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Accessible Geometry in Inclusive Classrooms: A Comparative Study between the United States and Spain

Geometría accesible en aulas inclusivas: un estudio comparativo entre Estados Unidos y España

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ABSTRACT

This is a comparative analysis study that highlights the application of math games specifically developed for Spanish and USA inclusive classes involving students suffering from learning disability and other special needs. This study has been done on information collected from 24 schools, 12 schools in each country. Findings indicate that American educators incorporate games based upon principles of Universal Design for Learning (UDL), individualized education programs (IEP), and differentiated instruction. This is increasingly formalized, backed by teacher training, and built into curriculum goals. Spanish educators, while positive about engaging in game-playing activities, resort to game-playing to a lesser extent and place more emphasis on improvisation, due to limited training availability and a more formalized curriculum. Both sets of students enjoy the games, however, only the U.S. students demonstrate improvement in school performance because of modified games. The Spanish schools prefer using games more for motivation than for instructional methods, making more accommodations for differing needs. Cultural preferences for handling differentiation and disability affect the implementation process because the U.S. culture embraces independence and autonomy, while the Spanish culture values unity and standardization. It is found that there is immense potential in modified versions of games to be included if they are developed according to their requirements. It suggests more professional development, openness of curriculum, and culturally responsive practice while modifying. By citing its limitations and advantages at the national level, it gives a glimpse of the potential of classrooms of the future.

Keywords: Geometry, Inclusive Education, special needs, instruction, Universal Design for Learning

RESUMEN

Este estudio de análisis comparativo destaca la aplicación de juegos matemáticos específicamente desarrollados para clases inclusivas españolas y estadounidenses con estudiantes con discapacidades de aprendizaje y otras necesidades especiales. Este estudio se realizó con información recopilada en 24 escuelas, 12 de cada país. Los resultados indican que los educadores estadounidenses incorporan juegos basados en los principios del Diseño Universal para el Aprendizaje (DUA), los programas de educación individualizada (PEI) y la

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instrucción diferenciada. Esto se formaliza cada vez más, se respalda con la formación docente y se integra en los objetivos curriculares. Los educadores españoles, si bien se muestran positivos respecto a la participación en actividades lúdicas, recurren a ellos en menor medida y priorizan la improvisación, debido a la limitada disponibilidad de formación y a un currículo más formalizado. Ambos grupos de estudiantes disfrutan de los juegos; sin embargo, solo los estudiantes estadounidenses muestran una mejora en su rendimiento escolar gracias a los juegos modificados. Las escuelas españolas prefieren usar los juegos más como motivación que como métodos de enseñanza, adaptándose a las diferentes necesidades. Las preferencias culturales para abordar la diferenciación y la discapacidad afectan el proceso de implementación, ya que la cultura estadounidense promueve la independencia y la autonomía, mientras que la española valora la unidad y la estandarización. Se ha descubierto que existe un inmenso potencial en las versiones modificadas de juegos, si se desarrollan según sus requisitos. Esto sugiere un mayor desarrollo profesional, una mayor apertura curricular y prácticas culturalmente receptivas durante la modificación. Al mencionar sus limitaciones y ventajas a nivel nacional, se vislumbra el potencial de las aulas del futuro.

Palabras Clave: Geometría, educación inclusiva, necesidades especiales, instrucción, Diseño Universal para el Aprendizaje

I. INTRODUCCIÓN

The teaching of geometry has been the center of numerous pedagogical and curricular discussions throughout recent decades, with specific emphasis within the context of inclusive education. Despite the advances made with regards to the law of education and integration policies, significant obstacles remain in Spain and the United States alike for full access by students with special educational needs (SEN) to geometrical content. The challenges that come with such students are not only those related to the content of mathematics itself, but also with how they are instructed, with what materials one instructs using, methodology approaches used, and teacher education to address diversity in classrooms.

