts, direct classroom observation and participant observational records, important documents, physical artifacts, and reflexive journaling. As described earlier, multiple techniques for the analysis have been employed by developing tools for data analysis given the wide range of interwoven study concepts and by consulting various qualitative data analysis techniques. Primarily, the techniques of content analysis suggested by Bengtsson (2016) were used as an analytical framework for the data analysis procedure in this study. Such as decontextualization (identifying meaning units through the surface structure of data), recontextualization and categorization (re-reading of the meaning units, reintegrated into themes and combining data sets to obtain generic categories of themes), and compilation (by mapping themes and findings by the theoretical representation of themes). Further details of the analysis and how other qualitative techniques have been employed are given below.

Decontextualization. At the ***manifest stage-1,*** the audio recorded interviews were transcribed verbatim by the lead researcher following the transcription rules and strategies recommended by Liamputtong (2011).

At the ***manifest stage-2****,* the line to line meaning units were obtained for all datasets, including interview transcriptions, observational datasheets, documents, physical artifacts, and reflexive journaling. In other words, the contents of each source of data have been obtained and this process was done for all data sets of each participant of the study. The meaning units were rewritten, which facilitated the process of negative case analysis and reduction of unnecessary/irrelevant data. This technique is described as meaning-making by Bengtsson (2016).

At the ***manifest stage-3***, the data was coded based on repetitive words/verbs/phrases, considering the keywords in the data relevant to the underlying concepts of the study, by comparing and contrasting, and by searching for missing information—mainly to find out teachers' understanding about the study concepts that are variability and barriers, as well as finding examples, quotations, practices, and experiences of the teachers that could be grouped according to the core research themes that are anticipation and intentional alignment. The techniques of pawing by grouping color-coded themes and continuing the process of cutting and sorting the relevant themes were applied until theoretical saturation was obtained (Ryan & Bernard, 2003).

The same process was done for each source of data separately and each participant independently. The process of regrouping and refining themes was not limited to the manifest stage; instead, it was extended until the last stage of the report writing. During the manifest stages, the manual coding procedures suggested by Auerbach and Silverstein (2003) and Ryan and Bernard (2003) were followed.

Recontextualization and Categorization. At the ***latent stage-1***, themes obtained from all data sources (interviews, documents, observations, artifacts, and journaling) were placed in one table to obtain the combined dataset for each participant. This combined data set provided the generic categories of obtained themes. At this level, similar themes were regrouped and condensed to reduce the thematic categories and sub-categories further. Each major thematic category was then assigned a relevant name. Thus, theoretical constructs were obtained. Separate categories were established for grouping different, unique, or unexpected findings. Bowen's (2009) methods for document analysis were used at this stage.

At the ***latent stage-2***, the relevant theories were revisited, and horizontal and vertical shuffling of the concepts of each participants' dataset provided consolidated first-order theoretical narratives. These narrative categories were then assigned theoretical descriptions based on the relevant theories and literature. During all data analysis procedures, different qualitative approaches were consulted to ensure the accuracy of the process. The accuracy of the process appeared systematic; however, the process was not linear and required countless data shuffling and back and forth revisions until the final themes and theoretical narratives were achieved. The techniques for categorization suggested by Auerbach and Silverstein (2003), Bengtsson (2016), and Shkedi (2005) were followed at the latent stages of data analysis.

Compilation and Conceptualization. The ***latent stage-3*** laid the foundations to map the findings in an organized way depicting quotes and evidence from the data set for each participant. The mapping procedure based on the first-order theoretical narratives enabled the researcher to compile and present within-case study unit analysis (see Figure 4). The findings obtained at this level are called category-focused narratives that provided a narration of the outcomes in vivo—without the researchers' interpretations and analysis but borrowing a storytelling feature of the participant, thus representing the participant's voice in the findings (Shkedi, 2005).

At the ***latent stage-4,*** considering the grounded nature of the research inquiry, the researcher carefully attended to the data and found areas of discoveries; analyses were built on the interpretations of the data, and the findings were then compared to the extant literature and theories. This stage referred to the conceptualization of the understudied concepts and relationships among them. Comparative analysis between the two case study units of the same school district based on level 1 (similarities and differences) and level 2 (strengths and challenges) led to the achievement of the cross-case study unit analysis. The same procedure was adopted to achieve the cross-case study analysis for the other school district. The final

Figure 4. A pictorial view of data analysis and report writing procedures

report reflects the comparative analyses between the two school districts—hence, providing in-depth analyses and multidimensional perspectives of the understudied phenomena, presenting a holistic and consolidated picture of the results (Yeh & Inman, 2007). Figure 5 represents a pictorial view of the organizational structure of findings.

The structure of the final report consisted of five components suggested by Gillham (2000). The chronological and logical coherence of the findings were maintained by presenting findings across understudied concepts. The aims and questions of the study remained the central focus throughout the analysis and reporting of results. Finally, the theorizing of the findings

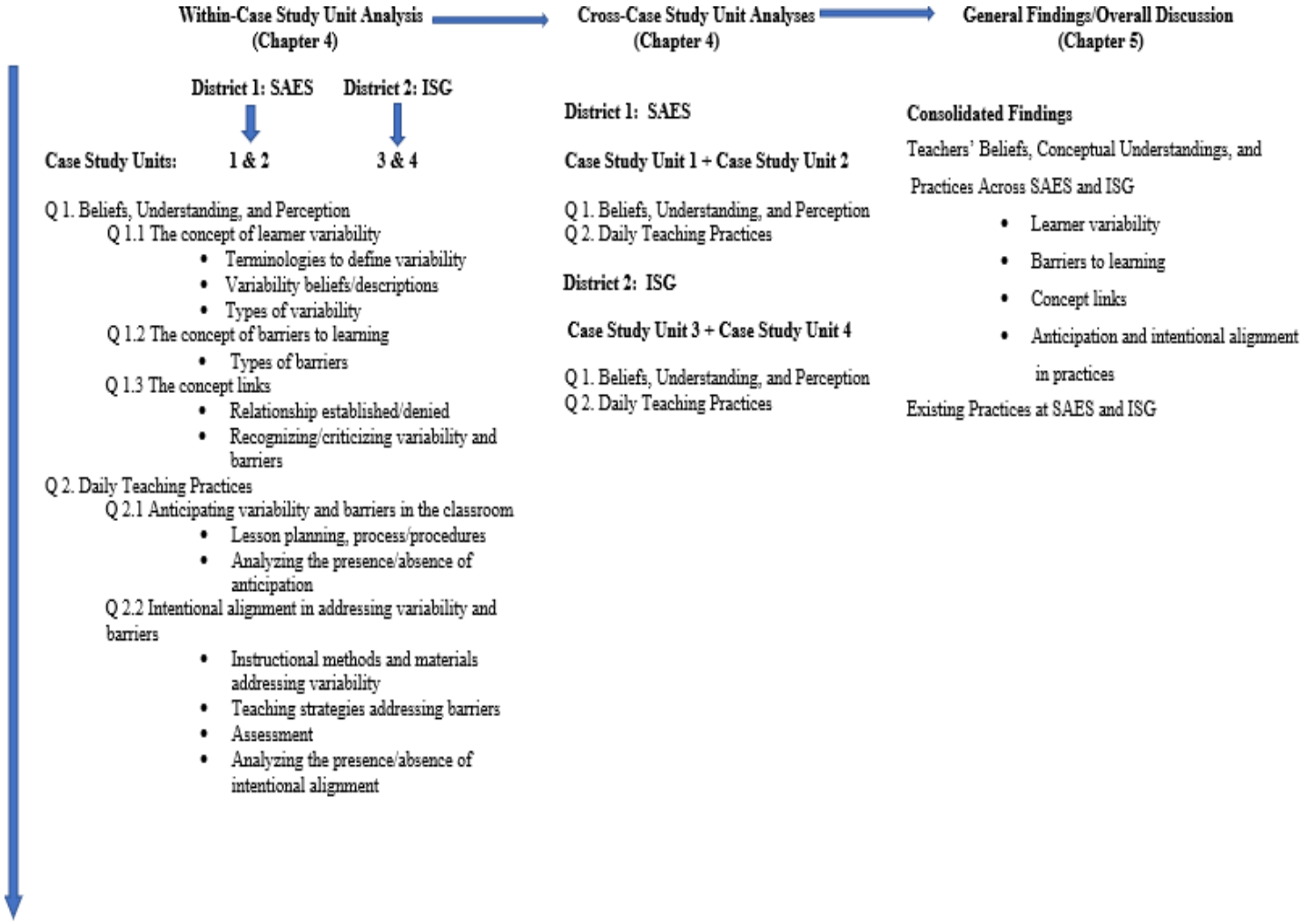

Figure 5. A pictorial view of the organizational structure of the study findings

were obtained by presenting a thick description of the findings and revisiting relevant theories and literature. The evaluation criteria for anticipation and intentional alignment were used during within-case analyses. The universally designed blueprint was consulted throughout during the analyses specifically in the cross-case analyses. The final analyses also highlight whether the findings were congruent with the assumptions of this study that were mentioned in the conceptual framework. The study protected the participants' anonymity by removing their names during the coding procedures to ensure confidentiality during data analysis and interpretations. Finally, the use of appropriate language throughout the research writing was confirmed by avoiding biased statements and by acknowledging the study participants' contribution to the advancement of knowledge (Creswell, 2013). Member checking was acquired twice during the data analysis procedure. First, it was acquired by sending the transcribed interviews to all participants, and second, by sharing the preliminary thematic categorization. Additionally, two Ph.D. graduates served as the auditors of the study and posed critical questions during and after completing the data analysis procedure. This procedure of peer debriefing and feedback led to acquiring a comprehensive set of study findings.

Research Rigor

The findings were validated by maintaining trustworthiness/credibility throughout the research protocols, data analyses and results presentations. Thus, confidence in the truth of the findings for the participants and the context of the study was established (Krefting, 1991; 1985). Some strategies for maintaining credibility have been discussed earlier, such as establishing familiarity with the participants, methodological triangulation by adopting multiple sources of data collection and participant triangulation, piloting the questionnaire, member checking, and peer debriefing. Additionally, negative case analysis was ensured by refining themes after initial

categorization by revisiting data and confirming that the obtained construct accounted for all instances of the phenomenon in the study (Bowen, 2005; Shenton, 2004). Furthermore, providing a full description of the findings and interpretations of the understudied constructs and phenomena also contributed to the credibility of this research (Maxwell, 2012; Yeh & Inman, 2007).

The dependability that relates to the consistency/confirmability of the research was accomplished by addressing credibility issues, data reconstruction, and thematic categorization during analyses, describing instrument information (interview protocols), and detailed procedures for conducting this research (Krefting, 1991). Applicability refers to transferability in the literature that Guba (1981) describes as the goodness of fit between two contexts. The researchers' responsibility is to provide sufficient descriptive data to allow for comparisons. Detailed demographic information of the study contexts (schools), participants (teachers), settings (classrooms), data collection procedures, and methodologies are provided to allow transferability. However, generalizations and transferability are currently not the interest of this research (Maxwell, 2012). Instead, the objective is to provide factual accuracy and accurate descriptions of the teachers' beliefs, meanings, patterns, and practices to obtain descriptive and interpretive validity of the research (Maxwell, 1992).

Nevertheless, the documentation of the current status of inclusive practices in private international schools may allow decisions in policymaking related to inclusive education in the Kingdom at the broader level. Addressing theoretical validity is essential in this research since it is aiming to provide the conceptual foundation for the understudied concepts for future studies; observing these methodologies possibly reduces the chances of falsification in the research (Maxwell, 1992).

Chapter Summary

In sum, this chapter provides a detailed description of the methodological approaches, research design, data collection methods and procedures, data analysis tools, and the process of data analyses. The data were collected from four elementary and middle school teachers from two different school districts in KSA. The purpose of this research was to evaluate the current status of inclusive education in the private international schools of the Kingdom. This purpose was achieved by evaluating the general education teachers' beliefs and understandings about the two core concepts of inclusive education, variability, and barriers and by exploring the connections of their beliefs and perspectives with their teaching practices. General education teachers were also investigated if they anticipate variability and barriers in their daily practices and if their practices are aligned with the core components of inclusive education. For this reason, evaluation criteria were developed for anticipation and alignment components in the teachers' practices. The confidentiality of the research participants was ensured by following the McGill REB procedures and guidelines. Furthermore, the research rigors were observed to ensure trustworthiness, dependability, and applicability throughout the analyses. The next chapter provides in-depth analyses and thick descriptions of the research findings separately for each school district.

Chapter Four: Results

Inquiring into Teachers' Beliefs, Perspectives, and Practices

The purpose of the research was to discover the general education teachers' thought processes and beliefs in understanding the meanings of two significant concepts: *learner variability* and *barriers to learnin*g and to analyze their daily teaching practices based on their beliefs and understandings about these concepts. For this purpose, it is critical to find out what teachers think, talk, and practice and this section sheds light on the related findings. The research findings in this chapter are presented distinctly for the participants selected from the two different districts: SAES and ISG-Dammam. An assimilated report prepared by pooling all data sources (face-to-face interviews, classroom observations, participant observations, document analysis, physical artifacts, and reflexivity) is presented categorically.

First, within-case study unit analyses for all four participant teachers that describe the findings of research questions 1 and 2 are presented. The emphasis at this first stage is on the participants' voices and terminologies, hence adopting a journalist approach (Shkedi, 2005). Second, the findings of each school district are followed by a cross-case study unit analysis. An analytical approach is adopted for cross-case study unit analysis by providing the researchers' insights and interpretations. This is done at two levels: similarities and differences, and strengths and challenges, across the two case study units of each school district concluding with a juxtaposition of the findings with the theory of UDL and the core components of inclusive education. A comprehensive view of the organizational structure of the research questions, data resources, research criteria, and analysis are presented in Table 4 (chapter 3). The organizational structure of the study findings is presented in Figure 5 (chapter 3). Finally, overall research findings are presented in Table 5 of this chapter 4.

School District 1: Saudi Aramco Expatriate Schools (SAES)

Two case study units (participant teachers) were selected for within and cross-case study unit analyses from SAES: Katei Heath and Mac Kelvin.

Within-Case Study Unit Analysis: Katei Heath

A Canadian national, Katei (pseudonym) acquired her combined Bachelor of Education and teacher's certification, and Bachelor of Science from the University of Alberta, Edmonton. She pursued her Master of Education degree from the Framingham State University in Boston. Katei has a productive 17 years of science and math teaching experience in Canada, South Korea, and the Middle East. Specifically, in Saudi Arabia, she spent more than nine years working in the schools of SAES located at different locations within the Kingdom. Enthusiastic about teaching math and science, Katei's only profession throughout her job career was teaching. She is an energetic and passionate teacher and serves as a Grade 5 homeroom teacher, teaching science, social studies, and mathematics. Precisely, her math class with 19 students was selected for data collection. The following section provides information about her ideas and teaching practices exclusively related to the research questions.

Beliefs, Understanding, and Perspectives

The following key question was formed followed by sub-questions to gain deep insight into teachers' beliefs, understanding, and perceptions about the core concepts variability and barriers. Since the first research question is comprised of three sub-questions, the findings for each sub-question are presented separately.

Q 1.1. The Concept of Learner Variability. The findings related to the conceptual understanding of the term learner variability were mainly obtained via the data gathered from a face-to-face interview. The interview lasted for more than three hours and provided rich

information based on 1488 lines in the verbatim transcription. Data emerged and was organized in groupings of primary themes such as *terminologies used for variability and definition, variability beliefs, and variance types.*

Terminologies used for Variability and Definition. When questioned about the familiarity of the term "learner variability," Katei responded that she had heard the term and other related terminologies, but the term was not used in everyday conversations at her school to describe the variance in the classroom. However, she preferred to use the term "learner variability" during the interview when asked about her terminology preference by using a "mirroring technique" in the questionnaire (Myers & Newman, 2007). It was also noted that the most frequently occurring terminologies that Katei used throughout her conversation to describe the learners in the classroom were "high performing/slow learners," "top kids/struggling kids," "above average/below average," "high-end kids/low-end kids," and "average learners."

The terminology utilized to describe the learning activities were "low-floor" and "high-ceiling" (KH, para. 5, Line. 50). The "low floor" activities are designed in a way that is accessible for students with different backgrounds, language, and reading levels, whereas, the "high-ceiling" activities are not just "restricted only to the higher achieving students" (KH, para. 6, Lines. 58-59) instead, "any learner can access the high ceiling work if given enough time to do and the right instructions" (KH, para. 7, Lines. 61-62).

In her understanding, learner variability means personality and ability differences among the students in a classroom. She defined the term as "some students are above grade level, some are at grade level, and some are below grade level. The classroom varies […] in personality and learner profiles". Further, she referred to variance as "multiple intelligences and different learning styles" (KH, para. 57, Lines. 1447).

Variability beliefs. Katei believes that "there is variance in the classrooms because learners have not been segregated, courses have not been streamed, and there has been little tracking, if any, in middle school and none until high school" (KH, para. 5, Lines. 45-46). This statement refers to her inclusive thoughts regarding the physical placement of various kinds of learners in one classroom, along with the non-segregated approach in the curriculum. She also believes that every learner has potential and equal ability to learn, it just takes some students longer to get there, and good coaching always helps. Referring to learning styles, she encourages her students to work more on their weaknesses rather than on their strengths; because they will never lose their strengths but will achieve less if their weaknesses remain unaddressed. Katei referred to the growth mindset frequently throughout her discussion. She believes that the principles of the growth mindset assist students to keep trying and persevering and challenges them to complete their tasks on time. She considers the growth mindset a key component of successful learning if both teachers and students genuinely adopt this approach.

