
SCHOOL ADMINISTRATORS' BELIEFS THAT SCHOOL IMPROVEMENTS WERE DUE TO FORMAL SCHOOL REGISTRATION GUTTMAN SCALES & THEIR INTER-CORRELATIONS

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Abstract

This paper presents an investigation into the attitudes of School Administrators to the relationship between formal school registration and school improvement. It concerns a mandatory inspection-type registration process for all Non-Government Schools in Western Australia. Part of the aim of this registration process was to help schools improve twelve educational and administrative aspects. These were: (1) School Governance, (2) School Financial Viability, (3) Enrolments & Attendance, (4) Number of Students, (5) Instructional Time, (6) School Staff, (7) School Infrastructure, (8) School Curriculum, (9) Student Learning Outcomes, (10) Care for Students, (11) Disputes and Complaints, (12) Legal Compliance. A questionnaire based on these twelve aspects was designed with five items per aspect (60 items total), conceptually ordered from easy to hard, and given to 110 administrators. It was completed by 65 administrators for a useable, response rate of 59%. The data were analysed to create twelve Guttman Scales. In a Guttman Scale the items are aligned from easy to hard horizontally and the person scores ae arranged vertically from high (top) to low (bottom) by items. If the data were to fit a Guttman pattern accurately, then the pattern of person responses for each item would be in a perfect step-type arrangement. If a person scores high on the hardest item, then that person scores high on all the other easier items. If a person scores low on the easiest item, then that person will score low on all the other harder items. In a practical situation, as was the case for these twelve Guttman Scales, the response patterns were not in perfect step-type arrangement, but they were all very acceptable. The response patterns fit a Guttman pattern, giving strong evidence for a unidimensional scale. The twelve Guttman Scale scores were then used to calculate 66 zero-order, effectively different inter-correlations (Pearson Product-Moment Correlations) between and amongst the twelve aspects of formal registration. The results showed that there were items that administrators said were relatively easy to say that actual school improvements were due to formal registration and other items that administrators said were very hard to say that actual school improvements were due to formal registration. This study produced new Guttman Scales and many interesting correlations for a key aspect of school improvement. It provides new insight into the policy and practice of school registration.

INTRODUCTION

In 2004, the Government of Western Australia introduced an inspection-type registration process for Non-Government (Independent) Schools, fulfilling the legislative requirement of a new School Education Act 1999 (Act, Part 4). The government claimed that it would ensure a high quality education for all students in Western Australian, including those students enrolled in Independent Schools (Barnett, 1997). Registration panels were formed to review the registration of independent schools. However, six years later, questions have arisen regarding this school registration process, no one knows whether or not this school registration process is actually helping schools, or even if school administrations believe that it has helped make improvements at their schools (Constable, 2010). There are no published research data from Western Australia in relation to this issue and the Registration Authority in Western Australia has not authorised any research on it. In response to this situation, the present study investigated the attitudes of School Administrators at Non-Government (Independent) Schools in Western Australia to the relationship between formal school registration and school improvement. It considered those attitudes to the following twelve criteria or aspects of school registration: (1) Governance; (2) Financial Viability; (3) Enrolment and Attendance; (4) Number of Students; (5) Time Available for Instruction; (6) Staff; (7) School Infrastructure; (8) Curriculum; (9) Student Learning Outcomes; (10) Levels of Care; (11) Management of Disputes and Complaints; and (12) School Compliance with Written Laws. It further placed these attitudes to the twelve aspects within the context of seven independent variables (gender, school size, school type, school location, qualification, age and seniority).

The Education System in Western Australia

Education in Western Australia is controlled by the Minister of Education, who is a member of the Government of Western Australia, via the Department of Education, which supervises state or public education and the Department of Education Services, which supervises all non-government education. Schooling is divided into three sections, starting with primary education (primary schools), followed by secondary education (secondary schools or secondary colleges) and tertiary education (Universities and Technical and Further Education Colleges).