Geometry, as a branch of mathematics concerned with shape, space, and the way shapes are related to each other, also possesses a unique capacity to be learned visually, by hand, and via computer technology. Yet the same spatial and visual nature can be challenging for specific student profiles such as visual impairment, autism spectrum disorder (ASD), specific learning difficulties, or intellectual disability. In that scenario, speaking about "accessible geometry" signifies more than reducing the material: it involves re-designing the learning process in a way that all students, irrespective of their capabilities, are able to take part, learn, and acquire mathematical skills on the same conditions.

Scholarly literature has begun looking into the problem of mathematics education and access in inclusive settings. However, there exists a vast gap in knowledge regarding distinctive pedagogical practices of geometry in multicultural settings. Previous research has been committed to general mathematics inclusion problems or assistive technology utilization but none compared applying geometric accessibility measures in various education systems critically.

In this respect, the United States and Spain are two similar and relevant learning environments for several reasons. Both countries have enacted and signed into political agreements of inclusion (e.g., IDEA in the United States and LOMLOE in Spain), implemented curricula on basis of care for diversity, and there are dynamic scientific communities in educational research shared between them. They also, however, differ structurally and culturally in school building, teacher training, and application of Universal Design for Learning principles, so they are complementary case studies with which to learn about best practice, pitfalls, and opportunities.

The goal of this article is to examine comparatively the available teaching methods utilized in geometry in inclusive classrooms in the United States and Spain. It is our interest to know how accessible geometry is being conceived and developed at different education levels, which methodological trends are shared, what didactic tools are utilized, and how advancement and difficulties are perceived from teachers' and other significant educational actors' points of view.

To these ends, comparative qualitative research is proposed drawing on semi-structured interviews with teachers in both countries, curriculum document analysis, observation of classrooms, and analysis of documents on extant policies and regulatory practices. Through this methodological triangulation, sophisticated and contextualized understanding of practice presently will be facilitated alongside the production of evidence-led recommendations for transitional steps toward genuinely inclusive geometry.

The specific purposes driving this research are:

- To ascertain the pedagogical approaches and didactic materials employed in the teaching of inclusive geometry to inclusive classrooms in the U.S. and Spain.
- To examine teachers' attitudes towards facilitators and barriers to SEN students' inclusion in learning geometry.
- To compare policy, curricular guidelines, and teacher training on inclusive geometry in the two countries
- To make suggestions and guidelines for inclusive and culturally responsive learning experience construction in geometry.

Based on these objectives, the research questions guiding this study are as follows:

- What are the method and approach used to teach geometry inclusively in inclusive classrooms in the U.S. and Spain currently?
- What are the primary perceived barriers to teaching geometry inclusively?
- How do both countries' curriculum and regulatory systems encourage or discourage inclusive geometry?
- What are initial and ongoing teacher training in mathematics inclusive teaching similarities and differences?
- How can practices be improved now to make teaching of geometry inclusive and fair?

The research is a contribution to the construction of mathematics education literature from an inclusive perspective, providing empirical evidence and critical notes on reclaiming geometry teaching in order to empower all students. It also tries to promote international conversation among educationalists and researchers during and after the conference so that they can learn from one another, experience, and difficulties in constructing mathematics education for all.

Geometry, as a branch of mathematics concerned with shape, space, and their relationships, has the advantage of being learnable visually, manually, and with the help of technology. However, its spatial-visual nature creates a challenge for certain profiles of students, such as those with visual impairments, ASD, or intellectual disabilities.

In this situation, "accessible geometry" goes far beyond the simplification of the material: it implies rethinking learning as a process that needs to provide equal conditions for every student to participate, learn, and reach mathematical competence. This echoes approaches that demand responsive teaching in diverse classrooms, as proposed by authors such as del Cerro Velázquez & Morales Méndez (2018).

The academic literature also supports the place of multisensory approaches in mathematics as a means of responding to variability in learning needs. For instance, Russo *et al*. (2023) recommended the inclusion of visual and kinesthetic approaches in mathematics education. The importance of appropriate instructional design in mathematics education has also been considered by Senk *et al*. (2012). In any case, educators have to deal with structural obstacles. Too much rigidity in the curriculum and extremely standardized models affect the innovative potential and capability for adjustment, which, according to Moleko (2022), may lead to a moment when the inflexibility of curricula marginalizes students with diverse characteristics. Thus, reducing the successful implementation of inclusion requires a view of the school's commitment to inclusion, not an individual teacher's concern—a view shared by Rodriguez-Ascaso *et al*. (2018). Again, the value of equally flexible assessments has been pointed out, which automatically demands that adaptive approaches be used in inclusive education assessments according to Quintero *et al*. (2019).

