TEACHERS' ATTITUDES/PROFESSIONAL STANDARDS AND MATHEMATICS TEACHING EFFICACY BELIEFS REGARDING STUDENTS WITH INTELLECTUAL DISABILITY

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ABSTRACT

This study investigated the mathematics teaching efficacy beliefs and attitudes/ Professional Standards of 5 teachers towards students with intellectual disability (ID) educated within a special school setting. The Mathematics Teaching Efficacy Beliefs of the teachers was measured using the Mathematics Teaching Efficacy Beliefs Instrument (MTEBI) developed by Enochs, Smith, and Huinker (2000). Questionnaires, constructed in accordance with the Australian Professional Standards for Teachers (AITSL, 2011) were administered to para-professionals to measure teachers' attitudes/Professional Standards. The outcomes of the study showed that while all 5 teachers demonstrated high Outcome Expectancy and Self Efficacy beliefs in their ability to teach mathematics to students with ID, teachers' expectations of their students were found to be low, inconsistent and high for 20%, 40% and another 40% of the teachers respectively.

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INTRODUCTION

Effective teachers are a significant asset in their classrooms and beyond (AITSL, 2011). Teachers' effectiveness encompasses the attitudes, beliefs and expectation held by teachers about learners with intellectual disability (ID) and others with learning difficulty. It also includes the effective utilization of para-professionals in their classrooms, management of lesson transition, knowledge of individual students and their disability diagnoses, knowledge of effective instructional strategies for students with learning difficulties and the individualization of teaching and learning through the modification or accommodation of learning activities. This is known as curriculum differentiation (Robert, S. & Winfried, H. (2012).

Teachers' attitudes towards students with intellectual disability are the singular most important factor that influences the formers' effectiveness in the classroom because beliefs influence behaviour (Swann & Snyder, 1980). This point was supported by Pike, Bradley and Mansfield (1997, p. 125) who acknowledged that "instructional belief system can either nurture or limit the way in which teachers function". Students' mathematics competence is a product of the interconnection between a range of factors that include the teacher and the learning environment. Teachers who exhibit a limiting instructional philosophy are more disposed toward taking a deficit perspective of students with ID. They have low expectations of students with ID, attend their classrooms without essential lesson preparations and planning and without a clear sense of instructional direction. These teachers allocate no time to reflect on their instructional practices, growth or ways to improve the learning of their students. Such teachers are overcome by a sense of powerlessness that is induced by the notion that the problem resides in the child and display "there is nothing I can do" attitude. Teachers with a nurturing philosophy of students with intellectual disability approach students with ID with a positive attitude, believing they can make a difference to their learning of numeracy regardless of the disability and learning challenges of the students. They understand the terms intellectual disability and learning disability are social constructions that depend on the complex relationship between the learning environment, learning activity and people (Dudley-Marling, 2004) of which the teacher is a major player. They accept their responsibility as instructional leaders and a catalyst for the enhancement of students' learning in their classrooms. As a result, they differentiate the curriculum, modify or accommodate learning programs according to the individual needs of their students and employ evidence-based instructional strategies. These teachers provide learning activities that are relevant, rigorous and meaningful but within the ability level of individual students. They constantly

monitor the progress of their student learning, undertake critical reflection on their practice constantly and seek as well as embrace opportunities for their own professional growth.