Primary education usually begins with two preparatory years, commonly known as the 'kindergarten' and 'pre-primary' years of schooling. These school years serve as an introduction to schooling. Formal learning in primary schools begins in Year One and concludes in Year Seven. (*Late 2011, the WA Minister of Education announced that starting in 2013, year seven would no longer be considered to be part of a student's primary education.)* (Constable, 2011). Secondary education consists of Years Eight to Twelve. Most secondary schools are generally separate institutions to primary schools. There are five universities in Western Australia; Edith Cowan University, Murdoch University, Curtin University, the University of Notre Dame and the University of Western Australia. The University of Notre Dame is the state's only private university (DES, 2010).

Education is compulsory in Western Australia for all children between the ages of six and seventeen. The enrolment of five year olds in pre-primary education is voluntary. *(Late 2011, the Minister of Education announced that beginning 2013, pre-primary education will be compulsory for all five year olds.)* (Constable, 2011) The normal school year for primary and secondary schools is divided into four - ten week school terms, which run from late January until mid-December. A standard week of schooling totals approximately twenty five hours of instructional time. Students enrolled in University or Technical Colleges begin their school year in mid-February and finish in mid-November. Students seeking admission into a university are required to sit a Tertiary Entrance Exam during their twelfth year of schooling. The result of that exam is used to determine a student's Tertiary Entrance Rank and Tertiary Entrance Score, which may determine a student's eligibility for tertiary study. Students having higher level Technical College certificates or/and mature aged students can also at times, depending on previous experiences, gain access to some university programs.

Sector Schools in Western Australia

Western Australia's education system includes government (public) and non-government (private) sector schools, also known as independent schools. In Western Australia there are about just under 800 government schools and approximately 300 independent schools ranging anywhere from a small community based school to large urban secondary schools and colleges. Approximately 66 per cent of students attend government schools and 34 per cent attend independent schools (Department of Education Services, 2010). Within the independent school sector there are Catholic schools run by the Catholic Education Office, (approx. 18%) and independent schools (approx.16%) which are operated by School Councils that may adhere to certain religious beliefs , such as Protestant, Jewish, Islamic or non-denominational schools and secular educational philosophies such as Montessori or Steiner (Association of Independent Schools of Western Australia, www.ais.wa.edu.au, 2010).

The School Education Act 1999, which governs all aspects of education in West Australia, including the policies and procedures for the registration of non-government schools, recognises a division between non-government schools that belong to a group of registered schools, such the Catholic Education Commission, *(known as 'system schools', see the School Education Act 1999, Part 4)* and those schools that do not belong to a recognised group of schools. Most 'non-system' schools are members of the Association of Independent Schools of Western Australia. This incorporated body advises the Government of Western Australia on non-government school matters and administers the State and Commonwealth funding to non-government schools. The registration of non-government schools, in accordance with the School Education Act 1999 and School Education Regulations 2000, is intended to ensure that all schools meet minimum acceptable education standards (DES, 2010).

The Process of School Registration

The process of school registration for non-government schools in Western Australia concerns the following seven audit and reporting requirements (DES, 2010):

1. The governing body of the school applying for registration or renewal of registration must submit documentary evidence in the school registration application form;
2. The Western Australia Department of Education Services contracts a panel of consultants to conduct the registration or renewal of registration process;
3. The selected panel completes a desktop audit of the documents provided by the school against the assessment criteria;
4. Evidence assessed through the desktop audit is complemented by observations made during a school visit;
5. The panel analyses the information gathered in relation to the aspects or criteria to make an on-balance judgement on whether the school complies with each of the legislated registration requirements;
6. A report is prepared for the Minister of Education by the panel. It includes recommendations to the Minister about the degree to which the school meets the legislated registration requirements and about the period for future registration; and
7. The Minister of Education considers the report and, if satisfied, the school meets the registration requirements issues a Certificate of Registration.

