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A Case Study of Effective Classroom Assessment Adjustments for a Student with Disability: The Role of Teacher Pedagogical Mobility in Assessment Adjustments

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Abstract: This study investigated how teachers' pedagogical mobility influences classroom assessment adjustments to support mathematics achievement for a student with disability. Structured and semi-structured surveys and artefacts associated with the student's mathematics assessment tasks for two Terms were used. Data were analyzed using qualitative inductive analysis. A scribe, a different place for the examination, and extra time were the adjustments provided for two mathematics assessment tasks. The results showed that in Term 1, the scribe's lack of familiarity with discipline knowledge in terms of mathematics terminology resulted in a low mathematics outcome. However, in Term 2, when the student had access to an appropriately knowledgeable scribe, mathematics achievement improved. The implications of these findings for future research and practice are discussed.

Keywords: biopsychological approach; pedagogical mobility; adjustments; mathematics; access skills; classroom assessment

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1. Introduction

In Australia, approximately 20% of students have been reported to have a disability (e.g., cognitive, physical, social-emotional, sensory), with approximately 19% of students receiving some form of adjustment due to disability to enable them to make progress in the general education curriculum [1]. Adjustments are conceptualized as changes or support efforts that are provided for students with disability to enable them to engage in age-appropriate learning experiences and demonstrate what they have learnt [2]. Adjustments, for example, include additional time to complete learning and assessment tasks, distraction-free space, large-print editions of learning materials and assessments, the provision of a scribe, and technological aids. Generally, there is inconsistency in the terminology to describe changes made in the curriculum, instructions, and assessments, such as differentiation, adjustments, adaptations, accommodations, and modifications [3]. In the current study, the term 'adjustments', an Australian terminology, will be used to refer to the provided changes and services within mainstream schools.

Over the past three decades, instructional and assessment adjustments have been provided at increasing rates in elementary and secondary settings [4]. Here, the focus will be on the assessment of learning (or summative assessment), since it is the basis for discovering whether students have learned. In fact, the basic assessment purposes are identifying student strengths and challenges that they face and addressing the challenges before they become failures [5]. To minimize the impacts of a disability on student performance, teachers need to understand and implement strategies for differentiating teaching and assessment tasks [6]. In Australia, the expectations of teacher knowledge and skill are based on seven professional standards. According to these standards, teachers are expected to (1) 'know students and how they learn'; (2) 'know the content and how to teach it';

(3) 'plan for and implement effective teaching and learning'; (4) 'create and maintain supportive and safe learning environments'; (5) 'assess, provide feedback and report on student learning'; (6) 'engage in professional learning'; and (7) 'engage professionally with colleagues, parents/carers and the community' [6] (p. 4). According to Standard 1, teachers are required to know and understand the 'physical, social and intellectual development and characteristics of students' (p. 10) and use 'strategies to support full participation of students with disability' (p. 11). These features are fully aligned to inclusive education.

Teachers in Australia believe that providing adjustments is a fair way to help students with disability demonstrate their knowledge [7]. However, teachers' ability to make adjustments might be limited due to the reported challenges they face such as inadequate specialized training, experience and pedagogical knowledge, extra workload, and time constraints [8,9]. A lack of provision of optimal adjustments might cause a student with disability to not receive the support they are legally entitled to, and they might be deprived of the quality of education provided to their peers. Therefore, teachers require a sound knowledge of pedagogical positions and the capacity to adjust, adopt, and enact pedagogies with a context-consciousness, which is conceptualized as pedagogical mobility [10] to meet student learning needs.

To make appropriate adjustments, teachers need to learn how to examine assessment tasks in terms of the potential impact of the characteristics of students with disabilities and in terms of students' target and access skills [11,12]. Target knowledge and skills are the target constructs that are intended to be measured by the assessment [11]. Access skills are prerequisite skills needed by students to complete assessment tasks, but are not intended to be measured by the assessment [13]. The characteristics of students' disability that cause impairment in access skills create barriers to the assessment of target skills [11]. When students do not have well-developed access skills, their assessment outcomes may reflect their limitations in that area, rather than their achievement of the target skills being measured. Construct-irrelevant variance is one of main threats to the validity of the assessment of the target construct, occurring when aspects of the assessment that are not intended to be assessed influence students' scores [14]. In the disability context, this means that the effects of student disability are intertwined with the target skills being measured [11]. The provision of adjustments for students with disability, therefore, is intended to minimize the impacts of barriers due to functional impairments in access skills to enable the students to demonstrate their knowledge of target skills during learning and assessment conditions.