When applied to mathematics education, Hogg and Vaughan's (2011) definition of attitude very well extends to self-efficacy beliefs and particularly in recognition of Bandura's acknowledgement that "self efficacy beliefs determine how people feel, think, motivate themselves, and behave" (1994, p. 1). While self-efficacy beliefs refer to individuals' capability to mobilise and carry out the needed courses of action to bring about desired outcomes (Bandura, 1997; Pampaka, Kleanthous, Hutcheson & Wake, 2011), mathematics self-efficacy has been defined as people's confidence in their ability to carry out and achieve in a particular mathematics task or problem within a given context (Hackett & Betz, 1989). It has been observed that teachers' perceptions, attitudes and expectations of students are often influenced by whether the label "disability" is attached to their names or not (Gutshall, 2013; Cook, 2001; Rolison & Medway, 1985; Dusek & Joseph, 1983; Levin, Arluke & Smith, 1982). Teachers learning expectations have been found to be lower for those with labels than non-labelled students and particularly for those diagnosed or described as having intellectual disability (Foster, Ysseldyke, & Reese, 1975). For this reason, Shifrer (2013) expressed his disapproval of special education placements because of the vulnerability of students with disability to prejudicial attitudes and negative treatments which undermine the attainment of improved educational outcomes. For special schools with intellectual disability the main eligibility and funding criterion is a diagnosis of intellectual disability. In other words, the majority of students in such schools wear the label of intellectual disability.

Previous studies and publications on self efficacy beliefs have been undertaken across a wide spread of disciplines and participants including university undergraduates (Bates, Latham & Kim, 2011), university graduates (DeChenne, Enoch & Needham, 2012); people accessing correctional facilities (Allred, Harrison & O'Connell, 2013), mainstream high school students (O'Brien, Martinez-Pons & Kopala 1999), mainstream elementary school students (Joet, Bressoux & Usher, 2011) and parent (Usher & Pajares, 2009), To the best of the first author's knowledge, no study on teachers' attitudes and Mathematics Teaching Efficacy Beliefs of teachers towards students with intellectual disability that are educated in special school settings has been undertaken. This study is aimed at partly filling the gap and the authors are of the opinion that such a study is important to achieving improvement and the quality of mathematics education of people with disability and particularly students with intellectual disability.

GOALS OF THE STUDY

The primary aim of this study was to improve the quality of mathematics education for students with intellectual disability by:

1. Gaining an understanding of teachers' mathematics teaching efficacy beliefs toward students with ID and particularly within a special school setting.
2. Ascertaining the attitude and expectation of teachers toward students with intellectual disability.
3. Assessing the degree to which teachers' expectations influence their practice in the classroom.

METHOD

PARTICIPANTS

The mathematics teaching efficacy beliefs and attitudes/ Professional Standards of 5 teachers from a specialist school for students with intellectual disability, situated in regional Australia were investigated in this study. Twelve education assistants from the same school assisted in the data collection process. Of the 5 teachers, one had a Master Degree in Learning Difficulty, two had first degrees in Special Education while the remaining two had their first degrees in general education. Teaching experience among the teachers range from 3 to 30 years in mainstream education and 17 months to 30 months in a special education setting. Of the 12 education assistants, 2 were qualified teachers with first degrees in education, 5 had Certificate IV Special Needs and the remaining 5 were high school graduates. They boasted experience ranging from 16 months to 15 years in an education support facility and 3.5 years to 18 years in a mainstream school setting.

INSTRUMENTATION

Enochs, Smith and Huinker (2000) constructed the Mathematics Teaching Efficacy Beliefs Instrument (MTEBI) for teachers. The instrument was used in this study with permission. MTEBI has a total of 21 items of which thirteen measured the confidence of teachers in their ability to teach mathematics

(Personal Mathematics Teaching Efficacy – PMTE) while eight items measured the strength of the belief that teachers' effective teaching is an influential factor to student learning (Mathematics Teaching Outcome Expectancy – MTOE). Each item was rated along five response categories including, strongly agree (weighted 5), agree (weighted 4), uncertain (weighted 3), disagree (weighted 2) and strongly disagree (weighted 1). A high total score (obtained from adding individual item scores) on the MTEBI and each of the two subdivisions (PMTE and MTOE) demonstrates a higher level of perceived teaching efficacy. Scoring of MTEBI was carried out as recommended by Enochs, Smith and Huinker (2000). The MTEBI was administered twice – 6 months apart. Likert-scale items and some open-ended qualitative items in the form of questionnaires were used also used in this study to collect data.