Research Questions

There are at least two main educational questions which are connected to school improvement through registration with the present study. The first question is: Do School Administrators believe that the school registration process leads to school improvements? And, the second question is: Which aspects of the school registration process lead to school improvements in their opinion? To answer this question, the following sub-questions were posed and these guide the development of 12 questionnaires, the data collection and data analysis.

1. Can a unidimensional scale be constructed using a Guttman Scale Measurement to analyse the attitudes of School Administrators concerning twelve aspects of school registration in relations to the standard of education for students enrolled in non-government schools. These aspects are: (1) governance; (2) financial viability; (3) enrolment and attendance; (4) number of students; (5) time available for instruction; (6) staff; (7) school infrastructure; (8) curriculum; (9) student learning outcomes; (10) levels of care; (11) disputes and complaints; (12) and compliance with written laws.
2. What school improvements are considered to be easy due to the formal school registration process?
3. What school improvements are considered to be hard due to the formal school registration process?
4. What attitudes do school leaders have regarding school improvement and formal school registration that are not addressed by the twelve formal registration criteria?

Significance of this Study

This study is significant for three main reasons: (1) The re-registration of non-government schools in Western Australia is new and little information about its acceptance in the school communities of Western Australia is available; (2) The re-registration process for non-government schools may need some 'fine-tuning' since it has not been reviewed since implementation; and (3) an 'off-shoot' from the research is the development of a Guttman Scale measure relating to the 12 aspects of school registration which has not been created before and which may help other researchers in other Australian states.

Limitations of this Study

There are number of limitations to this study. First, this study is restricted to those school leaders in schools that are members of the Association of Independent Schools in Western Australia. The study ignores systemic independents schools, e.g. the Catholic School Sector. Second, the study does not include the attitudes of several educational stakeholders, such as classroom teachers, students and parents or guardians. The study suggests that school leaders are arguably the key decision-makers in schools (La Pointe, 2006). Lastly the study acknowledges the dynamic nature of school improvement and the changing perceptions of school leaders. School improvement takes time and the attitudes of school leaders are subject to change.

Data Collection

The study data were collected between 19th March 2011 and the 30th November 2011. There were potentially available 150 non-government member schools of the Association of Independent Schools in Western Australia. One hundred and ten school leaders, constituting approximately 72% of the independent schools, actually completed a questionnaire of administrators' beliefs. Of the 110 participants, only 65 (approximately 59%) completed all twelve parts of the questionnaire and, of those 65, only 60 completed all 120 questions. This left completed data for 60 school administrators based on 60 questions for Actual Beliefs and 60 school administrators for 60 questions based on questions for Expected Beliefs.

Methodology

The study data were analysed with the use of a Guttman Scale measurement. In a Guttman Scale the items are aligned from easy to hard horizontally and the person scores are arranged vertically from high (top) to low (bottom) by items. If the data were to fit a Guttman pattern accurately, then the pattern of person responses for each item would be in a perfect step-type arrangement. If a person scores high on the hardest item, then that person scores high on all the other easier items. If a person scores low on the easiest item, then that person will score low on all the other harder items. In a practical situation, as was the case for these twelve Guttman Scales, the response patterns were not in perfect step-type arrangement, but they were all very acceptable. When the response patterns fit a Guttman pattern, then this is strong evidence for a unidimensional scale (see Fabrigar & MacGregor,

2007). In Guttman Scales, the total score is non-linear (although the scores are ordered) and are used as the person measure of the variable. This is because equal differences between different total scores on the Guttman Scales do not represent equal amounts of the variable being measured. There were twelve Guttman Scales resulting in 144 (12 x 12) correlations or 66 (12 x 11/2) effectively different correlations.