Most of the research on assessment adjustments and their impacts on learning outcomes for students with disability has been conducted by researchers in the US, predominantly in the context of standardized external tests and multiple-choice test forms. In such research, it has been argued that an adjustment is valid and enhances the valid interpretation of assessment outcomes when the adjustment provides a greater benefit for students with disability than students without disability, a differential boost hypothesis [15–17]. These studies have focused on the most common adjustments such as extended time, reading aloud (test questions), and the administration of the test in a quiet room. To date, no research study has been found that investigates the effectiveness of a specific type of adjustment, such as the provision of a scribe, on the classroom grades of students with disability in mainstream schools. A scribe is an individual who writes down responses dictated by students with temporary or permanent disability in an examination. Scribes are expected to have a number of abilities and skills such as extensive experience, subject familiarity, legibility, writing speed, and interpersonal skills [18,19].

In this paper, we present the challenges that a teacher faced to provide a student with disability with a scribe in two Terms of the school year (approximately 16 weeks). We then discuss, based on the biopsychosocial approach, how the adjustment made affects the student's mathematics outcomes from the perspectives of the student, as well as their teacher and parent, and from an analysis of the nature of the student's disability and mathematics outcomes. The biopsychosocial approach provides a better understanding

of how the biological and psychological correlates of disability enable teachers to provide educational settings that avoid intensifying difficulties that students may experience and that facilitate their optimal educational participation. In this approach, disability is considered as an activity restriction resulting from the interactions between student disability, health conditions, student-related socioemotional factors, and educational barriers [20]. To investigate how access to classroom assessment adjustments enables a student with disability to undertake assessment tasks on the same basis as students without disabilities, the following research question was addressed: how does the provision of a scribe affect mathematics achievement for a student with disability?

2. Materials and Methods

2.1. Participants

The data presented in this paper are drawn from an Australian project examining the provision of adjustments for secondary school students with disability in classroom assessments. Students in the project were identified by their school as having a disability and were learning in mainstream classrooms, that is, they were studying the same curriculum content as class peers without disability. Ethical approval was obtained from all relevant authorities, with informed consent provided by all participants (student, teacher, parent). The student with disability who is presented as a case study in this paper is Alfie, a 14-year-old Year 9 boy, who attended a high school in a metropolitan region in Queensland. Alfie's teacher was a female aged between 25 to 34 years who held a bachelor's degree and a diploma teaching qualification. She was a full-time teacher who had taught Years 7 to 12 mathematics for two years. The teacher stated she participated in professional learning about Disability Standards for Education (DSE) through a preservice teacher education program. The participating parent was Alfie's mother.

2.2. Data Gathering and Measures

The database consisted of two main components: student assessment data and survey data. The student assessment data included authentic student work samples that were uploaded by the teacher to a virtual research environment [21]. Survey data from the student, parent, and teacher using the surveys developed by the research team were gathered through an online survey platform [22]. The student assessment data used in this study are first described, followed with a description of the survey data.

2.2.1. Student Assessment Data

The teacher provided information on the curriculum content being taught, grading rubrics, the student's completed assessment work in Terms 1 and 2, and grades awarded and comments. The focus of assessment for Alfie was mathematics. The assessment tasks had been endorsed by the Head of Department within the school, in accordance with guidance and resources by the state education authority [23]. The level of approval for the assessment tasks completed by the case study student was, therefore, aligned with and reflected the learning priorities of the education authority and Australian Curriculum. This addresses the core validity issues raised by Tomlinson and Moon [24], which are discussed further in the following.