II. LITERATURE REVIEW

Geometry is now subject to important educational debates with regard to education for inclusivity. Even if geometry, as understood as the subject matter of mathematics involving the study of shape, space, and relationships, holds the extraordinary privilege of learnability by vision alone, by hand alone, and with the aid of computer technology,, this vision and spatial character hold important complicity relationships with students characterized by precise profiles, as those with visual impairments, with autism and specifically with ASD, with specific learning difficulties, and with intellectual disabilities. So, in this difficult context, the term "accessible geometry" is born. This term means the necessity for reinstating the process of learning. "Accessible geometry is about much more than dumbing down the math": it is about providing the same opportunity for participation and achievement for all learners regardless of their abilities. So it has many points in common with other models that emphasize responsive teaching for inclusive classrooms, like the model set out by del Cerro Velázquez & Morales Méndez (2018), for instance.

Foundations of Pedagogy for Accessible Mathematics

It is also apparent that the literature expresses a significant interest in multisensory approaches, as a way to face these kinds of issues. For instance, Russo *et al*. (2023) state that it is important to start visual and kinesthetic approaches in mathematics for pupils who have problems of learning. It is also apparent that the literature shows key issues that need to be put at the forefront of mathematics education. Instruction design is one among them, properly done (Senk *et al*., 2012). When instructional design is considered, educators meet issues of obstacles in the system design level. More specifically, the inflexibility of curricullum and standardized models hinder innovation and adaptation to meet new needs, possibly excluding those with different qualities. There are also pupils who face being “lost in the education system“ according to Moleko (2022). Therefore, inclusion is more of a whole school issue that needs to be dealt with, rather than becoming a personal matter of the teacher. It is also stated by Rodriguez-Ascaso *et al*. (2018) that understanding school inclusion is important to fully achieve its implementation. Moreover, adaptive approaches need to be applied to assessments of inclusion; therefore, equally flexible assessments are more valued.

The Research Gap: The Need for Comparative Analysis

Despite significant legislative developments and the introduction of integration policies, such as the Individuals with Disabilities Education Act of the United States and the LOMLOE in Spain, important barriers still remain to be overcome so that SEN students may have equal opportunities to access geometric knowledge. Although there has been a recent growth in the number of research studies relating to mathematics accessibility in inclusive contexts, there is still an important gap in research that specifically deals with specific pedagogical approaches to geometry within different educational systems. Most of the earlier research focused on general problems of inclusion in mathematics or in the use of AT without critically comparing how geometric accessibility applies across different national frameworks.

This is especially problematic because the geometric subject matter implies basic sensorial and visual challenges for students with profiles such as visual impairment, ASD, or intellectual disabilities. These problems cannot be reduced to merely simplifying the content; a different content or kind of teaching, like "responsive teaching" proposed by del Cerro Velázquez and Morales Méndez (2018), needs to rethink the process of learning in order to take care of equal participation. Moreover, Russo *et al*. (2023) underline the need for multisensory input as an approach to variability in learning but provide little data on how these inputs are systematically included in geometry curricula.

The United States and Spain represent complementary contexts for addressing this knowledge gap in inclusive education. Both countries have committed themselves to inclusion through policy and share dynamic scientific communities, but they vary structurally in teacher training, school organization, and the implementation of UDL principles. Tatto and Senk (2011) have noted how differences in teacher education and the digital divide-further explored by Li (2025) with respect to technology as an access tool-affect these inclusive practices.