Variance types. Continuing her discussion on growth mindset, she mentioned that students' personal beliefs have substantial effects on their learning. Students vary in their set of beliefs on achievement, homework approaches, perceptions about the math program, and religious beliefs that are unique to the students' families. Mentioning physical characteristics as another aspect of students' variance in the classroom, Katei finds differences in the students' age and maturity levels, reading and language proficiency, and gross motor skills. Besides, being an expat teacher, she observes the variance in the personal experiences of the students and the expat families that are associated with the variations in students' learning approaches. Examples of these include variance in the length of time expat families are living overseas, variance in the parents' job structure and the duration of children's time to stay in their home countries.

The theoretical analysis of the components and themes obtained from Katei's thought patterns, experiences, understanding, and beliefs regarding the concept of learner variability are presented in the cross-cases analyses.

Q 1.2. The Concept of Barriers to Learning. Katei said, "… the barriers to learning make it impossible or slower for a student to acquire the skills and knowledge, and attitude that they should" (KH, para. 31, Lines. 690-91). She did not, however, expand on the definition of the terminology. The overall analysis of the interview, however, allowed for the identification of different types of barriers that she experienced in her daily teaching practices over the past several years working at international schools. These barriers are grouped into three major themes: *cognitive barriers, social barriers, and instructional barriers*.

Cognitive Barriers. Student-related cognitive barriers that Katei considers hindering the learning process are grouped as maturity levels, reading levels, processing ability, and motor skills. She believes that students of the same age group can vary in their maturity levels to approach learning content and the process of learning. Students with high maturity levels take learning in its literal meaning with high levels of reasoning and are better able to cope with poor teaching strategies.

Katei considers reading levels as an essential component to progress in learning, meaning advancement in all aspects of reading, including literal, evaluative, figurative, word comprehension, vocabulary, and background knowledge. She believes that although some students catch up with their reading skills later, the critical factor is the students' concerns about their slow performance that motivates them to put more effort to overcome such barriers to learning.

Processing ability as part of the cognitive barriers was also mentioned in many different aspects in her speech, including but not limited to the students' understanding of facts and concepts, the ability to catch up to the pace of classroom activities, paying full attention via focused listening, and memorizing important information. She experienced that many students with low processing skills improve, but good coaching and giving them time to correct their mistakes are essential components required in making them progress gradually.

She considers *poor motor skills* as a cognitive barrier to learning. Katei shared a story of a student that had a problem in writing long paragraphs and precisely writing on the lines. He was always observed as inattentive and detached in the classroom until the day Katei realized that he needed to be referred to the counselor for his gross motor assessment. She believes that that is how obstacles snowball, where one barrier provides room for another barrier to grow.

Social Barriers. The environmental barriers category incorporates the following sub-themes: *parents as barriers and cultural barriers*. The most frequently reported barrier to learning in Katei's discussion was *parents as barriers*. There are several aspects of parents that frequently cause barriers in their children's day to day learning. However, if addressed, these aspects can serve as facilitators in learning. For example, most of the parents provide contradictory approaches to solving math problems to their children that cause the students difficulty in understanding classroom-based and parent-based problem-solving techniques. Such contradictions are because of the change in the curriculum over the years, and parents' lack of knowledge about the new math programs.

Within the theme of *cultural barriers,* Katei states that being an Asian is an asset in mathematics. She considers that being a non-Asian is another barrier because the Asian students outperform in math; they get extra coaching and put more emphasis on acquiring advanced math

skills. Despite cognitive and social barriers, Katei's discussion also reveals problems that are grouped under the theme of instructional barriers.

Instructional Barriers. Considering poor teaching strategies as an instructional barrier, Katei believes that the impact of good teaching on the students' achievement is not as apparent as the impact of poor teaching on the performance of the students. To some extent, a good student may survive with the poor teaching strategies due to his/her high personal strengths and cognitive functioning, but an average or below average student will not be able to internalize deep learning; thus, the achievement gap will increase and cause more barriers. Therefore, continual reflection on teaching strategies is an essential element for teachers to improve their teaching practices.

Q 1.3. Concept Links. When asked about the relationship between variability and barriers, *Katei's* discussion reflected that she considers that the concepts are strongly related to each other. However, she believes that the variance can present barriers if not addressed in a timely fashion, as shown by her statement "I think that you have to find out what the variance is, and find out what the barriers are, and then work on the barriers" (KH, para. 57, Lines. 1465-66). She believes that it is essential to address barriers by preparing teachers for all kinds of learners because the intention is to help everyone improve in the class and to reduce the achievement gap. If the achievement gap is not addressed, it will cause more barriers for the learners, and the cycle continues. She suggests that by preparing for the low-floor and high-ceiling activities along with assistive technology, and by giving choices and working with a growth mindset simultaneously, the teacher is in the best position to address variability and barriers.

In sum, Katei provided rich information around the conceptual understanding of the two core topics of the research questions 1: the salient themes and patterns of the meanings

associated with the constructs "learner variability," "barriers to learning," and the relationship among them. The in-depth analysis of these findings is provided in the cross-case study units analysis section. The following section sheds light on the research question 2: the daily teaching practices of Katei.

Daily Teaching Practices

The second question of the study investigates general education teachers' practices and explores if teachers anticipate variability and barriers and how they address them. The main question consists of two sub-questions; therefore, the findings are provided separately for each sub-question.

Q 2.1. Anticipating Variability and Barriers in the Classroom. The present research sets some parameters to evaluate anticipation element in teachers' practices. The criteria for anticipation are stated in Table 4 that facilitated the analysis of research question 2 and sub-questions. Although all data resources collectively provided information that is addressed under the topic of anticipation, however, *the lesson plans and the planning procedure* mainly provide vital information on this topic. The information collected through these resources was then triangulated with the classroom observations.

Lesson Planning. To analyze the thought processes essential to the anticipation of variability and barriers during the phase of lesson planning and deciding learning goals, Katei provided lesson plans collectively prepared by the teachers as well as provided by the Common Core State Standards (CCSS) for grade 5 (Everyday Mathematics, Connect Ed McGraw Hills-unit 5: Operations with Fractions), and some other supporting documents in addition to the interviews. Mainly, three sub-themes were identified under this category: *the process of lesson planning, the learning targets and goals, and the embedded resources.*

The Process of Lesson Planning takes place in meetings under the supervision of a math coach that occurs throughout the year. The purpose of such co-planning is to add enrichment activities that are not otherwise suggested by the textbook, to plan for the assessments, to evaluate students' background knowledge to prepare for the new lesson, and to put all resources and the problem solutions in one place that could be accessible to all teachers. They use the teachers' edition lesson guide suggested by the CCSS and the Sheltered Instruction Observation Protocol (SIOP) in their lesson planning. SIOP is an instructional framework utilized to address the academic needs of English language learners (ELL) and ESL students through purposeful teaching (Echevarria, Vogt, & Short, 2008).

Upon inquiring if Katei prepares individual lesson plans, she mentioned that she follows CCSS and the teachers' planner, but she takes personal notes in a notebook, on the whiteboard, and the Power School Learning (PSL) page. PSL is a school portal accessible to parents, teachers, and students. Katei posts important reminders, unfinished tasks, announcements, relevant instructions for specific tasks, common mathematic misconceptions, and activity links specified for ELL students and the entire class. She keeps home-school communication active through frequently posting on the PSL portal.

Learning targets and goals are found broadly but clearly stated in the CCSS and the teachers' lesson plan for Unit-5. The goals and contents in the plan depict the instructional process of the targeted lesson, including how students will be able to understand the new math concepts, learn, and practice. The goals written in the CCSS appear to be in line with all teaching components, including the learning material, teaching methods, and assessments. The goals mentioned in the teacher-made lesson plans that are in line with the CCSS do not, however, include descriptions or vocabulary representing the anticipation of variability and expected

barriers. The teacher-made lesson plans underscore the LESA model. This model is comprised of the following components: Launch (retrieving background knowledge), Explore (introducing the new content), Summarize (overview of the lesson), and Apply (practicing).

Lesson plans depict differentiated planning (i.e., taking into account readiness, enrichment, and extra practices) for ELL/ESL students, for students on academic support, and those with mixed strengths in the classroom. Teachers receive students' Tier record cards if they are receiving interventions and accommodations and follow students' progress in the monthly meetings with the Special Services Team (SST). Some descriptions in Katei's interview indicate her thoughtful planning to differentiation in the classroom, benefiting different kinds of learners. She mentioned that Everyday Mathematics is a rigorous program. Therefore, teachers plan the lesson in such a way that if some students have difficulty in understanding some concepts at any stage, the students will be able to catch up later, hence a spiral math program. The spiral math program allows rotational instructions and provides opportunities to the students to build on new learning, based on their background information.

Embedded resources are apparent in the lesson planning and the standards-based program that encourages teachers to utilize readily available resources designed for each lesson. These include e-presentations, students learning center links, facts workshop games, e-toolkit, professional development resources, home connections, and spiral trackers. The teachers-made lesson plans include hyperlinks to math journals and enrichment activities, including math games and practice.

In sum, the data provide some evidence of anticipation in the lesson planning. An in-depth analysis of anticipation is presented in the cross-case analysis section. Before starting such

analysis, it is, however, essential to explore if the general education teachers' practices are in line with the learning goals and the core components of inclusive education.

Q 2.2. Intentional Alignment in Addressing Variability and Barriers. As described earlier, the present research provides criteria to evaluate intentional alignment in teachers' practices (see Table 4). The major data sources to evaluate intentional alignment components are interviews, documents, physical artifacts, and classroom observations. Since criteria (a and b) are met in this case therefore, an evaluation was done according to criterion c. Three themes emerged regarding alignment and addressing variability and barrier issues: *instructional methods and materials addressing variability, teaching strategies addressing barriers, and assessments*.

Instructional Methods and Materials Addressing Variability. Methods and materials addressing variability are prominent in Katei's daily teaching strategies and her use of assistive technology. Katei regularly displays the teacher-made lesson plan daily on the Promethean board to show the students what they are going to learn and how she follows the LESA model on an almost daily basis and stays focused on the planned goals and learning targets. The classroom observation data indicate that her practices are aligned with the stated goals.

Many statements during her interview represent her reflective thoughts regarding her teaching practices with learner variability. For example, she states, "… we have more visual learners in the classroom, do we try to do something different in the class?" (KH, para. 41, Lines. 867-68). She uses various strategies to engage various learners, accessing enrichment activities on the Promethean board, using a document camera to show and explain math problems, encouraging students by recording their live presentations in the classroom and to post them on PSL to encourage their work, using Chrome books for browsing math games, encouraging

project-based learning strategy, involving students in engaging group discussions, and making heterogeneous groups of students with mixed strengths.

Katei adopts various techniques to address the learning needs of diverse students. She shared the story of a child who was trying to solve a math problem in a different way that did not match with the correct solution(s). Katei adopted a step by step procedure to resolve the dispute: she encouraged him to attend peer consultation and then recorded the conversation, offered him help, explained the written math rules, and placed them on the classroom wall. Once the issue got resolved, she gave him the authority and responsibility to teach the class and followed up on the issue by giving him reminders and communicating with his parents. Her teaching practices reflect her beliefs about encouraging a growth mindset and learning from mistakes. There is, however, overlap and a rare distinction between the various methods she adopts to address variability, and, in the strategies, she uses to remove the barriers. This might be because the two concepts are closely related, as reflected in the findings of research question 1.3 regarding concept links in her discussion.

Teaching Strategies Addressing Barriers. Intentional alignment of teaching strategies in addressing barriers is somewhat observed in the teachers' statements and practices. For instance, Katei mentioned that during the co-planning procedure for the math lessons, teachers use CCSS recommended terminologies and instructions and then follow them line-by-line in the class. CCSS emphasizes the differentiation and additional learning support for ELL students. Further, following the LESA model, CCSS encourages students' engagement in learning mathematical concepts. Besides, based on their planning for students on learning support and interventions suggested by the student support services team, Katei uses multiple ways to present learning tasks and strategies to remove *reading and comprehension barriers*. She utilizes, for example,

pull-out sessions for Leveled Literacy Intervention, employs digital scaffolds, peer feedback, teachers' corrective feedback, one-on-one instruction, and extra support to the students. She also shows the teachers' manual to the class using the document camera for students' self-corrections and enhances students' readiness by preparing them ahead for the new concepts and scheduled assessments.

Katei follows and applies the Go to Strategies Inventory (SIOP) to address *behavioral and emotional barriers* in the classroom. The document analysis shows that the inventory contains seven groups of strategies to address problematic behavior and literacy support in the classroom. Further, Katei administers surveys to collect students' feedback to improve her teaching practices accordingly. She believes that it is crucial to know the patterns of students' thinking and learning habits to cater to their individual needs. For this purpose, she encourages her students to post their discussions, comments, concerns, and worries on PSL. This activity helps students reflect on their thinking, and hence learn better. Additionally, it helps the teacher to know their learning patterns. After consulting with parents, students with additional behavioral and emotional issues are directed to the student support services team and the school counselor.

Assessment. Assessment procedures were evaluated using the documents (assessment sheets, self-assessment rubric, adapting assessment for English learners) and triangulated with the interview and observations. The analysis suggests that the formative and summative assessments indicate alignment with the unit goals and objectives prepared by the teachers and CCSS and emphasize students' academic achievement. Precisely, the process of formative assessment partially aligns with the differentiation goals for the students with multiple needs and strengths; however, summative assessments do not.

Data collected from the classroom observations indicate that formative assessments are done during the ongoing instructional classes and focus on students' daily progress. Students' understanding is evaluated by observing their ability to solve, summarize, and explain the math problem using a rubric of "not meeting expectations" and "meeting expectations." The LESA model assists the teacher in evaluating students' understanding. She also uses embedded scaffolds, instant corrective feedback, and partner checking to gauge students' performance on the task. However, a documented record is not maintained for such regular formative assessments.

Summative assessments, on the other hand, are done at the end of the unit and are formally documented. Before summative evaluations, Katei provides students a self-assessment rubric showing a list of the skill sets required for the entire unit across three levels of expertise (can do independently, can do with help, can do and explain). This rubric and the clearly stated expectations facilitate students' targeted practice in the relevant areas. Traditional paper-pencil based tests are administered, students are provided assessment instructions, and multiple responses are encouraged. Math problems are based on numerical, descriptive, and open-ended responses. Physical placement of the students also changes on the test day, and independent work is strictly monitored. Overall, the process of summative assessments was found to be traditional, with less flexible opportunities for students to express their learning using different options.

In sum, there is evidence supporting Katei's practices addressing variability and barrier issues. Addressing variability and barriers appear intentional sometimes while automatic other times and reflect as part of her excellent teaching practices. Her instructional methods, teaching strategies, and use of learning materials are aligned to several components considered core in

inclusive education literature, precisely aligned to CCSS-based differential planning for ELL/ESL and diverse learners, along with the use of assistive technology in her classroom. Assessment procedures are, however not fully aligned with the methods suggested by inclusive literature (see universally designed blueprint Figure 3). Nevertheless, an in-depth examination of intentional alignment concerning Katei's beliefs and anticipation practices is presented in the sections of cross-case study unit analysis. This process requires examining a second case from the same school district to increase the credibility of the findings.

Within-Case Study Unit Analysis: Mac Kalvin

An American national, Mac (pseudonym) acquired his undergraduate degree and teachers' certification from the University of Washington and a Master's degree from the University of New Hemisphere, USA, in high school math and science program. He was involved in teaching throughout his studies. Inspired by the teaching experiences of his sister in the international school systems around the world, he decided to pursue teaching as his core profession at the US-based international school systems. Mac has 25 years of high school teaching experience in the US, South Korea, Burma, Morocco, and Saudi Arabia. Specifically, he spent five years working with SAES in Saudi Arabia. Satisfied with his life as a veteran teacher, Mac is currently serving as a grade 8 math and science teacher at SAES. The following section sheds light on his perspectives around the two core research topics: variability in the classrooms and barriers to learning as well as the two research questions regarding beliefs, understanding, and perceptions, and daily teaching practices.

Beliefs, Understanding, and Perspectives

Q 1.1. The Concept of Learners Variability. To analyze Q 1.1, data was obtained from a line-by-line analysis of the interview transcription based on 805 lines that provide insight into

Mac's ideas, beliefs, and perspectives on variability and the related components. Two themes emerged: *terminologies and definitions used for the diverse learner; and beliefs about the variability facets.*

Terminologies and Definitions used for Diverse Learners. Once given a choice of using his everyday terminology instead of using "learner variability" during the interview (a mirroring technique), Mac preferred to use the same term and assured his understanding about the given term. He defined variability as "…learner with different aptitudes, different motivation levels …different natural talents, different abilities to focus, and different […] work ethics" (MK, para. 11, Lines. 112-14). Given this definition of variability, he mentioned that the specific terminologies he uses among his colleagues to describe learner variability are "weaker students and strong students" (MK, para. 11, Lines. 115-16). He moved on to defining these terms as "a weaker student will be either someone who would have poor work ethics or someone who struggles with the material or a combination of [both]…" (MK, para. 11, L. 116-17). In contrast, "a strong student will be the one with fantastic work ethics, and even if they do not do well in mathematics-but I know they always work hard, or they can be talented in math or combination of those things" (MK, para. 11, Lines. 118-19). Apart from these terms, he also used "low-end and high-end students' throughout his interview session.