2.2.2. Survey Data

The three participants (Alfie, his teacher, his mother) completed surveys at the commencement and end of a unit of study, developed by the teacher, as mentioned earlier (approximately six weeks). The surveys included both structured questions with a range of response options, and semi-structured questions with open-ended responses to enable all participants to express their views in their own words. First, they were asked to answer the questions about the nature of the student's disability (e.g., 'Please tell us briefly about your individual needs' (Student Survey); 'Please tell us briefly about your child's disability' (Parent Survey); 'What do you understand is the nature of the student's disability?' (Teacher

Survey)) and the effects of disability on the student's learning process and assessment experiences (e.g., 'how do your individual needs affect your assessment in class?' (Student Survey); 'What factors related to the student's disability do you believe present challenges in assessment?' (Teacher Survey). Furthermore, the teacher was asked to complete a background survey. The survey consisted of sixteen items asking questions about teacher age, gender, educational level, years of teaching, teaching qualification, subject(s) taught, and the number of students in the class. The final self-reflection surveys were used to investigate the student's, his mother's, and his teacher's reflections on the assessment adjustments provided for the mathematics task (e.g., 'How was the assessment adjusted for you?' (Student Survey); 'Do you think this adjustment better allowed your child to demonstrate what he knew or could do?' (Parent Survey); 'What were the positives and negatives of adapting assessment for the students?' (Teacher Survey).

2.3. Data Analysis

This research study was designed as an intrinsic case study [25]. An intrinsic case study is undertaken to gain in-depth understanding of a particular case. To explore the student's mathematics achievement in relation to the adjustments made within the classroom, a four-step structured approach to analysis was used to examine: (1) the extent to which the adjustments addressed the target skills and functional impairments in access skills required to complete the assessment task; (2) the extent to which the adjustments matched the needs identified by the student, parent, and teacher; (3) academic achievement under the adjusted conditions using the case study student's most recent mathematics grades; and (4) the validity of the assessment adjustments in terms of the curriculum content and focus of grading rubrics. The validity of assessment adjustments and grades under the adjusted situation was investigated through three issues [26]: (a) Did the provision of adjustments alter the target skills of assessment? If so, how? (b) Did the provision of adjustments improve the measurement of the student's knowledge? If so, how? (c) Was the student grade from the adjusted assessment comparable to grades of students without disability under unadjusted assessment?

2.4. The Trustworthiness of the Data

The trustworthiness of the data was achieved through (a) data source triangulation and (b) investigator triangulation [27]. Survey data were drawn from three groups of participants, including the student, his mother, and his teacher. The response data were triangulated to develop a more precise description of participants' judgments about the classroom assessment adjustments from multiple perspectives. Investigator triangulation includes at least two researchers to observe the same phenomenon [27]. Stake [27] posited that 'multiple eyes' is one of the important forms of triangulating. The analyses were discussed with the second author to ensure that concepts and ideas were interpreted consistently and key meanings were not overlooked. In the reporting of the findings, structured survey question options selected by participants are indicated by single quotation marks, and verbatim quotations from open-ended survey responses are indicated by double quotation marks.

2.5. Capturing the Student Experience: About Alfie

Alfie, his mother, and his teacher reported that Alfie was diagnosed with "dysgraphia". In the Diagnostic and Statistical Manual of Mental Disorders [28], dysgraphia is a neurological disorder, referred to as a specific learning disorder resulting in impairment in written expression. Individuals with dysgraphia have a prominent impairment in fine motor skills, as well as difficulties producing written forms, which, in turn, can impact the development of handwriting and spelling skills [29]. Difficulty with overall coherence in writing was another problem that Alfie experienced. Alfie's teacher said, "I understand that [Alfie] has difficulty taking the information from his head and writing it on a page in that his process takes longer than usual and can result in incoherent/unclear writing". Alfie believed his

educational performance had been affected "in every way" due to limitations resulting from his disability.

The teacher reported that Alfie had a medical problem, migraine headaches, that had caused him to miss "a lot of his classes". Alfie's teacher reported that she provided Alfie and his mother with "a copy of a unit plan with all of the topics and their relevant chapters and textbook questions for [Alfie] to refer to if he was away". Neither Alfie nor his mother mentioned migraine headaches or absences in their survey responses. The characteristics of the student's disability that have been described by Alfie's teacher are all evidence of dysgraphia, indicating that she had an understanding of his educational needs. In comparison to the more personal description of Alfie's disability provided by Alfie's mother, the teacher provided a more comprehensive representation of the difficulties that the student faced within the classroom. Difficulties in handwriting, spelling, and achieving overall coherence in written activities presented academic barriers to success. Alfie's teacher indicated she had received information about Alfie's disability from his mother, as well as through an email sent to her by the "case manager" of students with disability at the beginning of the school year. A case manager is responsible for ensuring the services in an Education Adjustment Program (EAP) are being provided. The teacher added that the email contained a description of the student's disability, as well as a list of suitable adjustments to be provided.