The twelve Guttman Scale scores were then used to calculate 66 zero-order, inter-correlations (Pearson Product-Moment Correlations) between and amongst the twelve aspects of formal registration. The inter-correlations are presented in five groups (see Tables 7.3, 7.4,7.5,7.6 and 7.8)). Technically, Pearson-Moment correlations are only computed between linear measures but, for the purposed used here, the Guttman Scales can be treated as though they are linear scales without any serious misinterpretation for the correlations.

Guttman Scales for Actual Improvements

For the Guttman Scales, the response categories were scored as follows: there was no improvement due to school registration (scored 1); improvement was not due to school registration (scored 2); there was some improvement due to school registration (scored 3); and there was significant improvement due to school registration (scored 4). The Guttman Scale for School Governance is given in Table 7.1 and that for Disputes and Complaints in Table 7.2.

The items for School Governance, in order of difficulty from easy to hard, are:
Item 10 (**easiest**), The School Council's understanding of the distinction between governance and management improved due to formal school registration;
Item 2, The actual efficiency of School Council meetings improved due to formal school registration;
Item 8, The actual expertise and skills of the School Council members improved due to formal school registration;
Item 4, The actual School Council's appointment and review of management staff improved due to formal school registration; and
Item 6 (**hardest**), The Actual School Council's community and public relations improved due to formal school registration (item 6).

Table 7.1
Guttman Scale Scores – School Governance (N=73)

	Easiest Item				Hardest Item	
	Item 10	Item 2	Item 8	Item 4	Item 6	
Name ID	easiest				hardest	total score
21	4	4	4	3	3	18
1	4	3	3	4	3	17
56	4	4	3	3	3	17
91	4	4	4	3	2	17
99	4	3	3	3	3	16
101	4	3	2	4	3	16
80	3	2	4	3	3	15
86	3	3	3	3	3	15
100	4	4	2	3	2	15
65	3	3	3	4	1	14
62	3	3	1	3	3	13
76	4	3	2	2	2	13
83	3	3	2	3	2	13
85	3	3	3	1	3	13
4	2	3	3	1	3	12
75	3	2	3	2	2	12
87	2	3	2	2	3	12
9	2	3	1	3	2	11
26	1	3	3	1	3	11
29	3	2	2	2	2	11
90	3	2	3	1	2	11
2	2	2	2	2	2	10
12	2	2	2	2	2	10
60	3	1	4	1	1	10
68	2	3	3	1	1	10
74	2	3	3	1	1	10
78	3	1	4	1	1	10
88	2	2	2	2	2	10
96	3	3	2	1	1	10
7	2	2	1	2	2	9
34	2	2	1	2	2	9
36	3	1	1	3	1	9
44	3	2	2	1	1	9
51	3	2	1	2	1	9
52	3	2	2	1	1	9
66	1	3	1	3	1	9
81	2	2	1	2	2	9
89	3	1	3	1	1	9
92	1	3	1	1	3	9
93	2	1	3	2	1	9
97	1	2	2	2	2	9
23	3	1	1	2	1	8
38	2	3	1	1	1	8
59	1	2	3	1	1	8
10	3	1	1	1	1	7
42	1	1	1	3	1	7
49	3	1	1	1	1	7
50	3	1	1	1	1	7
54	2	1	1	1	2	7
57	3	1	1	1	1	7
67	1	1	1	2	2	7
95	1	1	3	1	1	7
102	2	1	1	2	1	7
3	2	1	1	1	1	6
84	1	1	1	1	2	6
103	1	1	1	2	1	6
5	1	1	1	1	1	5
6	1	1	1	1	1	5
8	1	1	1	1	1	5
11	1	1	1	1	1	5
19	1	1	1	1	1	5
25	1	1	1	1	1	5
27	1	1	1	1	1	5
28	1	1	1	1	1	5
43	1	1	1	1	1	5
53	1	1	1	1	1	5
55	1	1	1	1	1	5
58	1	1	1	1	1	5
73	1	1	1	1	1	5
82	1	1	1	1	1	5
94	1	1	1	1	1	5
98	1	1	1	1	1	5
104	1	1	1	1	1	5
	157	138	133	125	117	