Beliefs about the variability facets. The data analysis illustrates an intertwined pattern of Mac's beliefs in describing five variability traits: perseverance, organization, math-ability, attention, and work ethics that he believes plays a significant role in learning. He also believes that "variability is multifaceted" (MK, para. 12, Line. 129), and all these characteristics may overlap and co-exist.

Perseverance is the most frequently reported characteristic in his interview. He believes in the sheer focus and staying on task until it is accomplished. As an expert teacher, he believes perseverance is the most needed characteristic of the diverse learners and therefore places it at a high value during his daily teaching. For example, he mentioned that in making heterogeneous groups of students, he purposefully includes at least one student with perseverance. Regardless of individual differences, perseverance is essential for all learners.

Mac believes that *organization* and perseverance are related and complement each other. He thinks that parents anticipate that organizational ability is already developed, and children in the middle-school automatically develop this characteristic. In his opinion, this ability is related to brain growth, and there are gender differences as well.

Over the years, Mac experienced students with innate *math-ability* who have a real talent, while other students are struggling, and the rest are somewhere in between these two poles.

Mac expressed that *attention,* which takes the role of staying focused, relates to perseverance, and *work ethic*. He believes that the work ethics facet is related to students' awareness and understanding of how to respond to the assigned task and pay attention. Mac thinks that this ability is not innate, and that students learn, cultivate, and enhance this ability with time and that it is closely related to the maturity facet of variability.

Mac's patterns of understanding and perceiving variability are well established and contribute to the conceptual debate. Before a conceptual discussion on question 1, it is vital to overview Mac's thoughts on the barriers' concept.

Q 1.2. The Concept of Barriers to Learning. Upon inquiring if he ever heard or used the term "barriers to learning," Mac said, "I have not heard that phrase before, but the way I will define it would be different categories that could be barriers" (MK, para. 34, Lines. 562-65).

Two themes emerged as barrier categories: *student-related barriers; and teacher-related barriers*.

The Student-related Barriers. This type incorporates physiological and emotional barriers. Mac considers physiological barriers as easy to identify and address. For instance, this category includes students with hearing, visual, or fine motor deficiencies. On the other hand, emotional barriers are challenging to manage. These barriers include distractibility and behavioral issues that need more time and planning to address.

The Teacher-related Barriers. These are instructional barriers. Mac believes that students are influenced by both the strengths and weaknesses of the teacher. His reflexive thoughts in identifying his weaknesses are found throughout the interview. He discusses overcoming his shortcomings by enhancing his strengths but mentions that the problems in his personality or teaching strategies, which he is unaware of, that must adversely impact his students. Therefore, he welcomes the adoption of new teaching skills and strategies to overcome teacher-related barriers.

Q 1.3. Concept Links. Mac believes that the concept of variability and barriers are related and influence each other, as he says, "I do not believe that they are mutually exclusive" (MK, para. 51, Line. 782). He relates variability facets with the physical maturity of the brain that he believes is responsible for barriers to learning in terms of distractibility and behavioral issues. He, however, emphasizes reducing the teacher-related barriers in addressing variability by enhancing effective teaching strategies.

After discovering Mac's beliefs, opinions, and understanding of variability and barriers, it is essential to know if these concepts are evident in Mac's actual teaching practices.

Daily Teaching Practices.

Q 2.1. Anticipating Variability and Barriers in the Classroom. As mentioned earlier, the anticipation component is related to thoughtful planning and predicting variability and barrier issues before starting actual teaching practices in the classroom. Based on the pre-defined criteria, document analysis and the interview were used to evaluate the presence or absence of the anticipation component during the process of Mac's *lesson planning and learning targets and goals.*

Lesson Planning. Mac provided five plans for 8th-grade math unit-4 from the Teachers' Lesson Planning Guide (TLPG) that follows CCSS. Besides, he provided the unit book 'Connect Ed Mathematics' published by Michigan State University. Mac also provided his handwritten daily planning notes. Mac mentioned that he prefers reflecting on the students' progress and their learning needs in his day-to-day non-formal style of planning. As shown in his hand-written notes, a planned agenda for the day includes activities, homework details, pending tasks, and essential details regarding the classroom and outside. He emphasizes following the CCSS in his planning and daily practices.

Learning Targets and Goals. Learning goals that are noticed in the CCSS-based TLPG significantly reflect the process of teaching the required math contents. Specific planning around serving the needs of diverse learners or anticipating learning obstacles, solutions, or differentiation was not evident in TLPG. The components of the LESA model and the unit related key vocabulary for ELL support are, however, found effectively focused on the planning. Mac mentioned that he spends a few weeks to comprehend students' personalities and learning patterns at the start of a new academic session. These observations and insights are not, however, documented and incorporated in Mac's lesson plans. A few indications of embedded

educational resources were also observed in the teachers' daily plans; however, no evidence for differentiation was noted.

The data support Mac's deep conceptual understanding about the variability and barrier concepts, hence criterion *a* for anticipation was met. However, only a few pieces of evidence are found reflecting anticipation in the lesson plans and planning procedure; therefore, criteria *b* and *c* were not fully met. Given his personal beliefs on variability facets and his recognition of barrier categories, it is interesting to note how Mac addresses these issues in daily practices.

Q 2.2. Intentional Alignment in Addressing Variability and Barriers. The limited evidence of anticipation component in lesson planning did not meet criteria *a,* for intentional alignment; therefore, further evaluations are based on criteria *b* and *d*. Criteria *d* refers to evaluate Mac's teaching practices in addressing variability and barriers in his classroom. All data resources are assessed in combination. Broadly, three themes emerged in this category: *the instructional methods and materials addressing variability, teaching strategies addressing barriers, and assessment*.

Instructional Methods and Materials Addressing Variability. Data obtained from the classroom observations support that Mac's teaching methods are aligned to the LESA model, CCSS-based TLPG, and his notes. Goals and objectives are presented and defined to the students every day. Mac accepts differences in personalities and uses a variety of techniques to serve the needs of various learners by adopting a flexible teaching approach and considering the variability facets. For example, he provides learning styles accommodations by posting online math resources, activities, games, and math problem solutions for students' self-corrections. He mentioned that this practice aids students to stay on task when they are afraid of making mistakes

in the classroom, in absent students, in those who need flexible work schedules, and in those who prefer to learn digitally.

Considering the differences in math-ability, he encourages proactive planning of a sitting arrangement to "cultivate symbiotic relationship" between the weak and strong students (MK, para. 25, Line. 355). Such arrangements encourage low performing students to exhibit their maximum work potential and learn perseverance from each other. He further utilizes a social appraisal strategy to encourage students by displaying their work to the class and sending appraisal emails to their parents. He believes that such strategies work in enhancing students' work ethic.

To increase students' engagement, participation, on-task behavior, and attention in the classroom, Mac uses a variety of educational technology and materials. For instance, students are allowed to use their laptops, Smartboard and calculators, and use online math activities like GeoGebra, Kahoot, and Khan Academy. Further, Mac also engages students by using the "staple with me" technique in his class. This is a teaching strategy where students enjoy high group energy and participation by gathering around teachers' table for short but an engaging discussion. Sometimes, he engages them in traditional lecture-based discussions, paper-pencil or ace activities, and small group discussions.

Teaching Strategies Addressing Barriers. Data appeared supporting Mac's practices addressing *barriers related to timing aspects, settings, and student and teacher-related barriers.* He is reflective while planning the daily activities and factors in the time of the class (morning or afternoon) because he thinks that in the morning, students are more focused and prepared to learn, while after lunch, they are excited and distracted. Therefore, he believes that strategies should be adopted accordingly to reduce *barriers caused by class timings*. Similarly, he prefers

to give short breaks during a 90-minute-long math block. He uses movement strategies within and outside the classroom and short breaks to reduce distracted behavior. Physical placement of the students and the classroom organization also minimize *setting barriers*. For example, students should be seated next to or close to each other, so that the peer consultation is feasible. Similarly, the placement of the students should be in a way that they could access learning materials. Additionally, using scaffolding strategies during instructional time, reading aloud, gaining attention before any new command, using background music during the math practice, solving math problems on the board as a group discussion and utilizing peer feedback reduce barriers related to the cognitive access of the curriculum and learning material.

The teacher initially addresses students with *behavioral and emotional problems*. Mac adopts different behavior management strategies, for example, pointing their behavior out in the class and referring them to the house logo that endorses respect and integrity. Later, he arranges a one-on-one discussion with them and sets expectations or ask them to fill a form that encourages them to solve their problems or identify their need for help. Sometimes, Mac needs to use the card system. When he warns students with behavioral problems, a yellow card is assigned, while receiving a red card means they need to see the principal. Mac mentioned that they have to learn to support teachers who practice Response to Intervention (RTI) with students with mild learning problems in consultation with the core subject teachers. They arrange to pull out sessions and place students on Tier levels based on their assessment. At the upper middle school level, they do not, however, have many ELL students. Thus, differentiation practices are not so often used in the classrooms.

To minimize *teachers-related barriers*, Mac adopts a role as a class facilitator rather than presenting himself as an authority figure in his daily teaching. He reflects on his practices and

tries to overcome his shortcomings by learning new skills, using educational technology, and being available to the students for extra help. He provides extra support to the students during his lunch hours and after school, amounting to more than eight times a week.

Assessment. Document analysis (self-assessment sheet, study strategies sheet, students' reflective notes, unit review sheet, and the unit assessment), observations and interview statements depict that variability and barriers are well addressed during the assessment preparation stage, however not much attention is given to these components during the actual assessment process. Also, the assessment procedures are well aligned to the TLPG, but the intentional alignment component is not apparent during the preparation and in the actual assessment procedures.

Mac mentioned that he uses observations, teachers' insight, and worksheets for the formative assessments, but he rarely documents the formative assessment. His objective is not to grade and rate students; instead, his goal is to assess the students' progress with time.

Before the summative assessment, Mac gives a point sheet to the students that is attached to the unit review. Points are assigned according to the students' way of solving the math problem. Further, he asks them to reflect on their best learning approaches and self-evaluate the study strategies that work best for them when preparing for their test. Progress monitoring using a progress dragon technique is another method of self-evaluation that he utilizes. In this technique, he draws a big dragon on the board and presents segments of following mathematical tasks on the dragon's body. The required tasks are written in these segments, and each students' name tags are placed around the board. Once a student achieves one level of assigned math task, he comes to the board and place his name tag to that section and proceeds to the next level. That is how students monitor their progress with an engaging learning activity. He also provides an

assessment rubric that clearly states expectations. All these strategies help students with various skill sets, strengths, and weaknesses to prepare for the summative assessment. Summative assessments are paper-and-pencil tests that Mac administers in a controlled time and setting traditionally.

In sum, Mac's daily practices appear to address variability and barrier factors in the classroom. His practices are aligned to CCSS but do not fulfill the full criteria for alignment. However, to explore further, it is critical to compare case findings within the same school district to make profound interpretations and infer interrelationships or interactions within the underlying research topics.

Cross-Case Study Unit Analysis: District 1-SAES

The cross-case study unit analysis for research question 1 is based on the general education teachers' beliefs, understanding, and perspectives regarding variability and barriers, and analyses for research question 2 are based on their practices in addressing variability and barriers. The analyses designate similar and different approaches of two SAES cases in terms of their ways of interpreting and perceiving the core concepts (see Table 5 for a brief description of the case study findings). Affiliation with the same school district, similar nationalities/culture, and educational backgrounds might account for the similar perspectives among the two cases. The personal experiences and unique context of each case account for the differences of approaches and advance an understanding of the researched concepts. A universally designed blueprint for anticipation and alignment was prepared that guides cross-case analyses and serves as a roadmap for this research (see Figure 3).

Q 1. Beliefs and Understanding

Katei's variability beliefs, the types she identifies, and the definition she uses reflect her beliefs in a wide range of learners' personality traits and levels of ability. For example, life experiences and students' beliefs further shape their personality traits and serve as determinants of their strengths and weaknesses. Katei believes that students bring different experiences and skillsets to the classroom, and the teacher is accountable for understanding and interpreting these variations as suggested by multiple intelligence theory (MIT). The MI theorists (Gardner, 2000; White, 2000) believe that every learner develops and cultivates time and context-oriented talents and skills that are unique to the individual. Katei also recognizes learning styles; and beliefs that the teacher serves as an investigator in identifying students' learning styles in order to assist in minimizing their weaknesses and increasing their strengths simultaneously. In her opinion, it is vital that personal abilities, such as maturity, reading skills, language proficiency, and motor skills, be considered essential to acquiring new knowledge.

Mac's definition of variability reflects his understanding that differences in terms of individual traits are positioned differently among different learners. He believes that these characteristics are inherent and develop gradually. Mac's beliefs about variability and trait identification are driven by his conceptualization of individual differences. Looking beyond Mac's approach regarding individual differences, his practices also reveal his beliefs that emphasize students' learning strategies. Mac provides opportunities for his students to reflect on the learning strategies that best meet their learning needs. Thus, a blend of understanding the individual differences and utilizing learning strategies provides him with ways to adapt teaching methods that are in line with the learners' needs.

There is consistency in the teachers' understanding of barriers as they both accentuate the identification of personal and social agents that slow down the learning process and deprive the

learners of attaining the intended learning outcomes. Both teachers quoted instances of student-related and social-oriented barriers, yet the emphasis was different in both teachers' perspectives. Within student-related barriers, Katei, for example, focused on the deficiencies that are considered as potential barriers relate to the learners' cognitive processing that is responsible for higher-order learning tasks. Mac, on the other hand, pointed out physical and affective barriers that cause hindrance in learning. Regarding instructional barriers, both teachers recognize that poor teaching strategies and teachers' strengths and weaknesses also cause barriers to learning. Katei further added parents' and cultural factors as an additional component in the array of social barriers to learning.

The analysis of both cases suggests a typical pattern of perceiving variability and barriers as co-occurring concepts. In Katei's perspective, identifying variability is pivotal in addressing barriers. For example, she would consider the achievement gap as a barrier that can be addressed by attending variability factors, and if not addressed promptly, can multiply barriers, and the cycle will continue. Recognizing the co-existence of the two concepts, Mac, however, believes that the immaturity facets within an individual (as mentioned above) are responsible for causing barriers. Although, the underlying perspective of both cases is to highlight that the unaddressed variability factors generate barriers, also indicating a strong relationship among them. However, Mac's discussion reflects his approach of perceiving individual differences as barriers within the person-oriented barriers category.

These findings warrant initiating discussions on this topic within inclusion and a UDL perspective at SAES to endorse variability and individual differences as strengths and not as barriers. This approach potentially leads to the restructuring of the concept of individual differences by adopting an inclusive model to teaching and learning systems at SAES. Shifting

the perspective of variability as a norm rather than a barrier in the general classrooms opens the door to anticipate and plan universally for all learners proactively.

Q 2. Daily Teaching Practices

The underlying assumption behind research question 2 was to explore if teachers in the general education setting anticipate possible variability and barriers in their classrooms. If they do, then to what extent do they anticipate them, and how does anticipation lead to the intentional alignment. The anticipation component was evaluated according to the criteria defined earlier that value curricula planning in addressing variability and removing barriers. Learning objectives and goals mentioned in the lesson planning of SAES teachers depicted an intentional effort to embed the means of achievement (instructional process and how students will learn and practice new concepts) rather than presenting the intended learning outcomes. The goals are found in line with the CCSS and are shared with the students in the classroom, but differentiation between the outcomes and the means of achieving goals is not apparent.

The collected data from both case study units suggest that the process of lesson planning is based on collaboration under the supervision of a math coach. The main objective of this collaborative planning is to ensure that the goals are in line with the CCSS and the learning tasks and enrichment activities are accessible to the teachers. Lesson planning at grade 5 level focuses on the low-floor high-ceiling activities for the diverse learners, ELLs, and includes differentiation. The support for ELLs was found in the lesson planning at grade 8 level, differentiation is, however, not in practice at this grade as an instructional framework.

Consistent with the Novak's (2016) notion, the document analysis suggests that the SAES standard-based curriculum consists of two types such as content standards requiring understanding and knowledge of the students that are assessed by the verbs "describe",

"explain," "analyze," "summarize," and "discuss," and method standards that require students to demonstrate that knowledge and assessed verbs "perform," "write," "use," "solve," and "create." This analysis concludes that the teachers' practices are aligned to the CCSS. Moreover, reflections on the instructional methods and learning goals are evident in the data sets for both cases. The data analysis also confirms reflexive teaching practices in SAES participants.

Overall, criterion *a,* for evaluating anticipation was met in both participants of SAES, while there were few pieces of evidence of the language depicting teachers' thoughtful and intentional planning for the activities based on variability and barriers—thus, criterion *b* was met partially in both cases. Criterion *c* was met in Katei's case and was not fulfilled in Mac's planning. Thus, the overall findings around anticipation remained partially achieved.