2.6. Adjustments to the Mathematics Assessment Tasks

The teacher consulted with Alfie and his mother in relation to the adjustments required for the mathematics assessment tasks. To address functional impairments in writing skills, a scribe was used to record the student's responses to the mathematics questions, reported by Alfie, his mother, and his teacher. Furthermore, the teacher stated that Alfie and his scribe were seated in a different place from where other students sat the examination, and extra time was permitted. These additional adjustments were not to address Alfie's disability, but to accommodate the effects for Alfie and for others of the completion of the assessment with a scribe.

The evidence shows that the use of a laptop was inefficient for Alfie, compared with a scribe, in the mathematics examination context. For example, the teacher reported that Alfie had access to a laptop to type his classroom notes and do activities. Alfie's teacher commented "[Alfie]'s notes on the laptop often had many typos, and sometimes his answers and notes were difficult to follow". This is demonstrated by an example of a response that Alfie typed in the student survey. Alfie said, "i has haperd my ablity to compleat in calss assments with out the help form an external sourc". Alfie's sentence shows that he has a well-developed vocabulary, but might be limited in his capacity to communicate his intended meaning in assessment tasks, especially if hand-written, and within specified time limits. In the following, the effectiveness of the provision of a scribe on Alfie's mathematics achievement in Terms 1 and 2 is investigated.

3. Results

3.1. Alfie's Academic Achievement in Term 1

The summative assessment task completed by Alfie in Term 1 addressed the mathematics curriculum area 'Rates, Linear functions & Surface area and Volume'. Alfie, his mother, and his teacher reported that his Term 1 task/target knowledge was not different from the task completed by the rest of the class. The important assessment elements focus on mathematical knowledge and expression, as well as reasoning [24], and not on the quality of handwriting or spelling.

The responses written by the scribe for Alfie for the Term 1 mathematics assessment task are presented in Figure 1. Although the students were asked to 'show all working' on their paper, Alfie's paper shows that the process of solving the problems using formulae was not fully expanded in writing. Alfie achieved a D grade for the Term 1 task. Using the five-point scale provided by the Queensland Curriculum Assessment and Reporting

Framework Standards (A = very high level, B = high level, C = sound level, D = limited level, E = very limited [23]), Alfie's Term 1 outcome implied a limited level of knowledge and understanding of mathematical concepts and procedures.