Table 7.2
Guttman Scale Scores – Disputes and Complaints (N=65)

Name ID	Item 104	Item 106	Item 108	Item 110	Item 102	
	easiest				hardest	total score
1	3	4	3	3	3	16
92	3	2	3	3	3	14
56	3	3	3	3	1	13
85	3	2	3	3	2	13
99	2	4	3	1	3	13
4	3	3	2	3	1	12
101	3	3	3	1	2	12
103	3	2	3	2	2	12
42	3	2	2	2	2	11
88	3	2	2	2	2	11
90	2	3	2	2	2	11
91	3	2	2	2	2	11
11	4	3	1	1	1	10
54	2	2	2	2	2	10
55	2	2	2	2	2	10
59	2	2	2	2	2	10
68	4	3	1	1	1	10
74	2	2	2	2	2	10
75	2	2	2	3	1	10
76	2	2	2	2	2	10
80	2	2	2	2	2	10
87	2	2	2	2	2	10
89	4	3	1	1	1	10
100	3	2	2	1	2	10
29	3	3	1	1	1	9
60	3	3	1	1	1	9
81	3	1	2	1	2	9
95	3	3	1	1	1	9
97	3	1	2	2	1	9
51	1	2	1	2	2	8
66	2	1	2	2	1	8
102	3	1	1	2	1	8
7	2	2	1	1	1	7
9	3	1	1	1	1	7
10	3	1	1	1	1	7
25	3	1	1	1	1	7
50	3	1	1	1	1	7
57	2	2	1	1	1	7
65	2	2	1	1	1	7
73	1	1	2	2	1	7
93	3	1	1	1	1	7
96	1	3	1	1	1	7
98	3	1	1	1	1	7
2	2	1	1	1	1	6
83	1	2	1	1	1	6
3	1	1	1	1	1	5
5	1	1	1	1	1	5
6	1	1	1	1	1	5
8	1	1	1	1	1	5
23	1	1	1	1	1	5
26	1	1	1	1	1	5
27	1	1	1	1	1	5
28	1	1	1	1	1	5
36	1	1	1	1	1	5
44	1	1	1	1	1	5
49	1	1	1	1	1	5
58	1	1	1	1	1	5
62	1	1	1	1	1	5
67	1	1	1	1	1	5
78	1	1	1	1	1	5
82	1	1	1	1	1	5
84	1	1	1	1	1	5
86	1	1	1	1	1	5
94	1	1	1	1	1	5
104	1	1	1	1	1	5
	135	113	97	94	88	

In a previous data analysis, "School Administrators' Beliefs That Actual School Improvements Were Due To Formal School Registration: A Rasch Measurement', items 2 and 4 did not fit the Rasch Measurement Model and were deleted from that analysis, but they are included in the Guttman Scale for School Governance (see Table 7.1). In the Rasch Scale, items 8 and 10 were found to be in the easy block of items and item 6 was found to be in the hard block of items and this is consistent with

the Guttman Scale item difficulty order for School Governance in Table 7.1. However, the Rasch analysis creates a linear scale and shows how much harder, for example, is item 6 than the other items whereas the Guttman scale is non-linear and doesn't say how much harder is item 6 – it just says that it is harder than the other items in that scale.

The Guttman Scale for Disputes and Complaints is given in Table 7.2. The items, in order of difficulty from easy to hard, are:
Item 104 (**easiest**), The actual school's disputes and complaints registered at school improved due to formal school registration;
Item 106, The school's actual commitment to the principles of procedural fairness improved due to formal school registration;
Item 8, Actual parental satisfaction with the school's disputes and complaints procedures improved due to formal school registration;
Item 110, The actual school's public relations on matters dealing with disputes and complaints improved due to formal school registration; and
Item 6 (**hardest**), There was an actual reduction in complaints registered at school improved due to formal school registration.