PROCEDURE

Questionnaires were administered to the para-professionals. The questionnaires were designed in line with the National Professional Standards for Teachers (AITSL, 2011) covering the 3 broad domains of professional knowledge, professional practice and professional engagement. The 46-item questionnaire addressed the 7 standards identified by the Australian Institute for Teaching and School Leadership (2011) including (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. Teachers' knowledge of the content of their lessons and how to teach them were evaluated using eight items including teachers' (i) enthusiasm, (ii) effectiveness in teaching students with intellectual disability, (iii) organisation of content into coherent, well sequenced teaching and learning, (iv) holding of weekly meetings with education assistants, (v) having high expectation of students, (vi) having a sound knowledge of the contents of lessons, (vii) commitment to teaching, and (viii) taking ownership of their classrooms.

RESULTS & DISCUSSION

MTEBI

Data obtained as a result of the administration of MTEBI to teachers at the beginning of the school year before commencement of mathematics instruction were relatively high for both Mathematics Teaching Outcome Expectancy (MTOE) and Personal Mathematics Teaching Efficacy (PMTE) (Tables 2 and 3). The results of MTEBI after six months of instruction were both similar to those obtained during the pre-intervention phase of the study (Tables 2 and 3). When all MTEBI results are considered alongside the results of the Professional Standards for teachers assessment, it suggests that while teachers are confident about their ability to teach mathematics to students with ID, the teachers will benefit from the provision of professional learning aimed at supporting them with the individualisation of learning programs for students with intellectual disability and particularly those with high needs.

QUESTIONNAIRES - PROFESSIONAL STANDARDS OF THE TEACHERS

Of the 5 teachers, one (Teacher J) was found to be an exemplary teacher who modified and accommodated the learning programs according to the learning needs of students and the limitations imposed on them by their disability. The teacher responded to the individual characteristics of the students in planning, instruction and assessment. The learning activities provided were often very engaging and students participated actively in every learning activity. For the 3 other teachers, their performance ranged from average to good across the various elements of the Professional Standard for Teachers. The performance of Teacher K was rated as poor and incompetent. For this teacher, no good planning, instruction or assessment ever occurred. Learning activities were never differentiated according to the individual needs of students. All students including the high functioning students, the average and the high needs students were treated the same way in all the three domains of teaching including professional knowledge, professional practice and professional engagement.

Table 2: MTEBI - Comparing the Mathematics Teaching Outcome Expectancy (MTOE) subscale scores of the 5 teachers prior and post intervention

	Outcome Expectancy Items	***TG**		***TH**		***TI**		***TJ**		***TK**	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	When a student does better than usual in Mathematics, it is often because the teacher exerted a little extra effort.	5	4	4	4	4	4	4	4	3	4
4	When the mathematics grades of students improve, it is often due to their teacher having found a more effective teaching approach.	4	4	3	4	4	3	4	5	5	3
7	If students are underachieving in mathematics, it is most likely due to ineffective mathematics teaching.	1	2	2	4	3	2	4	4	3	3
9	The inadequacy of a student‘s mathematics background can be overcome by good teaching.	4	3	4	4	3	3	4	4	4	4
10	When a low-achieving child progresses in mathematics, it is usually due to extra attention given by the teacher.	4	4	4	4	4	3	4	4	3	3
12	The teacher is generally responsible for the achievement of students in mathematics.	4	4	2	4	2	4	4	4	3	4
13	Students’ achievement in mathematics is directly related to their teacher’s effectiveness in mathematics teaching.	4	4	3	4	3	3	4	4	4	4
14	If parents comment that their child is showing more interest in mathematics at school, it is probably due to the performance of the child’s teacher.	4	5	3	3	4	3	4	5	2	2
	Total scores	**30/40**	**30/40**	**25/40**	**31/40**	**25/40**	**25/40**	**32/40**	**34/40**	**27/40**	**27/40**