One of the assumptions of the present study was that anticipation and intentional alignment components relate to each other, and teachers who practice anticipation during the lesson planning are likely to achieve intentional alignment across curricula. The within-case study unit analysis shows that the anticipation component among SAES teachers is partially achieved. The alignment component also appeared to be more automatic, intuitive, and tactic-based rather than intentional that requires further analysis to explore the strengths and weaknesses in the classroom practices according to the benchmark guiding this analysis (see Figure 3).

Overall, the classroom learning environment appeared to be well organized, caring, and supportive. The teachers appeared to be compassionate and paid full attention to the students' responses and actions. The SAES classes were found to be a blend of a learner-centered and teacher-centered environment with flexible approaches to teaching and learning where the teachers' role was as classroom facilitators rather than instructors. Moreover, Katei mentioned

that the school maintains a record for each students' assessment data and academic and behavioral progress (i.e., student replacement cards) that they pass on to the next grade's teacher at the start of the new school year. She prefers not to consult those records unless necessary to avoid possible bias towards the child, especially at the start of the academic year. It is, however, suggested that consulting these records throughout the year can help Katei in identifying and addressing barriers; thus, this practice can facilitate inclusive planning.

Team collaboration and student support (counselors, school psychologists, and math coaches, instructional specialist, and the health nurse), mutual observations (between classrooms and by keeping classroom recordings), and PLCs (creating a supportive space and building on existing knowledge) and teachers' roles as catalysts in the classrooms are additional building blocks for inclusion that are already situated at SAES. However, there is a necessity to recruit teachers specialized in special needs, and paraprofessional staff to advance inclusive practice at an extensive level.

Within the UDL perspective, achieving and maintaining intentional alignment requires additional components in instructional planning. For instance, principles, guidelines, and checkpoints to be focused during the planning through practice phases. Adhering to the UDL perspective, it is essential to see the extent to which the teachers' practices at SAES demonstrate the UDL approach given their profound experiential knowledge and a wide range of practices.

Utilizing *multiple means of engagement* as Principle 1, teachers at SAES recruit learners' interest by using various cognitive tools such as educational technology, mathematical games and software, and embedded scaffolds. Further, persistence among the learners is encouraged by group learning tasks and corrected feedback. Self-regulation skills are promoted by clearly stating expectations and rubrics while coping skills are obtained and monitored through SST

services, second-step program, and the Go to Strategies Inventory. Furthermore, students are provided with the opportunities for self-assessment through self-check, peer feedback, and aligning their work with the embedded solutions.

Positioning *multiple means of representation* as Principle 2, the teachers at SAES give the learners choices to complete tasks with multiple modalities of their interest. However, such practices should be adopted frequently to increase students' participation SAES teachers frequently use mathematical language and symbols and provide support in difficult mathematical vocabulary. Students' background knowledge is used to build new learning, and students' expressions of establishing a relationship between the previously learned concepts and new learning are encouraged.

Recognizing *multiple means of expression and communication* as Principle 3, teachers provide opportunities to showcase their learning in various ways, such as through show and tell, by making digital recordings and sharing, through digital presentations, and project work. These opportunities were however not a part of students' summative assessment in the math classroom. Nonetheless, the teachers provide progress monitoring and reflective opportunities to the students that enhance their executive functioning.

In sum, considering the background knowledge of the teachers, it is concluded that they have a strong understanding of the core concepts of "variability and barriers." Given their malleable believes towards student variance and understanding different types of barriers, specifically instructional barriers—teachers' beliefs overall appeared to be inclusive and flexible in comprehending the differences. Due to their general beliefs, it was found that their daily teaching practices were more flexible in addressing variability and barriers, and the teachers' roles in the classroom were as facilitators; these are essential factors in inclusive practices.

However, it can also be inferred that since these teachers lack experiences with students with special needs and disabilities in general education settings; therefore, their beliefs towards learning differences are inclusive and positive. Alternatively, their general beliefs might be established due to their background teaching and learning experiences in diversified educational and societal systems. Nonetheless, they need discussions on valuing learners' variability as a means of growth in teaching and improving inclusive practices, regardless of students' personality traits and abilities.

Teachers' experiential knowledge and administrative support provide a wide array of opportunities to SAES teachers that appeared to be intuitive in addressing variability and barriers. Therefore, the current practices are comprised of several UDL suggested practices; and are partially aligned with many core components of inclusive education. However, teachers' existing practices can be advanced from emerging and proficient to expert and distinguished that can serve an array of learners regardless of differences and disabilities. Overall, SAES teaching practices are aligned to the CCSS. However, the process of anticipation and alignment do not appear intentional, rather tactic based. Adoption of fully anticipated and intentionally aligned teaching components require system-wide initiatives on inclusive practices that are recommended in the next chapter. A comprehensive view of the organizational structure of the research findings can be found in Figure 5.

School District 2: International Schools Group (ISG-Dammam)

Two case study units are selected from ISG-Dammam: Naila Fahad, and Analyn Sylvia.

Within-Case Study Unit Analysis: Naila Fahad

Naila was born in India, which is where she acquired her Master's degree in Mathematics and B.Ed. in teaching and education. Passionate about teaching and learning, Naila had a long

history of teaching her siblings, others in the neighborhood, and at the local schools later in her life. She opted to teach as her sole profession and spent three years of teaching in India. This is her 18th year with ISG. At ISG, she has been teaching science, language art, math, and social studies. Specifically, her math class (grade 6) was chosen to collect data for this study.

Beliefs, Understanding, and Perspectives

The line by line analysis of 537 lines from the interview transcription provides information about Naila's understanding and perception of the core research topics - variability and barriers.

Q 1.1. The Concept of Learner Variability. The term "learner variability" was new to Naila, and she preferred to use "learning styles" and "differentiation in learning" during her interview. She believes that there are students with different skill levels, abilities, and interests in the classroom, and they want to be recognized as different. She believes that almost every student can come to the same solution using different problem-solving skills. Her definition shows her understanding and familiarity with the learning style and differentiation concepts, as she says:

> I think it is just a differentiation for me how I distinguish a learner. A learner is distinguished because of his abilities…I can see their style of learning is different…Just not like understanding [that] he is just a kinesthetic learner, or he is this type of learner. So, we are not just categorizing them or labeling them this way (NF, para. 8, Lines. 148-154).

Q 1.2. The Concept of Barriers to Learning. The discussion about barriers to learning with Naila elicited responses that are broadly grouped into three themes*: student-related barriers, social barriers, and instructional barriers*.

Student-related Barriers. Students who do not comply with the teachers' instructions and are less disciplined, restless, and non-confining, those who lack motivation, have a comprehension problem, or have English language difficulties are some examples stated by Naila throughout her interview that fall under the theme of *student-related barriers.*

Social Barriers, on the other hand, group her ideas that signify the environmental components that cause obstacles to learning. For example, Naila considers that the over usage of technology, if it is not goal-directed (i.e., games), is a barrier for students that keep them distracted for hours and hence, reduces their academic performance. Secondly, she believes parents also cause barriers when they do not control their child's absences or do not openly share the student's problems with the teacher and the school counselor. Also, when parents provide conflicting ways to solving math problems that do not match with the classroom instructions given to their children, this causes trouble in learning.

Instructional Barriers. She also considers herself a part of the *instructional barriers;* when her teaching styles are not matched with students' learning styles, the students feel they are behind. She mentioned throughout her discussion that she tries to overcome such barriers by adopting various techniques and solutions that are discussed in research question 2.

Q 1.3. The Concept Links. In Naila's opinion, the concept of variability and barriers are closely linked and "rarely not related" (NF, para. 35, Line. 492). In response to the question about the concept links, her focus remained on the barriers-related components overall, and the relationship between the two concepts rarely emerged during her discussion. For instance, she mentioned that she has been successful in dealing with the day-to-day problems experienced by students within the general education classroom; however, she rarely experiences serious trouble with the students. She shared a story of two students who had severe emotional and learning

difficulties, and they were not able to continue their studies at school. She mentioned that one of them remained always detached and confined to his seat in the classroom. She thinks that despite making her best efforts to improve learning motivation in that student, she felt helpless because there are some problems beyond her capacity to address.

This is, however, unclear that what strategies Naila used to engage that student in her class and how frequently she offered him opportunities to participate in the learning activities and to access learning content. Additionally, the role of the school counselor is also unclear in this case. These lacking indicate the need for integrated support and services both for the students and for the teacher to address barriers. Given Naila's understanding, opinions, and essential insight about the two significant concepts of variability and barriers, it is crucial to evaluate in further detail how she addresses variability and barrier issues in her daily practices.

Daily Teaching Practices.

Q 2.1. Anticipating Variability and Barriers in the Classroom. Data obtained from the lesson plans and interviews provided information about the anticipation component that was evaluated using the pre-determined criteria. In response to the variability anticipation probes by the primary investigator, Naila could not provide a satisfactory answer.

Given the anticipation criteria (*a, b, c*) as mentioned earlier, this is evident that anticipative planning is not a part of Naila's teaching practice. There were, however, a few times when she mentioned that she keeps students' common patterns of math errors in mind before she starts a lesson or when she prepares them for an assessment: she reminds them to make sure not to repeat those errors. These examples may be considered as her good teaching practices yet may not be counted as anticipative lesson planning.

The document analysis of lesson planning also elicits similar findings of anticipation. The plan that Naila shared is teacher-created CCSS-based lesson planning. The lesson objectives and descriptions are clearly stated according to Module 3 (Eureka Math-grade 6) requirements, for example, students should be able to write and use negative numbers, different direction quantities, give examples, and make connections with the real world. The lesson planner talks about the teaching materials and learning activities but does not provide any information about the formative and summative assessment planning.

Overall, anticipating variability and barriers was not evident in Naila's lesson planning; therefore, the criteria for anticipation were not fulfilled. However, given her beliefs about variability and barriers, it is interesting to investigate how she addresses such issues in her classroom.

Q 2.2. Intentional Alignment in Addressing Variability and Barriers. If identified, anticipation leads the teachers to plan activities according to the learners' requirements deliberately; thus, intentional alignment is achieved. Based on the previously stated criteria to evaluate the alignment component – the data does not support the criteria *a, b,* and *c*, therefore, considering the criterion *d*, three themes emerged from the interviews, classroom observations, physical artifacts, and document analysis: *methods and materials addressing variability, teaching strategies addressing barriers, and assessments.*

Methods and Materials Addressing Variability. Classroom observations show that Naila's daily warm-up math activities with the students include when she invites thoughts on interesting math facts and new concepts, linking math concepts with day to day life, and engaging solutions to the math riddles. These activities encourage students to think, discuss, respond, and reflect on their background knowledge, and she slowly guides their comprehension

of the required mathematical concepts and computations. She uses various ways to solve mathematical problems and encourages growing thinkers by asking for various solutions, as shown when she said: “we give them liberty to show [their work] the way they want as long as they are able to justify their solutions” (NF, para. 14, Line. 141).

Her practices are sometimes differentiated when she thinks students need this strategy in learning. She shared the stories of two students whom she identified as visual learners. She found a deliberate difference in both students’ math comprehension when she offered visual math learning material to them. Through administering surveys, she receives students’ feedback that helps to improve her teaching strategies and assessment planning and allows her to provide additional support to the students. In the classroom, she encourages group activities guided by peer consultation and feedback, show and tell, and improves students’ work by giving her corrective feedback.

Naila utilizes a smartboard, worksheets, notebooks, and manipulatives in her classroom, and posts homework, extra resources, and learning material on the Google Classroom. She mentioned that sometimes, students are not aware of their preferences, but she tries to cater to their needs. She is used to summarizing her lessons at the end of the class as her routine practice. While the LESA model was not found written in the lesson plan, components of this model were noticed during the classroom observations.

Teaching Strategies Addressing Barriers. Naila mentioned that she is flexible in making accommodations in the lesson planning for students who experience problems in understanding math concepts unless the learning outcomes are not compromised, and students show the expected level of mastery in learning. She mentioned that providing one-on-one instruction, having students show their work with feedback, and posting learning materials online helps

students with difficulties in the class. Elaborating on how she overcomes learning barriers during her daily instructions, she described the process of her teaching methodologies and the patterns of students' learning in her general classroom setting. For example, she first introduces a mathematical concept and simultaneously involves her students in using manipulatives that help to build a concrete mathematical concept. She gradually drags and shifts their concrete learning into conceptual learning and then relates the abstract learning to everyday life. At this stage, students can discuss and share their ideas with their peers. Once they are ready to reflect on their thoughts, they can make several stories and formulate math questions, hence overcome comprehension barriers.

Mixed reports were found regarding the placement of students with learning disabilities in the classroom. She mentioned that she never experienced having students with severe learning difficulties in her class. The school provides support services for students with ESL and behavioral problems. ESL support is, however, offered only in the elementary grade levels. In the middle-school, Naila mentioned that she addresses reading problems by practicing read-aloud programs, using reading and re-reading strategies, using dictionaries and doing translations, breaking down vocabulary, and following up their comprehension through the classroom discussion and conducting tests and assessments.

Assessments. The documents (exit ticket and unit assessment sheet) provided by the teacher were analyzed. In addition to her subjective judgments about students' progress, Naila administered exit tickets every second day a few minutes before the end of class as a type of formative assessment to track students' learning. She mentioned that this kind of quick paper-pencil assessment technique provides her with timely feedback about her performance and if students are learning the concepts and making progress.

The summative assessment is done at the end of the unit as a paper-pencil based unit test. Naila mentioned that teachers typically follow the CCSS directions in summative evaluations, but since students have access to those assessment sheets, she consults different resources to provide students with challenging tasks and to avoid cheating and peer consulting practices. The content analysis of the assessment sheet indicates numerical and descriptive questions, comparing items, and open-ended questions requiring a rational approach to solving the problem.

Overall, the findings suggest that Naila, as a general classroom teacher, adopts practices that are in line with the CCSS and the lesson objectives stated in the planning. It is not in Naila's practice to think about students' needs and preferences, problems, and challenges and then plan her strategies accordingly; therefore, the components of anticipation and intentional alignment are not evident in this case. It is, however, critical to corroborate these findings by exploring another case within the same school.

Within-Case Study Unit Analysis: Analyn Sylvia

Analyn is from the Philippines and acquired her bachelor's degree in computer sciences. She served as a computer engineer for a few years in the Philippines and then joined the teaching profession. She never had a chance to receive a formal teacher's certification, but she has been attending teaching courses and training in the Philippines during her vacations. She had 12 years of teaching experience and six years of working with ISG. She never thought of teaching as her core profession, but her strong background in mathematics and her relocation to Saudi Arabia drove her to adopt the teaching profession. Currently, she is teaching grade 5 mathematics; this class was selected to collect the data.

Beliefs, Understanding, and Perceptions

Q 1.1. The Concept of Learner Variability. Analyn was not familiar with the term "learner variability," and she preferred to use the term "individual differences." She believes that thinking about individual differences facilitates her acquisition of new teaching skills, as she says, "It even helps me. It is actually in two ways, I learn from them [students], and they learn from me" (AS, para. 2, Line. 85). She interprets individual differences in terms of variations in the learners' characteristics, cultural differences, and attitudes, and behaviors. Concerning individual characteristics, she believes that some are "smart and fast learners," while others are "struggling and slow learners," and these characteristics are easily identified.

She mentioned that the ISG is currently serving students from more than 40 nationalities. Therefore, multicultural differences are also prominent in her class. Differences in attitudes and behaviors were Analyn's main concern because she thinks that these differences cause barriers in students' learning if not addressed promptly. She thinks that students' behavioral problems relate to age differences. For instance, she had been teaching the upper middle school students, and now while teaching grade 5 students, she observes behavioral barriers that relate to the age differences. These barriers are discussed in the following section.

Q 1.2. The Concept of Barriers to Learning. Analyn understands the concept of barriers in terms of "hindrance to learning" and shares some barriers she encounters every day in her classroom. These examples are grouped into three themes: *behavioral barriers and time and setting-related barriers.* Firstly, *behavioral barriers* in Analyn's perspective are student-related problems in terms of their lack of attention and concentration, distracted behavior, playfulness and immaturity, and discipline issues. Secondly, time-related barriers are grouped into *settings barriers* — the time factor is significant in learning, and in attaining students' attention. Students are distracted and show extra energy in Analyn's math class when they come right after

lunch. Similarly, they pay less attention when their class is scheduled right before school dismissal. Alternatively, they are prepared to learn and pay full attention when they come to class in the morning.

Q 1.3. Constructs Links. In her opinion, Analyn considers the two concepts, "individual differences" and "hindrance to learning", as related. The examples she shared reflect her understanding of how to interpret the variability component by known or unknown barriers that the student might be experiencing. She says that many students show differences in learning behaviors as well as differences in dealing with teachers and their peers. These variations are the result of the differences in how they were brought up, domestic problems, and peer pressure and conflicts. Therefore, in her opinion, the two concepts are closely linked.