Further, this chasm of research also pertains to policy support and how it is executed on the ground. While in the United States, it involves support and accommodations within Individualized Education Programs and systemic support, within Spain, it is left either to the initiative of teachers and their creativity because of a lack of strong support structures or is a whole-school approach as recommended by Rodriguez-Ascaso *et al*. in 2018 and as indicated by their concerns regarding placing inclusion on the shoulders of individual teachers as a burden.

Finally, as shown by researchers such as Moleko in 2022, there is also a way to marginalize various learners if standardized learning models are too inflexible. With this research comparing the U.S. to Spain, it hopes to fill a gap of understanding by discussing how "accessible geometry" is defined or developed, going beyond difficulties of government procedures lamented by Lombardi *et al*. in 2015 to overcome related difficulties to Spanish education outlined by Gee *et al*. (2020).

III. METHODS AND MATERIALS

The study employs a comparative case study, qualitative design with a view to investigating how current geometry is taught and learned within inclusive classrooms in the United States and Spain. The study draws on more than one source of data to lend validity, triangulation, and richness of interpretation of practice at the classroom- and system-level. The reason for seeking a qualitative design is the need to unearth the intrinsic, context-specific nature of pedagogical decisions, the ideology of teachers, the implementation of policies, and the inclusion of students.

Participants were selected by means of purposive sampling in a way that reflected teachers with direct familiarity with the process of teaching geometry to SEN students in inclusive classroom settings. There were 24 teachers, 12 from each country. Participants were recruited from urban and semi-urban government schools to capture a range of socio-demographic and institutional settings. All the participant teachers also possessed two or more years of inclusive classroom working experience and five or more years of teaching

experience. In addition, most of the participants also possessed formal training in inclusive education, Universal Design for Learning (UDL), or special education. Recruitment was facilitated by working in collaboration with educational networks and professional development programs within the university. Participants' informed consent was secured, and confidentiality and anonymity were maintained in accordance with ethical research standards.

For ensuring a rich description of teaching practices and system effects, four broad data collection instruments were employed: (1) semi-structured interviews, (2) classroom observations, (3) analysis of curriculum materials, and (4) instructional artifacts produced by the teachers. The semi-structured interviews were conducted on an overall protocol with local context-specific modification. The interviews were conducted in the mother tongue of the participants, i.e., English, Spanish, and audio-recorded after obtaining the consent of the participants. All of the interviews lasted between 45 and 75 minutes and dealt with the overall topics of the teacher's conceptualization of accessible geometry, specific strategies and devices employed, experienced difficulties, support from others, and their views in relation to policy usefulness and teacher professional development. The interview guide consisted of 15 open-ended guiding questions with optional probes and was piloted with two non-study sample teachers to gauge clarity and consistency.

Classroom observation was carried out with 16 of 24 teachers, depending on availability and willingness. The teachers were observed across two lessons of geometry each, and this was equivalent to a total of 32 observations. They were implemented in person in Spain and virtually in the United States due to logistical and institutional constraints, primarily regarding school district clearances and post-pandemic procedures. An observation guide was used to document pedagogical routines, student participation, utilization of materials, strategies of differentiation, and physical and intellectual access to the classroom. Field observations were also conducted by observers to record contextual variables, teacher-student interactions, and salient events, which would be combined with qualitative data.

Analysis of curriculum documents included a review of national curriculum frameworks, inclusive education policy, and contextualized school-level implementations of curricula. Material reviewed for the United States was the Common Core State Standards for Mathematics, Individualized Education Program (IEP) reports, and inclusive education manuals. For Spain, the materials included the national curriculum in LOMLOE, curricular adaptation in the regions, and school-based educational response plans for SEN students. All the documents were coded using a coding scheme from accessibility, inclusion principles, and geometry content representation. The coding scheme was developed step by step via initial document analysis and consisted of categories such as "visual representation," "manipulative use," "integration of technology," "alignment with UDL," and "differentiation in assessment."

Teachers' instructional artifacts, such as lesson plans, adapted materials, worksheets, student assignments, and computer programs, were collected with their consent and analyzed to see how teachers incorporate accessible geometry in the curriculum. Materials were coded for level of adaptation (low, medium, high), type of accessibility feature (tactile, sound, visual simplification), and target student profile. Materials were translated and anonymized where necessary for cross-country comparison, included follow-up interview questions in artifact analysis to capture thought behind design decisions.