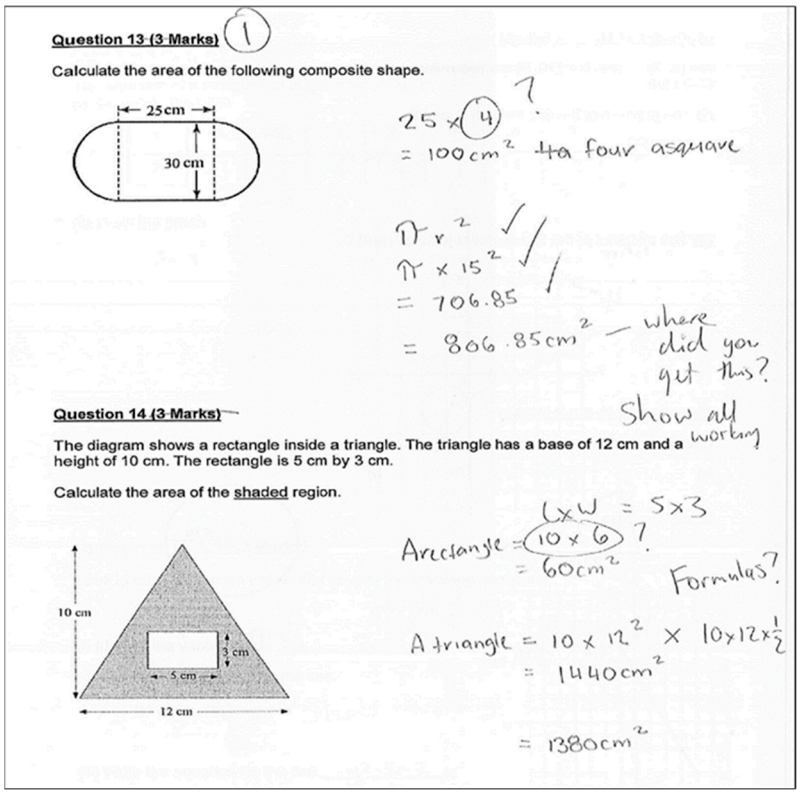

Figure 1. The sample of responses written by the scribe in the mathematics assessment task, Term 1.

3.2. The Perceived Impact of Provision of a Scribe on Academic Achievement in Term 1

In the Term 1 mathematics assessment, as reported by the teacher, Alfie showed the lowest achievement in the class, despite the provision of adjustments. The teacher stated that there was a considerable difference between how she perceived Alfie's "true" ability and his achievement outcome in mathematics. The teacher said that she was very surprised at Alfie's outcome because he grasped new mathematical concepts more quickly than the majority of the class.

Alfie's mother stated that achieving a D in the mathematics assessment task was "very disheartening" for Alfie. She added that in a meeting with the teacher, the teacher had said "[Alfie] understands all the work, puts his hand up in class and answers the questions correctly, and correctly finishes the homework". Following a discussion with Alfie, his mother, and his case manager, the teacher reported that Alfie's scribe for the Term 1 mathematics assessment was a teacher aide who did not have familiarity with mathematical symbols used in the official curriculum. The teacher added that when Alfie verbalized his answers to the scribe, he had to describe symbols explicitly as well. For example, instead of saying theta (θ), Alfie had to say, "draw an oval with a line through the middle". The teacher noted, based on Alfie's and his mother's report, that the same issue had occurred in his humanities class, where a "huge difference" occurred in the nature and extent of Alfie's responses when scribed by a teacher aide without humanities knowledge and those written by the humanities teacher. The observation of Alfie's classroom activities, Alfie's unsatisfactory outcome, and the problems resulting from the scribe's unfamiliarity with mathematics in Term 1 led to a decision for pedagogical mobility. The teacher suggested that Alfie should have access to a teacher aide who is a "former mathematics teacher" as the scribe for the Term 2 assessment; hence, the teacher arranged with the Head of Special Education Services for this teacher aide to be Alfie's scribe.

3.3. Alfie's Academic Achievement in Term 2

The summative assessment task completed by Alfie in Term 2 addressed the mathematics curriculum area 'Algebra; Linear Equations; Similarity'. Alfie undertook the same assessment task that was completed by his peers in class. He achieved an A grade in mathematics for the Term 2 task, showing a very high level of knowledge and understanding of Year 9 mathematics [23]. As shown in Figure 2, Alfie was able to demonstrate a systematic problem-solving approach to analyze the problem and derive the solution for Question 10 of the assessment task when the impairments to access skills were addressed by the provision of a trained scribe.