Daily Teaching Practices

Q 2.1. Anticipating Variability and Barriers in the Classroom. The anticipation component was assessed in the data obtained through the interview and the document analysis of the lesson plan. During Analyn's interview, she mentioned that at ISG, teachers meet in PLCs to plan math lessons yearly under the supervision of their math coach. The primary focus is given to the CCSS, and teachers' suggestions and recommendations are also considered. Given the multiethnic student population at ISG, the teachers often experience problems in following the CCSS. Therefore, they allow modifications in the lesson plans accordingly. This is, however, unclear why Analyn and other teachers experience problems in following CCSS in a multiethnic society. This can be inferred that multilingual students might experience English language difficulties in the American curriculum. The content analysis of the lesson plan indicates that it is a brief description of the weekly planning based on the objectives, materials, learning targets, assessment, and homework. Lesson objectives indicate the acquisition of the mathematical skill,

and the learning target reflects the process of how to achieve the defined objective. During the interview, upon probing about the anticipation of variability in lesson planning, Analyn remained unsuccessful in providing a satisfactory answer.

The content analysis of her responses indicates that she found it difficult to respond within the framework of inquiry. It also shows she plans only thinking about the average level of difficulty for the relevant activities. Similarly, once probed about her thought process regarding removing barriers in her lesson plan, she said that the teachers should be ready to deal with the barriers as they come up, but it is often beyond the teachers' control to "get rid of them right away" (AS, page. 14, Line. 402). After considering the predefined criteria for evaluating anticipation, this analysis indicates no evidence of anticipation in Analyn's planning for the learner variability and barriers in her classroom; thus, the criteria for anticipation were not fulfilled.

Q 2.2. Intentional Alignment in Addressing Variability and Barriers. Since the presence of the anticipation component is a significant part of intentional alignment criteria described earlier that is not fulfilled in Analyn's case, this section analyzes how Analyn deals with variability and barriers in everyday practices based on her beliefs (criterion *d*). Mainly, three themes were obtained, including *methods and materials addressing variability, teaching strategies addressing barriers, and assessments*.

Methods and Materials Addressing Variability. As described earlier, Analyn mentioned that due to the cultural and linguistic differences, she makes modifications in the lesson plans adhering to the CCSS. Although, the school offers an ESL program to the English language students. However, Analyn offers ESL support in her classroom as well, for example, using a read-aloud strategy. She also provides repetitive instructions and the problems' solutions. To

avoid disengagement of the other students with her repetition techniques, she provides one-on-one instruction to the students in need.

She encourages students to come to the board and show the problems' solutions; students were observed to be engaged during this activity. However, consistent patterns of students' participation were also observed. Those who present on the board always present; those who copy and paste solutions rarely present, and those who are disengaged in the classroom are seldom asked to present. These consistent patterns required teachers to assign different and challenging roles to enhance the students' active participation and multiple learning opportunities. Alternatively, students show deep interest when Analyn presents electronic math challenges using their laptops and educational software such as SEESAW. The teachers' progress tracking and immediate feedback and self- progress monitoring keep students on task and reduce their distracting behaviors—thus, these strategies help to address barriers in her classroom. However, it is interesting to note further what other strategies she adopts to address the barriers.

Teaching Strategies Addressing Barriers. The observation data supports Analyn's narrations regarding the barriers to learning she observes in her grade 5 classroom. Students were observed to be distracted, less focused, and playful in her classroom. Analyn uses strategies to engage them, such as providing math-related manipulatives for initiating purposeful discussion, involving them in peer conversations to exchange ideas, talking to the students and giving her full attention, and presenting and discussing math problems by drawing engaging conceptual models on the whiteboard. Mixed reports were found about using differential instructions in the classroom. She mentioned she was unsure if the school follows DI as an instructional program or if teachers use it as a good teaching practice.

Sometimes she finds the mentioned techniques helpful, but there are many times when Analyn feels she needs external support, for example, from the counselor, her supervisor, and in some cases, the principal. The counselor is responsible for providing student support services to those who show consistent behavioral problems in the classroom. Additionally, Analyn finds educational technology as a useful resource to reduce distractions in the classroom and increase on-task behavior. Analyn also reports that occasionally using yoga techniques and her talks with the students as a process of expectation reminders, realizations, and reflections, also have positive outcomes in managing their behavioral issues.

Assessments. Analyn administers bell sheets as a source of the paper-pencil-based formative assessment technique, and sometimes she uses it when students need to improve their grades. A paper-and-pencil end of the unit test is utilized as a summative assessment. Students are placed separately, and independent work is encouraged. The document analysis of the unit test suggests that the breakdown of the obtained marks is based on three components that allow students to perform and reflect on different parts of the questions and solutions such as concepts and procedures, problem-solving, and modeling, reasoning, and communication. This procedure encourages students to use various problem-solving techniques and ways to express their learning and understanding of the paper. Overall, the assessment procedure was aligned with the objectives stated in the lesson plan.

In sum, the findings suggest no evidence of anticipation and intentional alignment in Analyn's practices; however, her teaching practices are partially aligned to her variability beliefs and conceptual understanding of barriers. There are yet many areas in Analyn's practice that can be improved by offering training workshops specifically to address distractibility issues in the classroom. In Analyn's opinion, learning in professional development courses is different from

experiencing learner variance in an actual classroom. Given the distinct case findings and within-case analyses, it is interesting to corroborate them by conducting in-depth analyses across both cases of ISG-Dammam district that is presented in the following section.

Cross-Case Study Units Analysis-ISG-Dammam

Q 1. Understanding and Perceptions

The cross-case study unit analysis for research question 1 is based on the general education teachers' beliefs, understanding, and perspectives regarding variability and barriers, and analyses for research question 2 are based on their practices in addressing variability and barriers. The term learner variability was unfamiliar to both ISG teachers, and they chose their preferred terminologies to elucidate the discussion. For example, Naila's conversation was based on a blend of the concepts of learning styles and individual differences, while Analyn's understanding of the individual differences was governing her discussion patterns. However, the difference was noticed in the way both explained the concept that reflects their interpretations of the variability component in everyday experiences. Naila, for instance, understands that the differences in learners can be kinesthetic or visual, and not all the learners have the same skill sets. Therefore, their needs should be catered by using differentiation techniques. She does recognize that students are unique in their abilities and that their differences should be encouraged. Also, she believes that labeling or categorizing practices should not be encouraged based on their learning styles. However, despite endorsing differences, Naila believes in matching teaching styles with students' learning' styles, which shows a discrepancy among her ideas and understanding of differentiation and learning style perspective. Analyn, on the other side, expands on the individual differences concepts by adding cultural differences along with learners' attributes and behavior patterns. These findings suggest that the variability concept in

ISG participant teachers' perception integrates components of individual differences, teaching and learning style theories, and cultural diversity.

Both teachers appeared straightforward in their understanding of the barrier concept in terms of being a hindrance and problem to learning. The findings reflect general education teachers' ways of perceiving barriers within their classroom context and show commonalities and differences across ISG cases. For instance, both teachers appeared reporting student-related barriers that are classified as person-oriented barriers. There were, however, unique findings regarding barriers identification by Naila, who considers parents as barriers, and Analyn, who points out students' class timings as barriers. Additionally, the teachers recognize instructional styles as barriers and belief that removing instructional barriers in teaching is essential. However, their in-depth understanding of instructional barriers did not appear, and they elicited no further discussion on this topic.

Both teachers believe that variability and barrier concepts are closely related. How these concepts are linked is not, however clearly established in Naila's discussion. One explanation can be her experiences with the general education setting that might be superseding her thoughts and limiting her to express understanding in relating the two concepts explicitly. The lack of inclusive practices within the general classroom settings led Naila's thinking that there are barriers beyond her capacity to address. Besides establishing a clear link between variability and barriers, Analyn perceives that variability is sometimes easily interpretable while sometimes is unidentifiable and may be a result of differences in child-rearing practices, or domestic and peer conflicts. Analyn also believes that such unidentifiable factors sometimes cause barriers and that are beyond her capacity to address—similar to Naila's beliefs. These findings indicate that ISG

teachers are required skill-based training programs in barrier identification that should offer them classroom management skills in overcoming different barriers in their daily practices.

Q 2. Daily Teaching Practices

The predefined criteria signify the language and thought processes of the teachers while preparing lessons and during their instructional planning. Analyn mentioned that the math teachers at IGS collaborate under the supervision of a math coach once a year to plan for the next year. It is not, however, clear that the teachers at ISG also prepare personal notes as an addendum to the yearly planning regularly. It can be stated that limiting lesson planning every year reduces teachers' access to the emerging and advanced educational resources, thus minimizing chances for establishing an inclusive learning environment and establishing an expert teaching and learning connection to the students.

Distinctly stated goals and objectives are vital in addressing variability and barriers, thus a way to adopt inclusive practices. The document analysis of the lesson planning indicates no such distinction was made; still plans follow CCSS guidelines. Analyn mentioned that given the multiethnic student population in the school, teachers could make modifications in the CCSS-based lesson plans. This is not, however, clear that what kind of modifications are offered and how often—in the classroom. Further discussion on this topic could open the door towards adopting inclusive practices at ISG. The core inclusive practices signify modifications and accommodations according to the cognitive and physical needs of the learners.

Both within and cross-case study units analyses indicated no evidence of anticipative components in the lesson planning and teachers' thought processing. Since the alignment component is based on anticipation, therefore, it is not also apparent in the findings. However, given the conceptual understanding and perceptions about variability and barriers, rich teaching

experience, and administrative support and resources, to what extent the teaching practices at ISG address variability and barriers—are significant to analyze. Also, it is essential to see if ISG is incorporating core inclusive components suggested by literature (see Figure 3).

The teacher-centered traditional learning environment was observed in the classrooms with little evidence of student-centered approaches. Teachers were observed as having strong content and experiential knowledge in mathematics. Naila's classroom environment was well-disciplined and organized compared to Analyn's classroom that seemed to be organized but with multiple distractions. Interestingly, consistent patterns of students' responses were observed in both classrooms, for example, students who seemed engaged and participated—showed high motivation for learning, and those who were less engaged—showed infrequent participation only with the teacher's encouragement. These patterns suggest that teachers require deliberate attention to re-engage and recruit students' interest in using multiple strategies and age-appropriate learning challenges.

Some barriers were noticed in Analyn's classroom that appeared to impede students' learning and motivation. For example, *affective barriers* (students passively observing classroom discussion, being distracted and less focused), presentational *barriers* (students' complaints about the low visibility on the boards, inaccessible information due to low volume of the student presenters) (Novak, 2016), *settings barriers* (loud outdoor noises and distractions). Finally, *instructional barriers* (long lectures in a monotonous voice, strict verbal commands, poor time and classroom management, contradictions between commands and actions, and marking assessment sheets during the assessment causing distraction among students).

The UDL framework provides solutions to these barriers mentioned above. Affective barriers, for example, can be addressed by providing various ways of engagement to optimize

students' motivation and recruiting interest. This objective could be achieved by fostering collaborative activity, providing scaffolds, and offering choices to pick problems that match students' interests. Likewise, presentational barriers could be resolved by providing different perceptual options such as using bright colored markers for boards, providing clear and loud verbal descriptions for the work being presented, using multimedia and educational technology to present learning content in multiple ways, and restructuring the physical classroom arrangement to make learning content perceptually accessible. However, controlling outdoor noises and interruptions are suggested to be controlled by the administration to prevent both presentational and settings barriers, and to achieve a distraction-free learning environment.

Identification of these obstacles, including instructional barriers, shows a need to offer UDL-based classroom management training workshops to minimize such impediments that prevent establishing an expert teaching and learning system. These findings indicate that teachers in mainstream education lack training to deal with learners experiencing affective and behavioral barriers. It is suggested that offering in-service training programs can advance their classroom management strategies, show significant improvement in students' affective and behavioral barriers, and improve teacher-learner interaction.

There appeared some components in ISG teachers' practices that were somewhat aligned to UDL principles and guidelines. Concerning UDL Principle 1 that endorses using *multiple means of engaging learners*, ISG teachers were found recruiting students' interest through engaging them in purposeful individual and group discussions, giving full attention to them, and providing timely corrective feedback. However, teaching components to promote persistence and self-regulation were not identified in their classrooms.

Regarding Principle 2 that recommends choices in presenting educational tasks and activities using *multiple means of representation*, teachers were found presenting visuals using Smartboards, workbooks, manipulatives, and drawing models on the board. Students used laptops and educational software occasionally, and this appeared to be an engaging activity for them. However, it required structured supervision to reduce their off-task behavior. Since teachers are observed with substantial mathematical content knowledge, they provide concepts using appropriate mathematical vocabulary. Teachers place a high value on comprehension through building on students' background knowledge and relating their learning to daily life experiences.

Regarding Principle 3, which suggests providing *multiple means of action and expression*, teachers encourage students to use various ways of solving a math problem. However, these choices are only limited to paper-pencil-based activities. Although students were rarely found using the educational technology, it was however noticed that the immediate feedback and progress tracking systems on the online math programs increased students' motivation and interest in ISG classrooms.

In conclusion, the participant teachers' beliefs in ISG-Dammam about variability are primarily derived from the concepts of individual differences and learning styles. The content analysis of the teachers' discussion around the conceptual understanding of variability reveals that teachers have surface knowledge about this concept. However, they do recognize differences among students in the classroom. Regarding barriers, teachers mainly highlighted student-related (affective and behavioral) barriers, and both teachers recognized instructional barriers as impeding agents to learning. The relationship between the two concepts was, however, found established only in Analyn's discussion. These findings suggest a need to

initiate discussions around these core topics to build on teachers' existing conceptual understanding to advance their teaching practices. Since conceptual understanding, anticipation, and intentional alignment components appeared related to each other, teaching practices at ISG-Dammam do not appear to observe anticipation and intentional alignment. Overall, the teaching practices in ISG-Dammam lack many areas of general beliefs and practices about inclusion and require targeted training and professional development programs to improve teaching methodologies.

Chapter Summary

This chapter provides findings of data collected from the general education teachers of two school districts SAES and ISG. Multiple sources of data collection were used such as interviews, direct classroom observations, participant observations for SAES district, physical artifacts, document analysis, and reflexive journaling. The findings are based on within-case study unit analyses for all four teacher participants across the sub-questions. Later, the information obtained from within-case study unit analyses is further analyzed in the cross-case study unit analyses for two participants from each school district that answer the main research questions.

The findings regarding the SAES teachers indicate that the teachers have extensive experiential knowledge and have a deep understanding of the understudied concepts of learner variability and barriers to learning. They also have adequate administrative support to provide research-based instructional strategies to learners. Their daily teaching practices are aligned to the CCSS and continuous professional learning opportunities that are available to SAES teachers to enhance their capability to address learner variability and to remove barriers to learning in the classroom. However, the findings also indicate that the process of anticipation and alignment do

not appear intentional, but rather based on tactics. This shows a need for proposing UDL-based training programs for SAES teachers to initiate discussions on variability and barriers in the classroom.

The findings regarding ISG teachers indicate that teachers have strong experiential knowledge in their fields, however, their understanding of the understudied concepts of learner variability and barriers to learning were more superficial. Since conceptual understanding, anticipation, and intentional alignment components appeared related to each other, teaching practices at ISG-Dammam do not appear to observe anticipation and intentional alignment. The teachers did show interest in learning about such topics through professional development training that could benefit their teaching practices to serve the diverse needs of students.

Overall, it appears that the practices at SAES and ISG can be grouped under the core components of inclusive education identified in this study. By taking the findings of both school districts into account a detailed discussion on these topics is provided in chapter 5 along with salient features of this research with specific recommendations.

Table 5

Tabulated Presentation of the Case Studies Findings Across the Research Questions

School Districts	Case Study Units	Thematic Categorization of Q 1 Understanding and Perception			Thematic Categorization of Q 2 Daily Teaching Practices	
		Q 1.1 The concept of learners' variability	Q 1.2 The concept of barriers to learning	Q 1.3 The concept links	Q 2.1 Anticipating variability and barriers in the classroom	Q 2.2 Intentional alignment in addressing variability and barriers
Dist. 1	1	● Terminologies used for variability and definition ● Variability beliefs ● Types of variance in the classroom i.e., (students' beliefs, Physical characteristics, personal experiences)	Types of barriers ● Cognitive barriers i.e., (maturity, reading levels, processing ability, poor motor skills) ● Social barriers i.e., (parents and cultural factors) ● Instructional barriers i.e., (poor teaching strategies)	● Variability and barriers are strongly related ● Recognizing variability is critical in addressing barriers—a relationship established	Lesson planning ● The process of lesson planning ● The learning targets and goals ● The embedded resources Anticipation partially exists	● Instructional methods and materials addressing variability ● Teaching strategies addressing barriers ● Assessment ○ Addressing variability and barriers are evident, and practices are aligned to CCSS and DI ○ Practices are partially aligned to the core components to IE—not intentional rather tacit knowledge-based
Dist.1	2	● Terminologies used for the	● Student-related barriers i.e.,	● Not mutually exclusive	Lesson planning	● Instructional methods and

		variate learners and definition ● Beliefs about the variability facet i.e., (perseverance, organization ability, math-ability, attention)	(physical, emotional) ● Instructional barriers i.e., (teacher-related)	● Brain growth is responsible for eliminating student-related barriers ● Recognizing variability is essential in reducing teacher-related barriers—a relationship established	● Learning targets and goals A few evidences of anticipation	materials addressing variability ● Teaching strategies addressing barriers ● Assessment ○ Addressing variability and barriers are evident ○ Practices are aligned to CCSS ○ Core components of IE are partially followed—not intentional
Dist. 2	3	● A brief description of the definition and beliefs	● Student-related barriers i.e., (discipline, distraction, motivation, ELL, and comprehension) ● Social barriers i.e., (technology, and parents, ● Instructional barriers i.e., (teaching styles)	● The concepts are closely linked ● Relationships are not evident in the discussion	Anticipation is not evident in the lesson planning	● Instructional methods and materials addressing variability ● Teaching strategies addressing barriers ● Assessment ○ Addressing variability and barriers are somehow evident ○ Practices are aligned to CCSS ○ Few evidences of the core components of IE

						○ No intentional alignment is evident
Dist. 2	4	● A brief description on individual differences i.e., (characteristics, cultural differences, attitudes and behavioral)	● Behavioral barriers ● Time/setting-related barriers	● Concepts are closely linked ● Unidentified differences in learners cause barriers—relationship established	Anticipation is not evident in the lesson planning	● Methods and materials addressing variability ● Teaching strategies addressing barriers, ● Assessments. ○ Practices are partially aligned to her variability and barrier beliefs ○ Practices are partially aligned to CCSS ○ No intentional alignment is evident

Note. CCSS = Common Core State Standards; DI= Differential Instructions; ELL, English as a Second Language; IE= Inclusive Education

Chapter Five: Discussion

This qualitative study was designed to explore the beliefs and practices of the general education teachers in the private international schools of Saudi Arabia. Specifically, teachers' beliefs and understanding about learner variability and barriers to learning were considered to be fundamental in serving the needs of diverse learners and promoting inclusive teaching practices. The underlying purpose of the study was to explore whether the existing school practices could be grouped under the inclusive education practices identified by the literature. This multiple case study achieves more pointed objectives after breaking down the core components of inclusive education found in the literature into small units to gain insight into the underlying phenomena (inclusive beliefs and practices). These small units were based on the conceptual framework proposed by the present research that identified "anticipation" and "intentional alignment" as primary mechanisms in achieving inclusive practices in the classrooms.