The order of these items in the Guttman Scale for Disputes and Complaints can be compared to that in the previously Rasch-Created Scale. Items 104 and 106 were found to be in the easy block of items from the Rasch Scale and items 108, 110 and 102 were found to be in the hard block of items from the Rasch Scale, and this is consistent with the difficulties in the Guttman Scale. The only difference between the Rasch and Guttman Scale item difficulty order is that items 108 and 110 are reversed, although they are very nearly the same difficulty in the Rasch measure. The Rasch analysis creates a linear scale and shows how much harder is item 102, for example, than the other items, whereas the Guttman scale is non-linear and doesn't say how much harder is item 102 than the other items – just that it is harder than all the other items in that scale.

Zero-Order Inter-Correlations

The zero-order inter-correlations between and amongst the first six registration aspects, based on the Guttman Scales, are given in Table 7.3.

Moderately high positive correlations were found between:
1. Actual Improvements in School Governance Due to Formal School Registration and Actual Improvements in School Staff Matters Due to Formal School Registration (r=+0.749, representing 56% common variance); and
2. Actual Improvements in School Governance Due to Formal School Registration and Actual Improvements in School Financial Viability Due to Formal School Registration (r=+0.658, representing 43% common variance); and
3. Actual Improvements in School Enrolment & Attendance due to Formal School registration and Actual Improvements in the Number of Students due to Formal School Registration (r=+6.48 representing 42% common variance); and
4. Actual School Improvements in School Staff Matters Due to Formal School Registration and Actual Improvements in School Financial Ability Due to Formal School Registration (r=+0.685 representing 47% common variance); and
5. Actual School Improvements in School Staff Matters Due to Formal School Registration and Actual Improvements in School Enrolment & Attendance Due to Formal School Registration (r=+0.620 representing 38% common variance).

Moderate positive correlations were found between:
6. Actual School Improvements in School Staff Matters Due to Formal School Registration and Actual Improvements in the Numbers of Students Due to Formal School Registration (r=+0.581 representing 34% common variance); and

7. Actual School Improvements in School Financial Viability Due to Formal School Registration and Actual Improvements in the Numbers of Students Due to Formal School Registration (r=+0.562 representing 32% common variance); and
8. Actual Improvements in School Governance Due to Formal School Registration and Actual Improvements in School Enrolment & Attendance Due to Formal School Registration (r=+0.535, representing 29% common variance); and
9. Actual School Improvements in School Financial Viability Due to Formal School Registration and Actual Improvements in School Enrolment & Attendance Due to Formal School Registration (r=+0.521 representing 27% common variance); and
10. Actual Improvements in School Instructional Time Due to Formal School Registration and Actual Improvement in Numbers of Students Due to Formal School Registration (r=+0.412 representing 17% common variance).

Low positive correlations were found between:
11. Actual Improvements in School Governance Due to Formal School Registration and Actual Improvements in the Number of Students Due to Formal School Registration (r=+0.342, representing 12% common variance); and
12. Actual School Improvements in Instructional Time Due to Formal School Registration and Actual Improvements in School Enrolment & Attendance Due to Formal School Registration (r=+0.343 representing 12% common variance);and
13. Actual School Improvements in School Financial Viability Due to Formal School Registration and Actual Improvements in School Instructional Time Due to Formal School Registration (r=+0.337 representing 11% common variance); and
14. Actual School Improvements in Instructional Time Due to Formal School Registration and Actual Improvements in School Staff Matters Due to Formal School Registration (r=+0.265 representing 7% common variance); and
15. Actual School Improvements in School Governance Due to Formal School Registration and Actual Improvements in School Instructional Time Due to Formal School Registration (r=+0.249 representing 6% common variance).

Table 7.3
Correlations Between Aspects 1 and 6 of School Registration Causing Actual School Improvement (N=59).