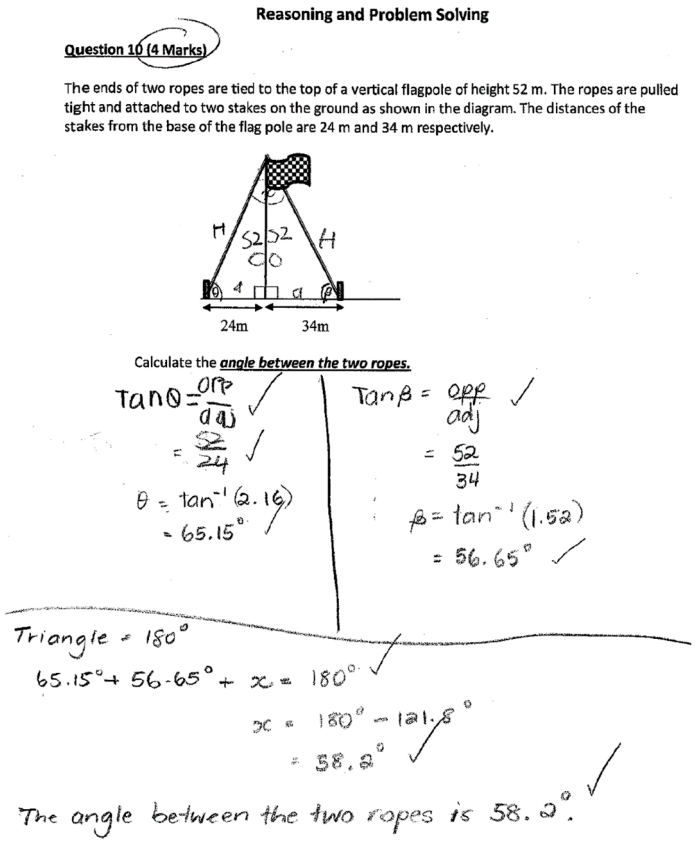

Figure 2. The sample of responses written by the trained scribe in the mathematics assessment task, Term 2.

3.4. The Perceived Impact of Provision of a Scribe on Academic Achievement in Term 2

The available evidence, as discussed by Alfie's teacher, showed that the trained scribe addressed the functional impairments in Alfie's access skills in Term 2 and had positive effects on Alfie's success in mathematics. The teacher noted that when a scribe with mathematical knowledge wrote down what Alfie dictated, Alfie was able to demonstrate his mathematical knowledge and skills, that is, the target knowledge and skills, to a greater degree than in Term 1. The teacher stated that Alfie no longer needed to explain mathematical terms and symbols to his scribe. She remarked that access to the knowledgeable scribe enabled Alfie to concentrate better on the questions and content of the mathematics assessment task. The teacher stated that Alfie told her after the assessment that he felt "very positive" and that it was easier to work with the scribe with mathematical knowledge than his previous scribe. Similarly, Alfie and his mother reported that access to this scribe was an appropriate adjustment that "absolutely" made Alfie able to demonstrate his full potential in mathematics. Overall, Alfie and his mother's survey responses about the type of adjustments made under the mathematics assessment aligned with the adjustments that Alfie's teacher mentioned in her written reports. Furthermore, the available evidence

demonstrated how the pedagogical mobility of the teacher bridged the gap in the student's academic outcomes and positively impacted the student's perception of his capabilities in mathematics. An analysis of access and target skills, the provided adjustments, and Alfie's outcomes of the mathematics assessments in Terms 1 and 2 are presented in Figure 3.

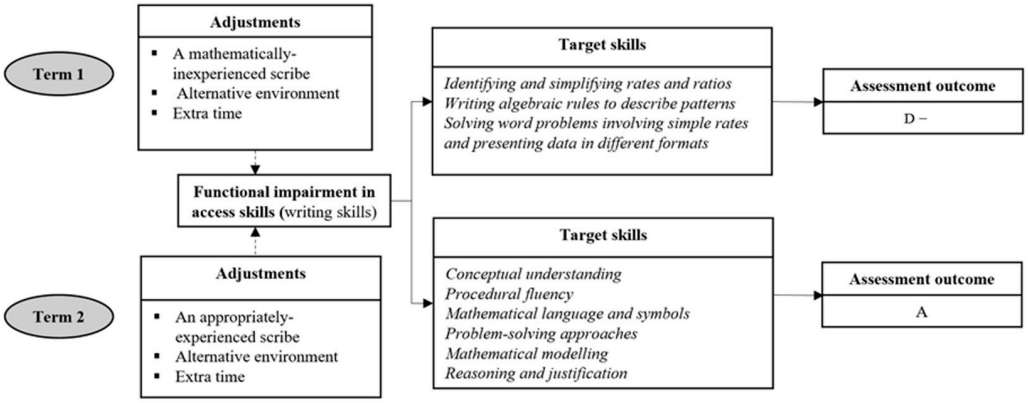

Figure 3. Access and target skills, the adjustments, and final results of mathematics assessments in Terms 1 and 2.