Elementary and middle-grade teachers were recruited to assist in collecting data about their beliefs about learner variability in the classroom and barriers to learning. The teachers' practices were evaluated considering their beliefs, and the presence or absence of anticipation and intentional alignment were evaluated based on the pre-defined criteria in the study. Thus, the overall beliefs and practices are reported that provide a comprehensive overview of the existing practices in two private schools of KSA.

Teachers' Beliefs, Conceptual Understandings, and Practices

Learner Variability

Teachers' inclusive beliefs and positive attitudes towards learning differences and disabilities are considered core in achieving successful inclusive education (Adhabi, 2018; Avramidis & Norwich, 2002). The present research investigated teachers' conceptual

understanding, beliefs, and perspectives about learner variability and barriers to learning. Regarding the conceptual understanding of learner variability, the overall findings suggest that this term was unfamiliar to most of the teachers. Primarily, the teachers' understanding of this term was reflected through discussions about the concepts of learning styles and preferences, and individual, personality, and cultural differences. The teachers' discussions reflected common usage of these concepts with overlaps and with loose ties to the theoretical underpinnings of these concepts. This trend in interpreting the term learner variability shows that teachers understood this term under the broad umbrella of individual differences and learning styles with shared meanings using their background knowledge. It might be due to the recent addition of these terms (i.e., learner variability and student variance) in the educational literature, specifically to the inclusive literature. Therefore, as general education teachers, they were not yet aware of this specific terminology; hence, it was difficult for some of them to incorporate it into their teaching practices.

The analysis of this research data shows that the conceptual understanding of the variability concept in SAES teachers was more established compared to the ISG teachers. The conceptual understanding appeared through SAES teachers' detailed discussion on the topic and identification of variability facets and variance types in the classrooms. The variability traits that Mac mentioned (i.e., attention, math-ability, perseverance, organization, and work ethics) fall under the four streams in the field of psychology. These streams are considered the significant components of individual differences (i.e., perception, cognitive processes, mental imagery, and personality constructs) (Cassidy, 2004) and relate to teachers' emphasizing of student's ability-related factors (Xu & Cooper, 2020). Understandings about these components strengthen Mac's beliefs to encourage and enhance learning strategies of students' choices that align with their

learning preferences. Providing frequent opportunities of learning reflections to the students through written notes and open discussion are a few examples of promoting students' preferred learning choices in his classroom.

SAES teachers' beliefs about variability were in line with multiple intelligence theory and growth mindset considering both the student and the teachers' variables (Dweck, 2015; Gardner, 2000; White, 2000). These approaches led SAES teachers to understand learners and learning differences as malleable agents in the teaching and learning process, as indicated through Katei's beliefs about variability that reflect her flexible approach in understanding student variance within their unique contexts and needs. These findings are in line with the research indicating that adopting a flexible approach towards the learning process, and the learners are related to adopting the inclusive teaching practices (i.e., Trigwell & Prosser, 2014; Turner, Christensen, & Meyer, 2009). The teaching practices of SAES teachers concerning their beliefs are discussed later on.

The variability beliefs of the ISG teachers were primarily based on the learning style theory. Despite influenced by the learning style approach, Nahida mentioned that she did not believe in labeling or categorizing practices based on students' learning styles. These findings are consistent with learning style critics who do not favor confining individuals with dynamic characteristics in distinct groupings (i.e., Reynolds, 1997; Cuthbert, 2005). However, Nahida beliefs in matching teaching styles with students' learning styles to acquire desired learning outcomes when differential instructions are followed. The research indicates that differentiation practices do not favor matching teaching style with the students' learning styles, but rather designing instructions according to the needs of the group of learners or individual learner (Curry, 1990; Tomlinson, 2000). Additionally, in the research, the concept of matching teaching

styles with students' learning styles has been widely criticized, and the idea of using multiple teaching strategies with diverse students is encouraged (Curry, 1990; Pritchard, 2013).

Further, the language of membership among general education teachers was analyzed by Lowrey et al. (2017). They inferred that the language that teachers use in an inclusive classroom setting to describe the students reflect teachers' predispositions to think of the student as capable or less able. The present study indicates that the terms used by general education teachers to describe students, for example, "high-performing, top kid, and high-end students;" and "slow learners, struggling, and low-end" appeared to differentiate the groups of learners based on ability. Such descriptions show that teachers view student's abilities as innate and fixed with little potential for improvement. Xu and Cooper (2020) caution that these types of views can limit teachers 'abilities to view their students as growing learners. Focusing more on the language of membership (i.e., students with diverse needs and variance), and then developing a common language of practice, can increase the likelihood of designing activities universally for the class, rather than differentiating students by their skill levels. That is a critical component in creating an inclusive learning environment with a UDL perspective that accommodates all kinds of students, regardless of their disabilities.

All teachers, regardless of the school districts, showed positive beliefs about variability and recognized learning differences. However, understanding and considering learning differences as a source of growth and opportunity to improve teaching and learning is not yet established in the general education teachers' perspectives, and that is an influential parameter to initiate debates on the inclusive beliefs under the UDL theory within these schools in the Kingdom (Myer et al., 2014; UNESCO, 2017). Further, the analysis indicates a need for

teachers' training to acquire appropriate and targeted skills in identifying and addressing differences and variability in the classrooms.

Barriers to Learning

Congruent with the past literature, all teachers from SAES and ISG mentioned student-related/person-oriented barriers such as cognitive, behavioral, and physical problems that limit their performance in learning (Adelman & Taylor, 1997; Montgomery, 2006; Nelson & Soli, 2000). These barriers reflected mild-to-moderate levels of difficulties, and severe in rare cases in their general classroom settings. However, Katei from SAES district considers barriers in cognitive processing as the main hindrance to learning. This idea is well established in the research that recognizes the role of cognitive processing in the higher-order learning tasks such as metacognition and information integration (Montgomery, 2006; Pritchard, 2013) that are considered core in the learning process.

Regarding behavioral/affective barriers, nearly all teachers believed that these problems relate to the age difference. Based on their teaching experiences within the general education settings, they mentioned that as students grow, learn more, and become mentally mature, their behavioral problems fade away. While these teachers in the general education settings did not experience physical barriers beyond the mild-to-moderate vision and hearing impairment among the students, therefore a limited discussion was elicited on this topic.

Interestingly, all teachers mentioned and realized that poor teaching styles and teachers' personalities are also barriers to learning—these factors are grouped under "instructional barriers" in this research. These findings are in line to the previous research that identifies barriers related to the teachers' personality and poor teaching methodologies and suggest removing instructional barriers in teaching (Duffy & Elwood, 2013; Meyer et al., 2014;

Potgieter-Groot et al., 2012; Rose & Meyer, 2002). These findings indicate that teachers are aware of instructional barriers, and they do underscore different types of barriers in their daily practices. However, they sometimes consider barriers beyond their capacity to address, as reflected through the findings of ISG participants. Teachers' responses are congruent to past research that shows how insufficient training of general classroom teachers causes a failure/lack in serving students with affective and behavioral barriers (Potgieter-Groot et al., 2012). Therefore, they need cohesive training workshops to identify the problems caused by these barriers both for the teachers and the learners and how to overcome them by acquiring different skills, management strategies, seeking collaboration, and being resourceful.

The existence of family conflicts is well recognized as barriers to learning in education research (Adelman & Taylor, 1997). However, the present study adds "parents as barriers" from the general education teachers' perspectives, which is a unique contribution in the array of barrier research. Three out of the four teachers pointed out that parents' contradicting ways of teaching math to their children cause confusion and misunderstandings and hinder their learning process. Additionally, Analyn and Mac pointed out that the class timings/settings are also found barriers in the general classrooms. They suggested that the administration needs to consider the students' physical and mental readiness when preparing class schedules for them, specifically for mathematics.

Overall, the concept of barriers to learning was consistently found among all the participant teachers that reflect their understanding of the concept and its types. However, the term barriers to learning was not frequently used in their day-to-day practices, and due to the mild-moderate nature of the listed barriers, teachers addressed them as part of their routine work and not by practicing and following additional planning, program, and strategies to address them.

Collectively, the behavioral/affective barriers are mentioned frequently, and teachers generally approach to the school counselors/administration to address these types of barriers. Interestingly, a close relationship between the concepts of variability and barriers to learning was identified that initiates further discussions on these topics.

Concept Links

UDL theorists and inclusive education researchers believe in recognizing variability and differences as opportunities to grow in teaching and learning rather than considering them as barriers (Meyer et al., 2014; UNICEF, 2017). Regarding the inquiries about the co-existence of variability and barriers concepts, all teachers agreed that the two concepts are closely related. Three out of four teachers believed that identifying and recognizing variability are essential in addressing the barriers because unaddressed variability factors cause barriers. The cycle continues if not addressed on time, thus causing achievement gaps. It can be inferred that teachers in the general education settings believe that variability—regardless of types (differences, learning styles, preferences), and barriers regardless of types (student-related; environment-oriented; and instructional) and severity (e.g., disability levels)—are co-existing concepts. Variability and barriers should be addressed simultaneously as co-occurring events in the teaching and learning process.

After identifying the multi-dimensional aspects of variability in the past literature (Cuthbert, 2005; Meyer et al., 2014; Perry, 1985; Pritchard, 2013; Riding & Sadler-Smith, 1997; Tomlinson, 2000), and discovering variability facets and types in the general education teachers' perspectives, it is inferred that the concept of learner variability carries sponge-like characteristics that absorb many different terminologies, concepts, and facets of individual and learning differences. The concept of learner variability is evolving alongside the evolution of

inclusive education itself and moving beyond it to incorporate diversity (multi-ethnicity and multilingual differences) and disability components concurrently, thus turning into a global movement of social justice in education regardless of geographical and educational policy differences. This finding can inform policymakers to redefine inclusive education as a global movement of social justice and introduce learner variability and barriers to learning as essential components of the definition. Social justice—in terms of recognizing, accommodating, and serving all types of differences under one roof of the classroom with no distinctions and discriminations in providing equal learning opportunities to the learners according to their unique needs.

The components of equity in education, differences, and disabilities are simultaneously discussed in UNESCO (2017) to ensure social justice in education and to discourage any exclusion that SWD experience in the classrooms. A revised definition of inclusive education, recognizing learner variability will endorse all types of individual and learning differences to ensure equity and social justice in education. Nonetheless, social justice in education remains unfulfilled without providing specialized human support (i.e., co-teaching and structured training opportunities) and material resources (i.e., assistive technology) to the teachers alongside continuous progress monitoring to track improvements in their belief systems towards inclusion, inclusive education and inclusive practices. The following discussion highlights teaching practices concerning teachers' beliefs about variability and barriers.

Anticipation and Intentional Alignment in Practices

The component of anticipation was evaluated by using predefined criteria. The criteria emphasized teachers' background knowledge, beliefs, and understanding about variability and barriers concepts; specific language reflecting teachers' intentions about designing lessons

considering variability and barriers; and finally, seeking pieces of evidence of differential practices and embedded resources in the lesson plans. The criteria remained partially fulfilled in SAES cases and were not fulfilled in ISG cases.

UDL researchers consider differentiating between the lesson goals and the means to achieve the goals is foundational in initiating proactive planning for variability and barriers (CAST, 2018). Likewise, Spencer and Whittaker (2017) accentuate the need for clarity between the learning goals and lesson objectives. Learning goals are unique to the individuals based on his/her needs, while objectives may vary in the amount of content to be taught, level of difficulty, pace, and ways of learning. No such distinctions between the learning goals and lesson objectives were found in the lesson planning of both school district participants. The findings of both school districts suggest that the teachers in general education settings plan lessons and teaching activities considering the average level of students' abilities in mind, thus consider it an accessible curriculum to all. These findings are contrary to the UDL research that criticizes lesson planning based on average students that creates obstacles to the students on the margins and do not meet the needs of all learners (Meyer et al., 2014; Winter, 2016).

Additionally, within the UDL framework, researchers accentuate lesson planning as a flexible and ongoing procedure of collaboration that allows teachers to be resourceful according to the ever-changing needs of the diverse learners regardless of general, special, and inclusive settings (Meyer et al., 2014). SAES teachers were found frequently meeting with their colleagues to revise math lesson planning during an academic year. ISG teachers, on the other hand, attend annual PLCs for developing yearly lesson planning that reduces teachers' growth in acquiring advanced techniques to enhance teaching methodologies and to present math contents according to the diverse needs of the learners.

The analyses also indicate that the teaching practices of almost all teachers at SAES and ISG were aligned to the CCSS with the main emphasis on the ELLs. These findings are in line with core inclusive practices that endorse lesson planning and instructions aligned to the state standards (Novak, 2016; Rao & Meo, 2016). Brown, Anfara, and Roney (2004) studied the differences between high-performing and low-performing schools and noticed differences in the ways teachers perceived and believed about standards. Teachers in the high-performing schools had curricula aligned to the standards with no exceptions.

The evidence of differential instructions was found only in one case in the SAES district. It was noted that differential instructions were not apparent in the eighth-grade math classroom at SAES. These findings affirm that differentiated practices are frequently found at the elementary school level due to a wide range of students with high differentiation needs (e.g., using manipulatives, targeted support, and step-by-step scaffolded instructions) in the classrooms compared to the higher-grade levels (Heald, 2016). At the ISG, although teachers mentioned that they practice differential instructions in their classrooms, but no evidence of differentiation was found in the lesson planning and teaching practices. Regarding differentiation in assessment and providing various opportunities to showcase students' learning through multiple options were found lacking in both school districts. Specifically, no such pieces of evidence were found in summative assessment—these assessments were based on traditional paper-pencil test format. These findings show discrepancies with the UDL research base that endorses various means for assessment to reduce construct-irrelevant barriers situated in traditional paper-and-pencil assessment techniques (Black et al., 2015; Dolan et al., 2005).

The relationships were identified between the teachers' conceptual understanding and their choices of teaching methodologies in addressing variability and barrier issues in the

classroom. For example, teachers at SAES appeared to have a deep conceptual understanding and flexible beliefs regarding the researched concepts. Further, the teachers were found adopting facilitator roles in their classrooms that are an essential characteristic of inclusive practices and underscored by many researchers (i.e., Adelman & Taylor, 1997; Udvari-Solner, 1996). Additionally, in line with UDL, teachers appeared to value reflexive teaching and modification of practices to attain the restructured goals (Novak, 2016). Likewise, their everyday teaching practices were more flexible in terms of task presentation and engaging strategies. However, their flexible teaching methodologies were not a part of planning in addressing variability, and barrier issues instead appeared automatic, intuitive, and tactic-based (UNESCO, 2017). Similarly, the criteria for evaluating the intentional alignment of curricula with the core inclusive education components were not fulfilled. Nonetheless, within the UDL framework, it is inferred that the existing practices at SAES can be advanced from emerging and proficient to expert and distinguished in meeting the needs of diverse learners (Novak & Rodriguez, 2018).

Conversely, teachers at ISG appeared to have a surface understanding of the concepts of variability and barriers. Though, ISG teachers were found with strong content and experiential knowledge in mathematics and a few pieces of evidence of reflexive teaching. Their teaching practices were, however, found to be more traditional and teacher-centered with little evidence of the student-centered approach (Trigwell & Prosser, 2013). There was no evidence of anticipation or of intentional planning of curricula and of alignment of practices with the core component of inclusive education among the ISG participants.