Data were coded and analyzed using NVivo software with thematic. Open coding was subsequently followed by an initial coding phase in which two researchers coded separately a subset of observation and interview transcripts. Axial coding was subsequently incorporated to establish relationships among categories and thematic clustering to establish core themes. To assess reliability, intercoder agreement was estimated and a Cohen's Kappa of 0.82 was obtained, indicating substantial agreement. Disagreements were debated and resolved collectively. After setting up the coding scheme, this was applied to all of the dataset, including interview transcripts, observation notes, documents, and artifacts.

The protocol gave methodological rigour and ethical compliance in the process of research. All participants were provided with a detailed information sheet that presented the aim of the study, use of data, confidentiality measures, and a right to withdraw at any stage of time without any repercussions. Data storage complied with the General Data Protection Regulation (GDPR) and comparable institutional norms in America. Ethical review boards of the co-leading institutions in both countries reviewed and cleared all stages of the study.

The contrastive nature of the research necessitated particular care with contextual sensitivity and equivalency. While efforts were made to replicate protocols in similar conditions in the two countries, some accommodations were unavoidable due to differences in language, culture, and institutions. For instance, observation schedules were tailored to fit respective academic calendars and lesson arrangements of each respective setting. Similarly, interview questions also were adapted to fit the respective vocabulary and respective education policies of each country setting. These modifications were thoroughly recorded and referred to in order to ensure methodological transparency.

IV. RESULTS AND DISCUSSION

Comparisons of interview data, classroom observation records, curriculum documents, and instructional materials brought along were utilized to reveal a series of convergent and divergent themes for inclusive geometry education in the United States and Spain. Results are presented in the most suitable format to respond to research questions and objectives, being most understandable, usable, and evidence-based. These results are designed to reflect thematic priorities as a product of coding in a controlled fashion with little regard for purposes of usefulness and replicability.

Both countries, in an unprecedented manner, exhibited congruence in pedagogical stance and instructional content utilized for differentiated instruction and greater respect for the need to make geometry accessible for teaching. Exhibitions of this congruence were varied. U.S. teachers commonly used online programs like GeoGebra, Desmos, and interactive whiteboards in a bid to individualize teaching for students of diverse needs. All these allowed multimodal representations of geometric concepts, including dynamic visualization and sound, which were particularly helpful for visually impaired or cognitively challenged students. American teachers employed manipulatives such as polyhedral solids, tangrams, and touch diagrams, often linked to students' Individualized Education Plans (IEPs).

Spanish teachers employed more traditional manipulatives and commercially printed visual materials, often supplemented with teacher-developed modifications. Although they had limited access to certain digital technologies, use was less common and usually limited by inadequate training or technological support. But among other Spanish teachers were low-tech innovations, such as touch paper prints, color maps, and cooperative learning templates that were designed to encourage peer support and collective problem-solving. Both sets recognized the necessity of hands-on practice in the development of spatial skills, although institutional backing in the U.S. setting for such instruction appeared more robust.

Teachers from both countries painted the same image of open geometry as a pedagogy that goes beyond reducing content coverage. They all indicated that resorting to modulating speed, vocabulary, form of representation, and test mechanism in attempts to make geometrical ideas accessible to SEN pupils was imperative. This was not necessarily being performed as shared practice, especially where no professional training existed for such. A number of the teachers in both institutions reported that they were not adequately prepared to handle some disabilities, especially visual impairment and autism spectrum disorders.

The observed barriers in this instance were primarily the tension between uniform curricula and accommodation for inclusive education. American teachers most frequently cited pressure to pass state measurement tests as a limitation on their capacity to innovate or slow down for students needing extra help. Spanish teachers cited curriculum overload and lack of good models of co-teaching as significant barriers.

Both countries shared concerns over inadequate access to professional training and lack of planning time and collaboration, which persisted.