3.5. Validity of Adjustments to the Classroom Assessment

Alfie completed the same assessment tasks as other students. Therefore, the adjustments provided for Alfie did not alter the elements of the target skills that were to be assessed [25], but were implemented to address his difficulties with the access skills in writing responses. The major change to address his access skills was the provision of a scribe. He was also provided with extra time, as dictating takes longer than writing, and completed his assessment in a separate location to avoid distracting other students. For the mathematics assessment task, therefore, the major adjustment, the scribe, was intended to remove barriers relating to access skills, to make the task more accessible to Alfie and, hence, to improve the measurement of his knowledge and abilities [25]. For Alfie, the teacher reported considerable evidence that the final assessment with the appropriately experienced scribe was reflective of Alfie's standard of knowledge. Therefore, the adjustments increased the assessment validity. Though many students may benefit from the adjustment of the provision of extra time, Sireci's third proposition of comparability, the extra time provided to Alfie was required for dictating, not reasoning. The use of the same grading rubric for Alfie's work as for other students, and the focus on objectively scored elements, meant that his grade was comparable with the results for other students [25]. Overall, the provision of the adjustment in the form of an appropriate scribe for Alfie was both necessary and effective in Term 2.

4. Discussion

This study presented the lived experiences of a teacher and student with disability in relation to the adjustments made within the mathematics classroom examinations, and investigated how the pedagogical mobility of the teacher and the provision of a scribe affected the student's mathematics grade. The first finding of this study showed that the student's need for a scribe to undertake the examination was appropriate for the identified impairment in access skills, that is, the hand-written and graphical skills required to write mathematical symbols. However, the teacher's pedagogical mobility identified that the suitability of a scribe, as an appropriate choice of an adjustment, is an essential issue in adjustments for the student with disability. In this study, the scribe's lack of familiarity with mathematics terminology caused what the student dictated to be time-consuming, written incorrectly or out of context. Given that each subject area has its own discipline-based terminology [30], a scribe's unfamiliarity with the special terms being used in an examination could lead to repeated stops, as the scribe required more clarification for the

terms [18]. The use of a scribe has been reported as the most commonly used adjustment in Australia's external standardized testing, National Assessment Program-Literacy and Numeracy (NAPLAN), comprising more than one-third of the adjustments provided for Year 9 students with disability [31]. It is critical, prior to the examination, that a scribe's skills and abilities be checked for the quality of performing the role (Edwards, n.d.), and that a student practices with the appropriate scribe [19]. Thus, it is advisable that the scribe be a retired teacher or former student of the school [19]. Overall, this study showed that the provision of a scribe should be investigated to consider the influence of 'discipline alignment' or fit with the curriculum program in which the scribe is working with the student.

The available evidence of this study showed that the assessment content of the tasks examined was not adjusted, as the student was judged by his teacher, and himself, to have an adequate level of mathematical competence, that is, the target knowledge, to complete the same task as his peers. The second finding of this study indicated that when an appropriately experienced scribe was available, the student was well able to demonstrate the target skills measured in the examination. As a result, allocating a scribe with appropriate experience led to a differential boost in Alfie's grade and increasing the assessment validity [25]. A differential boost implies that the effects of impairment in the student's access skills were not intertwined with the target skills measured in mathematics [11]. Thus, the student's grade on the examination is reflective of the target knowledge [13]. Edwards [18] noted that it was 'preferable' for scribes to have 'reasonable knowledge' of a subject area (p. 14). For Alfie, the mathematical knowledge of the scribe had a significant impact on his demonstration of his target skills and may have had a deleterious effect on his future schooling outcomes and options. A positive relationship has been found between teachers' mathematical knowledge for teaching and student achievement [32,33]. Subject-specific knowledge may not only be important for classroom teachers, but, we would argue, also essential for classroom teacher aides, and especially in assessment conditions. Overall, our study showed that the provision of a mathematically experienced scribe positively affected the student's mathematics grade.