Collectively, the data support that the teaching practices in addressing variability and barrier issues in general classrooms relate to the teachers' level of conceptual understanding and beliefs. However, as it was anticipated in the research assumptions, overall, no evidence of

anticipation and intentional alignment of the teaching components (planning, teaching methods, materials, and assessment) with the core components of inclusive was noted in the general education teachers' practices in both school districts. As described earlier, this can also be inferred that the differences between teachers' general beliefs and understanding about the researched concepts alongside their teaching methodologies reflect differences in their culture and background knowledge. Teachers' ideology about adopting a particular teaching approach relates to their personal experiences and background information (Moallem, 1998). In this research, teachers belonging to the Western countries depicted more general and malleable beliefs about the under-study concepts; also exhibited flexible teaching methodologies compared to the teachers belonging to the Asian countries.

Given these findings, it can be stated that the teachers in Western society bring inclusive beliefs from their past inclusive experiences. They are more exposed to the inclusive societal and educational structure compared to the Asian countries. Additionally, their exposure with diverse, multiethnic/multilingual communities and acceptance of inclusion in the academic institutions encourage inclusive mindset and flexible beliefs towards education. The Asian countries, specifically, KSA, need to adopt an inclusive mindset at the societal level first in order to promote an inclusive ideology at the teachers' level. Introducing and implementing inclusive education models from the primary to the post-secondary institutions potentially bring forth change in the teachers' pre-established mindset and experiences at the grassroots level.

Nonetheless, the present research does not support the claims published in the past that the private international schools in the Middle East practice inclusive education (Brown, 2005; Weber, 2012). Some practices that can be grouped under the core inclusive components identified in the inclusive literature that reflect the strength of these schools (Messiou &

Ainscow, 2015; UNESCO, 2017). However, they need to take further steps in order to adopt and implement inclusive education models within their existing systems.

Existing Practices at SAES and ISG-Dammam

SAES and ISG are not currently using an inclusive education model in schools, and teachers in these general education settings have no experience working with students with special needs. However, given the school districts' mandate to students with diverse multiethnic, cultural, and linguistic backgrounds, they offer a variety of services and teaching practices to the students to meet their diverse learning needs. Some of these practices are discussed previously in within-case and cross-case analyses, and presented here as an overview, while others have emerged as unique categories from the data. These findings are grouped to document existing practices in SAES and ISG-Dammam per the core components of inclusive education identified in the literature.

Coherent Instructional Program

Many supportive pieces of evidence suggest that the teaching practices at SAES and ISG-Dammam are aligned to the Common Core State Standards. Teachers prepare math lesson plans under the supervision of math coaches using a variety of teaching resources. Teachers have rich content and experiential content knowledge. These practices increase the likelihood of preparing and presenting specified subject matter in an expert way to the diverse learners according to their level of understandings, cognitive abilities, preferences, and interests.

Collaborative Instructional Programs and Flexible Teaching and Learning

Data show SAES teachers use flexible teaching methodologies with structured instructional approaches, such as the Sheltered Instruction Observation Protocol (SIOP) framework, differentiated instruction, Go to Strategies Inventory, and the Learning by Design

model, to address the academic needs of ELL/ESLs and others in the classroom. Additionally, math teachers provide multiple means of action, expression, and task presentation in daily teaching practices. The Student Support Team provides counseling services to students with behavioral and academic problems. They offer programs based on students' social-emotional needs as well as a Response to Intervention program for students with learning difficulties. Teachers work in collaboration with the school psychologist, instructional specialists, speech pathologist, and health care nurse. At ISG-Dammam, ELL support is provided to students, and counseling services are also accessible.

Professional Development

The school leadership at SAES offers a variety of learning opportunities regularly throughout the year. Teachers from the same subject and grade levels meet in a weekly professional learning community (PLC) and share effective teaching practices. Then, they gather in monthly PLCs and share solutions to the challenges they experience when applying new teaching strategies. SAES also organizes PD training quarterly to introduce new initiatives or to refine the previously introduced programs. Overall, the PD programs at SAES are well structured. PD in ISG-Dammam is offered twice a year, and the district conducts teaching workshops. Math teachers also meet for lesson planning during the yearly PLCs. Furthermore, teachers are encouraged to go abroad to attend international conferences related to teaching and educational practices.

Learning Environment

The caring learning environment was found in both SAES and ISG-Dammam. The teachers appeared to establish a warm and respectful relationship with the students, and were observed appreciating, encouraging, and being attentive to students' responses and participation.

Overall, a non-traditional student-centered learning environment was found at SAES, and the components of cooperative learning, inquiry-based learning, and embedded instructions were frequently found present (Alquraini & Gut, 2012). The role of the SAES teachers was found as facilitator and moderator in the class (Adelman & Tylor, 1997; Pedersen & Liu, 2003). These findings are consistent with the comprehensive learning environment research where adopting a facilitators' role has a high value in reducing barriers to learning (Adelman & Taylor, 1997; Udvari-Solner, 1996). Conversely, a traditional teacher-centered learning environment appeared at ISG-Dammam with some evidence of cooperative learning and embedded instructions (Trigwell & Prosser, 2013). The component of reflexive teaching was, however, found common in the participant teachers of both school districts.

Efficient Use of Resources

Data support that the teachers at SAES effectively and frequently use educational technology in the classroom. Students are provided with modern digital technology regularly to increase their learning content and 21st-century skills. Moreover, teachers use a variety of educational software and online resources during classroom activities and as assigned homework. Students are provided digital scaffolds, progress monitoring, and feedback systems to increase their learning engagement. The use of educational technology was also found at ISG-Dammam, yet not frequently. Nonetheless, teachers are used to consulting educational software and online learning material as classroom and homework activities.

High Standards and High Expectations

Since both SAES and ISG-Dammam are academically focused, the math programs in both schools are challenging and place high expectations for the teachers and the learners. Teachers are highly qualified with a vibrant teaching background and content experience,

therefore set high standards for learning and their students' achievement. These high expectations positively impact learners' academic output and school performance (Rosenthal & Jacobson, 1968).

In conclusion, besides the teachers' beliefs and practices in addressing variability and barriers issues in the classroom at both SAES and ISAG-Dammam, the above-stated characteristics are found more or less in place at both schools. The presence of these characteristics indicates that these schools have a strong basis for initiating inclusive education after introducing some modifications and additions to their existing systems to serve students with diverse learning needs, including disabilities. In order to take the initiative for adopting an inclusive approach in their existing educational practices, these schools will need to be restructured at the administrative level. This study suggests the following methods that can be beneficial in adopting an inclusive education model in these schools.

Recommendations for SAES and ISG-Dammam

The role of school principals and leaders is recognized in the educational literature in taking initiatives and introducing educational reforms—they are considered as the gatekeepers of change. Fullan (2007) suggests that significant educational change contains a change in beliefs, teaching styles, and methodologies, which can come about only through the process of teachers' personal development within their social context. Collectively, all participant teachers from SAES and ISG-Dammam are ready to improve their practices and open towards learning new teaching methodologies to meet the diversified needs of learners in their classrooms. It is recommended that teachers, school leaders, and outside individuals who bring external ideas for inclusive practices should be allowed to collaborate (Ammons, 2015). The present research makes further recommendations to SAES and ISG-Dammam.

1. Given the established PD structure in these schools, teachers can benefit from the PD and PLCs by initially pooling professional expertise within the school community, including with parents who have specialized skills in inclusive/special education services. These PLCs can be structured based on teachers' existing needs as identified by this research and by doing initial surveys to introduce targeted training. For example, the consistent patterns of learning disengagement and the lack of meaningful participation in one of the ISG classrooms suggest that teachers require deliberate attention to re-engage and recruit students' interest by using multiple strategies and age-appropriate learning challenges (Adelman & Taylor, 1997; Adelman & Taylor, 2006; Katz, 2013). Organizing targeted PDs can benefit teachers in improving areas that are lacking in classroom management to reduce barriers.
2. The present research serves as a re-examination of the teachers' beliefs and practices in understanding and addressing variability and barriers issues in the classrooms. Initiating debates on such topics in these schools by utilizing PLCs and PD platforms can target teachers' attention towards recognizing and viewing variability as an asset and resource to improve teaching skills. Thus, initial efforts should be made to bring positive changes in teachers' belief systems at the first level (UNESCO, 2017). These debates should then be extended by offering training programs and short courses on how variability and barriers can be identified and addressed by utilizing domestic and outreach resources. Although these schools are already serving diverse student populations, and teachers are already open towards differences, there needs additional planning to extend discussions on differences to incorporate students with special needs as an essential and inclusive part of "differences." The inclusive research suggest that teachers develop positive attitudes

towards students with disabilities and inclusion if they are provided resources and training to address student's needs (Sharma & Sokal, 2015).

3. Both SAES and ISG-Dammam need to redefine their mission-vision statements to include diversity and inclusion as critical components of their school policy. An inclusive education initiative will benefit expats who find challenges staying in the Kingdom when catering to the needs of their children with special needs. This initiative will then lead to the benefit of retaining the workforce in an inclusive community and education system.
4. Both SAES and ISG-Dammam should take initiatives to hire teachers with special education training and experience.
5. Introducing UDL-based lesson planning, and universally designed curriculum and assessment planning at the teachers' and administrative levels is also suggested. UDL-based teaching practices can increase teachers' competencies in developing and sustaining inclusive practices by adopting ways to anticipate and intentionally align teaching components with the core components of inclusive education, thus empowering teachers to serve a broad range of learners regardless of differences.

It can be inferred that these private international schools in the Kingdom have many components that are considered core in the inclusive education literature. Nonetheless, they require administrative restructuring in adopting an inclusive education model by empowering teachers by introducing the UDL framework and related inclusive approaches in teaching. Once established in inclusive practices, these schools can serve as exemplary academic institutions for the local schools in the Kingdom.

Recommendations for Inclusive Education Policy in KSA

Many efforts are being initiated in the Kingdom to improve inclusive practices in education. Recent studies conducted in KSA illustrates a need for change in the existing system through integrating the UDL approach to general and special education (Al-Assaf, 2017; Alquraini & Rao, 2018a; Alsalem, 2015). Considering the current status of inclusive practices in the Kingdom, the present research makes these recommendations for policymakers based on the reviewed literature and the research findings.

1. The government should recognize the private international schools running in the Kingdom as exemplary academic institutions. Research indicates that school-to-school collaborations can increase the capacity and performance of individual organizations to serve the diverse student population—specifically for marginalized students (Brown, 2005; Muijs, Ainscow, Chapman, & West, 2011; UNESCO, 2017). These collaborations can be at different levels, for example, arranging observational training sessions between the schools, combined PLCs and meeting sessions to share teaching experiences, sharing resources, and arranging co-teaching practices among schools (Booth & Ainscow, 2016).

2. UDL integration should begin in the general education system in the Kingdom by emphasizing the various ways of identifying barriers to learning and ways to serve the variability component in daily teaching practices. At this level, discussions about these foundational concepts of UDL-based practices with the teachers will have two core benefits. First, they will start with intentional planning to address barriers and to serve classroom variability. Secondly, once the pattern of universally designed instruction is established through intentional planning, it will allow the inclusion of students with disabilities in general education classrooms.

3. Systematic planning of UDL implementation in special education should be divided into three groups: for students with (a) mild-moderate disabilities, (b) moderate-severe disabilities, and (c) severe disabilities. Literature shows that a wide range of disability groups are benefitting from UDL-based practices by integrating these groups gradually in the general classrooms and simultaneously empowering teachers via training and professional development programs. Teachers can benefit from appropriate, effective practices, goal development, instructional planning, and learning and assessment tools provided by a universally designed research base; thus, the gradual integration of the SWD can be accommodated adequately in regular classrooms.
4. Restructuring courses in pre-service teachers training programs to introduce and apply UDL teaching and learning theories, showing how these theories are used in practice in both general and special education classrooms. Similarly, the establishment of the UDL-based professional learning communities for in-service teachers within K-12 and higher education is essential.
5. Teachers should be provided with co-teaching practice, and gaps in knowledge and practices between general and special education professionals should be minimized. Further, the involvement of other educational professionals such as school psychologists, counselors, speech and language pathologists, assistive technology experts, and educational consultants to promote a collaborative working environment at the educational institutions is considered fundamental in the preparation stage of UDL implementation.
6. UDL experts suggest that introducing UDL in isolation is not possible (Ammons, 2015). A system-wide push is required that includes the equal participation of many different

educational practitioners, for example, curriculum and course designers, program developers, professional development agencies, researchers, and the aggressive involvement of teachers' training institutions within the Kingdom.

7. Research communities in KSA should be encouraged to advance research, starting with a need for change in the education system through planning UDL implementation and assessing the fidelity of implementation (Basham, Gardner, & Smith, 2020; Salend & Whittaker, 2017). Evaluating the efficacy of UDL implementation at each level and with all stakeholders involved is essential to sustain the promising outcomes of UDL-based practices. UDL-based empirical studies should provide adequate information and resources about the intervention/software/programs/cognitive tools to replicate the studies and to get benefits in educational practices. Longitudinal studies in UDL research are required to follow students' academic performance over time to determine the ongoing impacts of inclusive practices in education (Dymond et al., 2006).

Finally, it is stated that collaborating educational professionals with the education researchers for conducting studies in the field of inclusive education within different regions of KSA is essential. It is concluded that the role of the private international schools in KSA can be instrumental by diagnosing their strengths and weaknesses to catalyze school improvement and their capacity to promote inclusion (Booth & Ainscow, 2016; Education, 2000).

Original Contributions and Implications

According to UDL researchers, recognizing learner variability, differences, strengths, and weaknesses, along with learning preferences are essential when it comes to developing lesson goals, regardless of diversity and abilities (Hall, Cohen, Vue, & Ganley, 2015; Winter, 2016). However, there is limited information regarding how teachers perceive the concepts of learner

variability and barriers to learning and how they address these issues in their daily practices, using the curricula in the general classroom settings. The present research provides insight into this area that could help to identify unattended variability components to prevent generating unintended and unnecessary barriers to learning and decreasing learning outcomes.

The in-depth insight provided in this research about teachers' understanding of two different yet parallel issues through their beliefs and perspectives will assist in the evaluation of teaching practices.

In a global scenario, the present research generates various hypotheses and future research questions through conceptual debate, in-depth thematic analysis, analytical alignment of data with the structured theory of UDL, and core components of inclusive education. This is seemingly the first study that initiated a discussion on identifying and analyzing anticipation and intentional alignment across curricula or teaching components. The study also provides a blueprint for the teachers to observe anticipation in the classroom and intentionally aligning curricula to the core components of inclusive education in their daily teaching practices. The theoretical debate on these topics is expected to extend existing approaches in inclusive learning – specifically, UDL.

UDL is referenced in the central state initiatives in the United States Department of Education including ESSA (2012, 2015), IDEA (2004), and Higher Education Opportunity Act (HEOA) (2008), which mandates that all students should have access to equal opportunities for learning using the same state standards and accountability measures (Winter, 2016). The clear descriptions of the underlying concepts in the UDL can create accurate planning for both inclusive education policies and practices for educators.

This study aligns with the objectives of the UNESCO 2030 agenda for Sustainability Development Goals (2017). Additionally, it aligns to the objectives of a recent bill passed in the House of Common Canada *"Act to Ensure a Barrier-Free Canada"*(Naef & Perez-Leclerc, 2019) that aims to remove barriers for individuals with disabilities from major areas of life including program and services delivery, employment and communication. Further, the study informs international education policymakers to reflect on the definition of inclusive education and incorporate variability and barriers to learning as essential parts of the definition as inclusion is an issue of social justice and equity.

Within the Kingdom, the present research documents the current status of teaching practices in private international schools and investigates if such practices are in line with inclusive education. The prospects of this research include developing and introducing UDL-based preservice and in-service teacher training programs in and outside of KSA. Also, this research could initiate discussion on the inclusion of students with diverse physical and cognitive needs, and abilities within the private international schools in the Kingdom. Furthermore, the study highlights some core components of inclusive education that exist in these schools. This identification can potentially create a snowball effect, using these schools as models for others to emulate, and by developing inter-school collaboration programs between the private and public schools of KSA (UNESCO, 2017).

Future Research

Based on the areas for in-service teachers' training and PD identified by this research, it is suggested that future research should track the progress and performance of the teachers/school districts after introducing inclusive education programs in the private international schools of KSA. Simultaneously, the efficacy of the UDL-based blueprint prepared

for this research can also be evaluated by developing its scoring key and providing free access of the blueprint to the general education teachers during the training workshops and PDs. Future research can also benefit from the evaluation criteria for anticipation and intentional alignment developed in this study. Future research can also replicate this study with other private international schools with more case study units using the same evaluation tools. This process will potentially increase the applicability of the findings of similar studies in the Kingdom (Luttrell, 2010). Lastly, future research can also benefit from the relationships among the understudied concepts and some hypotheses elicited by the conceptual debate in the present research.

Limitations

There are a few limitations in the methodological procedures that were adopted for the current study. Although the small number of the case study units/participants provided a rich source of information and chances to make in-depth analyses of the data, caution is advised to the transferability of the present research findings to other grade levels that were not included in this study, and to the teaching practices of the other private international schools running in the Kingdom. Another limitation is only one type of informant, teachers, were interviewed in this study. It would have been helpful to have had access to the perspectives of other informants such as administrative staff. Thus, the study lacks the viewpoints of multiple informants that could add multi-layered perspectives in the exploration of understudied concepts.