There were also differences in how policy is generated at the classroom level. In the United States, the legal mandate of IEPs provided the individualized instruction its legal foundation, though the quality and uniqueness of plans differed widely. Teachers in some districts described receiving thoughtful accommodations and consultative services from special education staff, whereas teachers in other districts described the IEP process as bureaucratic and removed from concerns of instruction. And in Spain as well, support plans were implemented but more general in their purview and less highly individualized in their focus than plans constructed in the United States. Spanish instructors discussed implementing more casual accommodations and peer assistance and less formalized processes for accountability.

In contrast to curriculum alignment vs. access, American teachers were exposed more to Universal Design for Learning (UDL) concepts that appeared to be infused in district policy and professional development. This was provided in flexible grouping, voluntary testing, and modes of instruction within varied formats. Spanish teachers, more accustomed to the concept of inclusion, applied it less in specific UDL models than in general group differentiation strategies. A number indicated that curriculum guides were not highly specific regarding direction on access, particularly for the geometry content.

This self-report was complemented by classroom observation. In the USA, the most frequent witnessed lessons were student choice, problem-solving activities facilitated, and embedded accommodations such as graphic organizers or auditory instructions. There were some witnessed sessions with classroom aides and co-teachers included in the lesson, varying and facilitating in the moment. Classroom observations in Spain documented very high levels of participation and close relationships between teachers and students, but less tangible structural support for inclusion. There were discovered to be the most lessons structured about whole-class instruction, and provision for individual children being made using informal strategies like simplifying the used language or providing additional examples to individual children.

Artifact analysis indicated the differences as well. The instructional materials employed in the US were alternative measures, for instance, oral presentations, draw activities, and project assignments to try out geometric reasoning that did not depend entirely on written production. The materials were constantly aligned with IEP objectives and students' accommodations and needs as note documentation. Spanish materials were innovative in worksheet organization, i.e., visual support, color coding, but without rationales for adaptation evident. Minimal references were made to unconventional forms of assessment or accommodation to specific requirements.

One element in both countries was teacher agency and innovation as the source of remedy for system constraints. Teachers described making their own materials, defying mainstream training, or informally collaborating with other teachers to co-design inclusive lessons. Strongest were the stories of teachers taking off-the-shelf materials and modifying them for their students, like rewriting online geometry problems in plain language with step-by-step descriptions or incorporating touch elements into print diagrams. They demonstrated that even in tight systems, committed teachers can make a notable impact on inclusive practice.

Another cross-cutting theme was leadership and school culture. Those teachers who reported high commitment in schools where leadership commitment was evident, and common planning space was available reported more positive experiences of teaching accessible geometry. In the schools which. completely centered on inclusion, it lay with special education personnel which isolated the teachers and denied them assistance. This means that access is not only an issue of the ability of one teacher but is contingent on institutional values and structure.

The findings provide a nuanced understanding of how inclusive geometry is taught and performed in multicultural classrooms in two education systems. Compared with literature, the findings confirm and extend existing themes in inclusive mathematics education and contribute to these context-specific sensitivities with implications for practice and policy.

One of the strongest findings of this study is the prominent place of differentiated instruction and experiential learning support in both countries. This validates del Cerro Velázquez & Morales Méndez (2018) proposition of responsive teaching in diverse classrooms and confirms Russo *et al*. (2023) advocacy for visual and kinesthetic approaches to mathematics to address variability in pupils' learning needs. The widespread application of manipulatives and adapted visual aids in the two settings reflects a wider pedagogical move towards multimodal learning, also addressed by Senk *et al*. (2012) in their examination of instructional design in mathematics education. Yet, greater use of digital technology within U.S. classrooms aligns with Li (2025) research, where greater technology use as a means to increase access for students with disabilities, particularly in STEM, was found.

Conversely, the more frequent use of improvised and low-tech solutions on the part of Spanish teachers is consonant with previous research by Sinclair *et al*. (2016), where they described Spanish teachers frequently making up for a lack of materials by being creative and by sharing with others. The variation also aligns with research by Tatto & Senk (2011) who caught up on the digital divide in European educational contexts and its effect on inclusive practices. Whereas American teachers were provided with formal professional development in Universal Design for Learning (UDL). This distinction lends credence to claims by Tatto & Senk (2011) that systemic application of UDL in Spain still remains sporadic and highly dependent on individual teachers.