The third finding of this study indicated the role of consultation with the student with disability and parents in the teacher's pedagogical mobility, leading to providing the effective adjustments to classroom assessment. The teacher developed a deep awareness of the student's disability and the impact of an inappropriate scribe on the assessment outcomes through discussing in the counselling sessions. This awareness helped the teacher to change the scribe to be more effective to meet the specific learning needs of the student. Under Australia's legal requirements for provision for students with disability, the Disability Standards for Education [34], education providers are obliged to consult with students with disability and their parents/carers to determine the appropriate adjustments to meet individual student needs in classroom teaching and assessment. The findings of this study show that consultation with a student with disability and their parents about specific learning needs will improve inclusive education provision. In Alfie's case, the use of technology such as a laptop may have been assumed to be a more modern provision of an adjustment for his disability. However, the evidence through consultation was that this would not be effective for assessment and that a scribe was more suitable. Including students and their parents in the decision-making process about adjustments can, therefore, result in two important outcomes: (a) identifying students' functional impairments in access skills more accurately, and (b) determining appropriate adjustments or modifying them to be more effective.

In this study, assessment is viewed as a socio-cognitive process, which results from reciprocal interactions among personal factors (e.g., perception, abilities), one's behavior (e.g., effort, achievement), and social/environmental conditions (e.g., teacher feedback, educational adjustments) [35]. This approach is compatible with the biopsychosocial model of disability [36] that informed this study of assessment adjustments for students with disability. The findings of this case study showed, on the one hand, how the student's

disability, health issues, and their impacts limited the student's ability to access learning and assessment at school (biological domain). On the other hand, removing the access barriers helped the student achieve his full potential in the mathematics assessment task (social domain). Providing appropriate adjustments alongside the academic success resulted in a positive internal feeling for the student (psychological domain). The reverse is also true; for example, the provision of the inappropriate adjustment in Term 1, the scribe's unfamiliarity with mathematics, led to poor achievement outcomes in mathematics, which, in turn, caused the student to be disheartened.

Two limitations were noted in this study. First, the perceptions and understandings about the nature of the students' disability and assessment adjustments were only explored with the students' general classroom teacher, not special education staff in the school. For this case study student, the teacher reported that the basic information regarding the nature of the student's disability and recommended adjustments was provided by a case manager. Second, as previously mentioned, the data informing this study were derived from semi-structured surveys to gain participants' perspectives (student, parent, teacher). The study did not involve direct observation of classroom practice or interviews. Further research involving observation could provide additional validation of actual practices in determining adjustments in assessment in classroom settings [37]. For example, the quality of the communication between a scribe and the student could be carefully investigated through direct observations to ensure that a knowledgeable scribe does not influence the knowledge demonstrated by the student. However, in this case study, Alfie's teacher had identified that his outcomes with the more appropriate scribe matched her observations of his mathematics knowledge and skills in the classroom, but that the results from the mathematically inexperienced scribe did not.

Although the rules relating to scribing (e.g., experience working as a scribe) have been detailed in the protocol of the NAPLAN test administration in Australia [38], there are still barriers to identifying and arranging scribes at the school level. For example, Alfie's teacher reported that although the presence of a scribe could be beneficial for the student, a scribe's availability might not always be possible and raised core practical issues for such assistance. Therefore, further research is needed to investigate factors that would affect the provision and quality of a scribe within learning and assessment contexts.

As the case of Alfie showed, impairment in written expression was not limited to writing words, but it also affected his abilities to sketch diagrams and apply mathematical symbols. The Year 9 achievement standard for mathematics in the Australian Curriculum does not require students to be able to 'write', but to apply mathematical concepts and knowledge. It includes ability to 'sketch', a skill that could be undertaken using technology (www.australiancurriculum.edu.au (accessed on 25 January 2022). There is advice available to assist students with dysgraphia in mathematics in their learning such as the use of large-grip pencils and large-lined paper to help with number formation and alignment, but specific research is absent, especially for more advanced mathematical topics such as trigonometry.

5. Conclusions

A concluding observation from the findings of this study is that it demonstrates that students with disability in mainstream schools are not necessarily low achievers and may be able to demonstrate high levels of academic achievement. There is a need to hold high expectations for all students, as noted in Australian policy. However, there are still barriers to accessing education for students with disability that might negatively affect their academic achievement. This study showed that when an assessment task is accessible, and effective and appropriate adjustments are provided for students with disability, academic achievement outcomes can be valid representations of what a student with disability knows and can do.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Human Research Ethics Committee at Australian Catholic University (HREC: 2018-51H, 2 July 2018).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data are unavailable due to privacy or ethical restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

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