Despite making efforts to provide enough details about the teachers' beliefs and practices, there is a chance that the researcher overlooked some information, or the participant did not provide the information due to memory, lack of information, or school's restricted disclosure policies. For example, when the teachers were probed about the reasons for the lack

of inclusive practices in their schools, most of them were unaware of the school's policies on inclusive education. There are also possibilities of socially desirable behavior of the teachers during classroom observations. This limitation was addressed by adopting the methodological triangulation technique by collecting data from more than one resource (i.e., documents and interviews).

Regarding the falsification issues and verification bias that might be caused by adopting case-study methodology in terms of the researchers' perspectives on the investigating phenomenon, situation, and the research process (Starman, 2013). The researcher provided descriptions in the data analysis about addressing verification bias, falsification issues and reducing the chance of misrepresentations in the results by revising the research assumptions, restructuring research questions, providing a detailed description on the data collection and analysis procedures, preparing reflexive journals, conducting face-to-face discussions with the respondents, and probing of the unclear response segments (Starman, 2013). Further, the researcher followed-up by asking follow-up questions to the teachers later during the analysis phase to clarify information and themes that emerged during the coding procedure and ensured member checking procedure. Furthermore, the potential limitations and descriptive and interpretive threats to the research validity were addressed by ensuring the research rigor throughout the data analysis to interpretation procedures.

Lastly, caution applies when it comes to transferring these study findings to other grade levels within the same school district and to other private international or local general education schools in the Kingdom due to the contextual variations. Contextual variations apply to the selection and composition of the schools, selection of the study participants, and grade levels. Teachers' background knowledge and belonging to the diverse cultural backgrounds also

account for the contextual variations in the study findings. Since the purpose of this study was to provide factual accuracy and accurate descriptions of the teachers' beliefs, conceptual understandings, and detailed reflections of their teaching practices. Therefore, the locus of judgment about the applicability of the findings relies more on the potential user to judge transferability or fit the findings to their context (Luttrell, 2010).

Conclusion

The overreaching goal of the present research was to explore the possibilities of inclusive education practices within the private international schools of the Kingdom. Given the complex discourse of inclusive education, this study adopted a backward approach of inquiry by choosing multiple case study design to discover general education teachers' beliefs, conceptual understanding, and practices in addressing the core concepts "learner variability and barriers to learning." Concurrently, the study explored the underlying mechanisms involved in inclusive practices—anticipating for variability and barriers and intentionally aligning teaching components (lesson planning, teaching methods, materials, and assessment) with the core components of inclusive education. The concepts of anticipation and intentional alignment were analyzed by developing evaluation criteria.

The findings of this study suggest that addressing variability and barriers are related to the teachers' beliefs and conceptual understanding of these concepts. The general education teachers who revealed deep conceptual understanding and positive and malleable beliefs about variability and barriers were found adopting flexible instructional approaches in addressing variability and barriers compared to the teachers who showed surface levels of understanding these concepts. Further, teachers who adopted flexible teaching strategies were more likely to establish a non-traditional model of teaching and learning in the classroom gaining maximum

benefits from educational and technological resources. The study also suggests that the teachers in general education settings do not observe anticipation and intentional alignment across teaching components; instead, their teaching practices appear automatic and intuitive. Further, the study suggests that general education teachers need to advance their existing teaching skills to serve a broad range of students regardless of differences by adopting inclusive models of education.

The analysis of the current status of practices in private international schools in KSA suggests that the participating schools are not currently practicing inclusive education models. However, many practices are in line with the core inclusive practices found in the literature, and schools have strong foundations to initiate an inclusive educational model. This research provides a set of recommendations to the participant schools that can be beneficial for introducing inclusive practice in these schools. The study also informs international education policymakers to incorporate variability and barriers to learning as essential parts of the definition of inclusive education.

Opening gates for inclusion in the existing educational institutions in KSA are critical to restructuring teachers' belief system and then tracking the gradual improvement in their beliefs and understanding about the inclusive approach. Providing an inclusive learning environment in today's classrooms will facilitate an inclusive mindset in the teachers of the future. Promoting inclusive education based on UDL implementation in KSA is a gradual process of change, and educational communities need to adjust to this change that cannot be attained in isolation. Starting from small changes and involving stakeholders in establishing UDL communities can address the issues related to the school-wide and Kingdom-wide resistance in the implementation of UDL-based curriculum and alternative instructional design (Dymond et al., 2006; Marino et

al., 2014). Inter-school collaboration can be a useful tool to promote inclusive education in the Kingdom. Therefore, this study was an attempt to provide a springboard for further discussion on inclusive education in the private international schools of Saudi Arabia.

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Appendices

Appendix A

Permission for Research

Title of Study: Addressing Learners' Variability and Barriers to Learning in the Classrooms: The Teachers' Perspectives

Purpose of Study: The purpose of this study is exploring and documenting teachers' ways of understanding, anticipating, and addressing learners' variability and strategies to remove barriers to learning in their daily teaching practices.

Participation Requirements: With the permission of school authorities, elementary and middle school teachers will be identified as potential participants through employment at the two separate school systems proposed for this research. Two teachers from each school will be recruited from grades 4-6 from the general education classrooms. Teachers will be provided with information through a consent form about the study before choosing to participate. If participants agree, interviews will be conducted within or after school hours at the school. With the prior permission of the participants, interviews will be audio-recorded and will not take more than one hour. A follow-up interview may be conducted if the participants agree for further clarification of the under-study concepts. Additionally, nonparticipant observations will take place in the classrooms by observing teachers' ways of addressing learners' variability and barriers to learning in their daily classroom practices and students' responses. These observations may last one to two weeks period depending on the time of instructions required from introducing a new lesson to the assessment in each class. Further, teachers will be requested to provide relevant written lesson plans for further analyses of the proposed study constructs. All collected information will be confidential and anonymous throughout the data collection, analysis, and result discussions.

Potential Risks: The proposed study poses no severe ethical problems for the participants. However, the process of data collection will start after taking the ethics approval from the Research Ethics Board (REB), McGill University, for conducting this research with human participants.

Potential Benefits: This study hopes to document the teachers' perspectives and practices on understanding and addressing learners' variability and barriers to learning. Discussions on such topics may inform their daily practices in addressing such issues intentionally in the classrooms. Additionally, it may be anticipated that the information obtained from this study will generate future teachers' training programs promoting ways to incorporate techniques to address such issues in the classrooms and may promote inclusive practices and the access to learning for all.

Confidentiality: Confidentiality of the school identity and the anonymity of the research participants will be protected to the greatest extent possible throughout the study. Such as audiotaped interview collection will be used solely for transcribing and analyzing the participant's responses in the proposed research only. The participants will be ensured about the safety of the data by providing them information on the data storage system. The lead researcher will keep the data protected in a hard drive and binder for five years and will be discarded later on. The coding procedure will ensure the anonymity of the participants' names and confidentiality.

Voluntary Participation: Participation in this research study is voluntary. Teachers may choose not to participate or withdraw consent to participate at any time. They will have full access to the audio files and transcripts of their recorded interviews and study results. The participants will be informed in the consent form about their rights to participate in the study.

Contact Information: If you have further questions about this study or regarding the rights of the research participants, you can contact:

The lead researcher:

Asma Batool, Ph.D. Candidate,

Department of Education and Counselling Psychology, Human Development Program,

McGill University, Montreal, Canada

E-mail: asma.batool@mail.mcgill.ca; Phone: 0508477824; 013-8788785

The Research Supervisor:

Dr. Tara Flanagan

Department of Education and Counselling Psychology

McGill University, Montreal, Canada

E-mail: tara.flanagan@mcgill.ca; Phone: office: +1514-398-3441; Fax: +1514-398-6968;

SPARC lab: +1514- 398-2765

Consent

I have read the above description of the study and understand the conditions of my school's participation. I agree to allow the research to be conducted at our elementary and middle schools.

Name of the School: _____

Associate Superintendent: _____

Signature _____ Date _____

Name of the Researcher: Mrs. Asma Batool

Signature _____ Date _____

Appendix B

Research Participation Consent Form

The Primary Researcher:

Asma Batool, Ph.D. Candidate,

Department of Education and Counselling Psychology, Human Development Program,

McGill University, Montreal, Canada

E-mail: asma.batool@mail.mcgill.ca; Phone: 0508477824; 013-8788785

The Research Supervisor:

Dr. Tara Flanagan

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McGill University, Montreal, Canada

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SPARC lab:

+1514-398-2765

Title of Study: Addressing Learners' Variability and Barriers to Learning in the Classrooms: The Teachers' Perspectives

The purpose of the Study: You are being invited to participate in a research study. Before deciding to participate in this study, you are advised to understand the purpose of this research and how the research will be conducted. The purpose of this study is to explore and documenting teachers' ways of understanding, anticipating, and addressing learners' variability in the classrooms and strategies to remove barriers to learning in their daily teaching practices.

Study Procedure: Teachers' opinion on the stated topics will be collected by conducting an interview. With the permission of the participants, interviews will be audio-recorded and will not take more than one hour. A follow-up interview may be conducted if the participants agree

for further clarification of the understudy concepts. These interviews will be conducted in the school during or after school hours, subject to the availability of the teachers. The primary purpose of audio recording the interviews is to avoid relying on human memory and to maintain precision in the teachers' perspectives in the research. These interviews will be transcribed later for this research analysis only and will be accessible to the participants. Participants will be presented with the transcribed copies of the interviews for their review.

Additionally, nonparticipant observations will take place in the general classrooms to observe teachers' ways of addressing learners' variability and barriers to learning in their daily classroom practices and students' responses. These observations may last one to two weeks period depending on the time of instructions required from introducing a new lesson to the assessment in each class. The primary researcher will perform a role of a non-participant observer with least or no interference during the daily classroom functioning; context and settings will be well respected, and the physical presence of the researcher will cause minimum disruptions. Information from these observations will be collected manually in a notebook.

Furthermore, teachers will be requested to provide written lesson plans for further analyses of the observed classrooms. All collected information will be confidential and anonymous throughout the data collection, analysis, and result dissemination.

Potential Risks: The proposed study is posing no physical, emotional, or ethical problems to the participants. All obtained information will be kept confidential, and anonymity of the organization and the participant information through the coded method will be ensured.

Potential Benefits: This study hopes to document the teachers' perspectives and practices on understanding and addressing learners' variability and barriers to learning. Discussions on such topics may inform teachers' daily practices in addressing such issues intentionally in the

classrooms. Additionally, it may be anticipated that the information obtained from this study will generate future teachers' training programs promoting ways to incorporate techniques to address such issues in the classrooms and may promote inclusive practices and the access to learning for all.

Compensation: The study is offering no monetary benefits to the participants. Additionally, a decision to participate in the study or not to participate will not affect your professional status and company benefits entitlements.

Voluntary Participation: Participation in this research study is voluntary. You have a right to choose to participate or not to participate in the study. If you choose to participate, you will be requested to fill and sign the consent form. Your signatures are required only for the confirmation of your understanding and willingness to participate in this study, and this information will be kept confidential. If you decide to participate and do not want to answer any question, you have a right to decline or skip the question. Additionally, if you decide to withdraw a signed consent, you have a right to do it at any time without giving any reason. In this case, your information will be either returned to you or will be destroyed. However, participation in this study will be anonymous. Therefore, the withdrawal will not be possible after the study is concluded and analyses have been finalized. Also, you will have a right to request for the audio files and transcripts of your recorded interviews and the study results.

Confidentiality: Information obtained from the consent forms, your responses to the audio recorded interview, transcriptions, information obtained from the classroom observations as well as documents collected from the teachers (lesson plans) will be kept confidential in a personal computer and a binder. Only the primary researcher and supervisor will have access to the data for the research analysis purposes. The following efforts will be made by the researcher to

preserve your confidentiality, (a) pseudonyms will be assigned to protect the participants' anonymity in the research paper and dissemination of the results, and (b) the primary researcher will safeguard the information for seven years in a hard drive and a binder, and will be discarded later on.

Contact Information: If you have questions, concerns, or clarifications at any time about this study, you may contact the primary researcher and the research supervisor, their contact information has been provided on the first page. If you have any ethical concerns or complaints about your participation in this study and want to speak with someone not on the research team, please contact the McGill Ethics Manager at 001-514-398-6831 or lynda.mcneil@mcgill.ca. Please sign below if you have read the information mentioned above and voluntarily agree to take part in this study

---

Consent

I have read and understood that I have no obligation to sign this consent and know my rights to voluntary participation in this study. I also know that I have a right to ask questions at any time and to refuse to participate at any time, without giving a reason and without any penalty. By signing this consent, I understand that I will give permission to audio record my interview and I will have a right to access the information I will be providing. I will be given a copy of this consent form. I voluntarily agree to participate in this research study.

Participants' name _____

Participant's signature_____ Date_____

Primary Researcher's signature _____Date_____

Appendix C

Teacher Interview Protocol

1. How long have you been teaching?
2. Have you always wanted to be a teacher?
3. Did you have a different career before? If so, what?
4. Have you heard the term "learners' variability" in classrooms or other related terms before?
5. What do you think about "_____" in the classrooms? How would you define "_____"? (Use of mirror terms (Myers & Newman, 2007))
6. Do you think about addressing "_____" when you prepare lesson plans for your class? What are your thoughts about preparing lesson plans?
7. How do you address "_____" in the classroom? Can you share your classroom experiences and stories about it?
8. Do you feel you are satisfied with your existing teaching practices in addressing "_____" in your classrooms?
9. Are you satisfied with the existing institutional and administrative support in addressing "____" in your classroom?
10. What do you know about the term "barriers to learning"? How would you define this term?
11. Can you identify barriers to learning in your classroom (examples)?
12. Do you think about using ways to remove barriers to learning while preparing lessons for your class? Examples?
13. Specifically, what components you consider are essential in teaching in removing barriers to learning for your classroom? (teaching practices that help remove barriers)

14. Do you feel you are satisfied with your existing practices in addressing the issues of barriers in your classroom?
15. Are you satisfied with the administrative support in addressing the issues of barriers in your classroom?

    How do you think the concepts of "_____" and barriers to learning relate to each other?

Appendix D

Field Notes of Participant Classroom Observations

Days	Teachers' Name	Observers' Name	Date	Grade	Start – End Time	Classroom Settings	Focused Lesson	Instructional strategies / Teaching Methods	Instructional Material	Assessment methods	Students Responses	My comments/reactions/ feelings
Day 1												
Day 2												
Day 3												
Day 4												
Day 5												

Note. Initially, this table is created to keep data in the excel file

Appendix E

McGill REB-III Approval Letter

McGill

Research Ethics Board Office
James Administration Bldg.
845 Sherbrooke Street West. Rm 325
Montreal, QC H3A 0G4

Tel: (514) 398-6831
Fax: (514) 398-4644
Website: www.mcgill.ca/research/researchers/compliance/human/

Research Ethics Board III
Certificate of Ethical Acceptability of Research Involving Humans

REB File #: 206-1017

Project Title: Addressing Learners' Variability and Barriers to Learning in the Classrooms: The Teachers' Perspectives

Principal Investigator: Asma Batool

Department: Educational & Counselling Psychology

Status: Ph.D. Student

Supervisor: Prof. Tara Flanagan

Approval Period: November 8, 2017 –November 7, 2018

The REB-III reviewed and approved this project by delegated review in accordance with the requirements of the McGill University Policy on the Ethical Conduct of Research Involving Human Participants and the Tri-Council Policy Statement: Ethical Conduct For Research Involving Humans.

Lynda McNeil
Associate Director, Research Ethics

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* Approval is granted only for the research and purposes described.
* Modifications to the approved research must be reviewed and approved by the REB before they can be implemented.
* A Request for Renewal form must be submitted before the above expiry date. Research cannot be conducted without a current ethics approval. Submit 2-3 weeks ahead of the expiry date.
* When a project has been completed or terminated, a Study Closure form must be submitted.
* Unanticipated issues that may increase the risk level to participants or that may have other ethical implications must be promptly reported to the REB. Serious adverse events experienced by a participant in conjunction with the research must be reported to the REB without delay.
* The REB must be promptly notified of any new information that may affect the welfare or consent of participants.
* The REB must be notified of any suspension or cancellation imposed by a funding agency or regulatory body that is related to this study.
* The REB must be notified of any findings that may have ethical implications or may affect the decision of the REB.

Appendix F

Parents' Information Letter

Dear Parents,

You are being informed that our classroom will be having a research procedure of a non-participant observation conducted by a doctoral researcher at McGill University, Canada, intending to document teachers' classroom practices in diverse groups and addressing barriers to student's learning. The purpose of a non-participant observation is to record behaviors, process, or a phenomenon in a real-time with least or no interruptions in the actual routines, schedules, and behaviors. These observations will be starting on (date) and will continue until (date) in (English language art/science/math/social studies) during the class time. No student identification will be required, obtained, and recorded. If you have any further questions about the observations or the research project, you can contact the classroom in-charge teacher or the researcher directly at asma.batool@mail.mcgill.ca

Thank you.

Teacher's name

Note: Dates and classrooms are subject to the availability of the participant teachers (yet unknown) for the observation procedure and will be added later on.

Appendix G

Timeline of Data Collection