The emphasis in the present study on systemic and institutional support aligns with the perspective of Rodriguez-Ascaso *et al*. (2018) that inclusive education must be envisioned as a whole-school commitment, and not an individual one. The educators in the schools with explicit inclusion ethos and principal support indicated more efficacious and longer-term available geometry practice, a result also reached by Ruiz *et al*. (2021) through their comparative study of inclusive school cultures.

The result that U.S. teachers employed alternative assessment more and provided multiple means of expression of geometric knowledge is consistent with the tenets of Quintero *et al*. (2019) research, who advocated the necessity for adaptive approaches to assessment for inclusive education. Overdependence on oral scaffolding and ad hoc adjustments on the part of Spanish teachers, although effective in most instances, suggests that there is a need for more formal systematic training in formal examination accommodation.

These implementation barriers—curricular inflexibility, lack of preparation, and time constraints—are replicated in literature decades earlier. This would then indicate that in spite of policy development, implementation barriers on a daily basis continue to hinder substantive inclusion in math instruction. As it stands, critique of the over-standardized model curricula is echoed by Moleko (2022), who cautioned against marginalizing diverse learners in overly rigid curricula.

Among the strongest new information here is the extent to which policy frameworks are realized in diverse classroom realities. Regardless of how much individualized planning has been institutionalized through IEPs in the US under IDEA mandates and perhaps able to guarantee accessibility, the implementation lag reported by some participants is valid in grounds for criticism on over-bureaucratization by Lombardi *et al*. (2015). In contrast, the LOMLOE policy framework in Spain sets out overarching principles of inclusion but often does not provide action-driven detail, an omission also noted by Gee *et al*. (2020). The contrast between these two policy approaches illustrates the reciprocal interdependence of policy design and pedagogical practice hypothesized by Graham (2020), who argue that policy is interpreted and reinterpreted at the local level.

Finally, this research and analysis add to a growing body of comparative education research that seeks to describe how education tradition, policy, and national culture shape inclusive practice. The difference in UDL implementation, application of digital technologies, and assessment between flexibility in Spain and the U.S. illustrates how context matters mediate the realization of global inclusion results.

V. CONCLUSIONS

In this case, the study sought to establish the current status of inclusive geometry education in inclusive classrooms in both the United States and Spain. This is supported by the findings outlined below in the four major conclusions:

- Conceptual Appreciation of Accessibility: The conceptual appreciation of accessibility within geometry teaching as a complex construct was enthusiastically received by the teaching community in the UK and Australia. The complex construct surpasses simplistic content by incorporating physical accessibility of materials, cognitive support, social participation, and assessment differentiation. Yet, to what extent this conceptual framework can be applied in practice is diversely dependent upon structural, cultural, and organizational entities.

- Lack of Divergence between Systemic Support and Personal Inspiration to Action: While systemic reform in the form of IEPs, mandate IDEA, and heightened sensitivity of the system to UDL principles makes more systematic accessibility available within the United States, in the case of Spanish education reform, the support is largely dependent on the initiative of the teacher. LOMLOE's framework mentioned inclusion, but its lack of specificity is directly reliant on the inclination of the teacher.

- Universal Barriers: Lack of Training and Curricular Rigidity: The most prominent barrier to education, cited by educators in both nations, is the lack of training on inclusive education in geometry, particularly in respect to individualswith different disabilities such as visual impairment and/or ASD. Moreover, teaching has always remained hampered by rigid curriculum requirements or high stakes testing programs, thus making it difficult to teach in a creative way.

- Critical Role of Culture and School Leaders: It is evident in this study that outstanding results in inclusive geometry instruction were achieved in schools with visible commitment to values of inclusiveness. There is an implication here that while providing lessons with a focus on inclusiveness is in the hands of individual educators, creating results requires collective or at least organizational commitment.

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