** ‘Teacher G’, ‘Teacher H’, ‘Teacher I’, ‘Teacher J’ and ‘Teacher K’.*

Table 3: MTEBI – Comparing the Personal Mathematics Teaching Efficacy (PMTE) subscale scores of the 5 teachers prior and post intervention

	Personal Mathematics Teaching Efficacy Items	***TG**		***TH**		***TI**		***TJ**		***TK**	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
2	I will continually find better ways to teach mathematics.	5	4	5	5	5	4	4	4	4	4
3	Even if I try very hard, I do not teach mathematics as well as I do most subjects.	4	4	4	4	4	3	4	5	3	4
5	I know the steps necessary to teach mathematics concepts effectively.	3	4	4	3	4	4	4	5	4	4
6	I am not very effective in monitoring mathematics activities.	4	4	4	4	3	3	4	5	4	4
8	I generally teach mathematics ineffectively.	4	4	4	4	4	4	4	5	4	4
11.	I understand mathematics concepts well enough to be effective in teaching mathematics.	4	4	4	4	4	4	4	4	4	4
15.	I find it difficult to use manipulatives to explain to students why mathematics works.	4	3	5	4	4	4	4	4	3	3
16.	I am typically able to answer students' mathematics questions.	4	4	1	4	4	4	4	4	5	5
17.	I wonder if I have the necessary skills to teach mathematics.	4	4	4	3	3	2	5	5	4	4
18.	Given a choice, I would not invite the principal to evaluate my mathematics teaching.	3	4	3	5	5	4	4	4	3	3
19.	When a student has difficulty understanding a mathematics concept, I am usually at a loss as to how to help the student understand it better.	4	4	4	1	4	4	4	5	4	4
20	When teaching mathematics, I usually welcome student questions	4	4	5	5	5	4	4	4	5	5
21	I do not know what to do to turn students on to mathematics	4	4	4	5	3	4	4	5	3	4
	Total scores	**51/65**	**51/65**	**51/65**	**51/65**	**52/65**	**48/65**	**53/65**	**59/65**	**50/65**	**52/65**

** 'Teacher G', 'Teacher H', 'Teacher I', 'Teacher J' and 'Teacher K'.*

The five teachers performed in similar fashion as described above. It emerged from the study that regardless of qualification and previous experience, generally, differentiation of the curriculum was a problem among the teachers save for Teacher J. For this teacher, she was outstanding and catered for the ability levels of her students as described below by an education assistant:

> 'Teacher has got class into good shape. The class runs very smoothly. It is a great class to be involved in. Teacher is a joy to work with. Even though teacher is a graduate teacher, teacher endeavours to understand students and their needs. Teacher is always open to suggestions from the Education Assistants and implements Individual Behaviour Plans and tweaks them if necessary when needed. This goes for lesson plans also. In prior years, I have worked with qualified teachers who did not cater for the needs of our students. This has been very frustrating. It has been refreshing to work with a teacher who does care. Teacher will excel in the job if teacher maintains the same enthusiasm throughout career'.

While 60% of the teachers were 'good with more functional students' the high needs students were particularly disadvantaged by 80% of the teachers as noted by the majority of the para-professionals:

> 'Teacher provides the same work to all students with no modification for high needs students'
>
> 'The worksheets are not individualised to suit the various abilities of students'
>
> 'Assistants run all programs for high needs students'
>
> 'Most of the time high needs students are not catered for. All work presented to the students is identical'
>
> 'Teacher has neglected high needs students by not having specific planning for them. Some lessons are not appropriate for high needs students'

CONCLUSION

This study has demonstrated that while teachers are confident about their ability to teach mathematics to students with ID, the teachers will benefit from the provision of regular professional learning opportunities aimed at supporting them with the individualisation of learning programs for students with intellectual disability and particularly for students with high needs. To address the non-availability of relief teachers in regional and remote schools, schools need to seek and employ technological tools such as *webinar*, *Microsoft Lync* and others to enhance their capacity to support staff and enhance the learning of students with ID and other learning needs.

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