PEARSON CORRELATIONS

Aspect	Actual SG	Actual SFV	Actual E&A	Actual NS	Actual IT	Actual SS
School Governance (ACG)	1					
School Financial Viability (SFV)	0.658	1				
School Enrolment & Attendance (AE&A)	0.535	0.521	1			
Numbers of Students (ANS)	0.342	0.562	0.648	1		
Instructional Time (AIT)	0.249	0.337	0.343	0.402	1	
School Staff Matters (ASS)	0.749	0.685	0.620	0.581	0.265	1

Std. Deviations: ASG = 3.42, ASFV = 2.86, AE&A = 2.897, ANS = 2.35, AIT = 2.29, ASS = 3.03

It is not inferred from these correlations that there is necessarily a direct causative effect between these variables but that they are probably linked by another variable or variables that are related to all six aspects, most probably some overall general variable relating to school improvement. This variable might be called Actual General School Improvements Due to Formal School Registration. Although uncertain, the reason for some moderately low correlations may be linked to another variable related to the legislative constraints placed on School Instructional Time. It is a pre-determined condition set by the Minister of Education, reducing the potential for actual improvements in instructional time due to formal school registration.

Table 7.4
Correlation Matrix for Aspects 7 and 8 Versus Aspects 1,2,3,4,5,6 and 7 of School Registration Causing Actual School Improvement (N=59).

PEARSON CORRELATIONS

Aspect	Actual School Infrastructure	Actual School Curriculum
School Governance (ACG)	0.546	0.551
School Financial Viability (SFV)	0.564	0.390
School Enrolment & Attendance (AE&A)	0.661	0.569
Numbers of Students (ANS)	0.567	0.467
Instructional Time (AIT)	0.505	0.258
School Staff Matters (ASS)	0.595	0.607
School Infrastructure(ASI)	1	0.518
Standard Deviations:	ASI = 3.95	ASC = 3.61
Std. Deviations: ASG = 3.42, ASFV = 2.86, AE&A = 2.897, ANS = 2.35, AIT = 2.29, ASS = 3.03		

Moderately high positive correlations were found between:
16. Actual Improvements in School Enrolment &Attendance Due to Formal School Registration and Actual Improvements in School Infrastructure Due to Formal School Registration (r=+0.661, representing 44% common variance); and
17. Actual Improvements in School Staff Matters Due to Formal School Registration and Actual Improvements in School Curriculum Due to Formal School Registration (r=+0.607, representing 37% common variance); and
18. Actual Improvements in School Staff Matters Due to Formal School Registration and Actual Improvements in School Infrastructure Due to Formal School Registration (r=+0.595, representing 35% common variance).
Moderate positive correlations were found between:
19. Actual School Improvements in School Enrolment & Attendance Due to Formal School Registration and Actual Improvements in School Curriculum Due to Formal School Registration (r=+0.569 representing 32% common variance); and
20. Actual School Improvements in School Infrastructure Due to Formal School Registration and Actual Improvements in the Numbers of Students Due to Formal School Registration (r=+0.567 representing 32% common variance); and
21. Actual School Improvements in School Infrastructure Due to Formal School Registration and

Actual Improvements Financial Viability Due to Formal School Registration (r=+0.564 representing 32% common variance); and
22. Actual School Improvements in School Curriculum Due to Formal School Registration and Actual Improvements in School Governance Due to Formal School Registration (r=+0.551 representing 30% common variance); and
23. Actual School Improvements in School Infrastructure Due to Formal School Registration and Actual Improvements in School Governance Due to Formal School Registration (r=+0.546 representing 30% common variance); and
24. Actual School Improvements in School Infrastructure Due to Formal School Registration and Actual Improvements in School Curriculum Due to Formal School Registration (r=+0.518 representing 27% common variance); and
25. Actual School Improvements in School Infrastructure Due to Formal School Registration and Actual Improvements in Instructional Time Due to Formal School Registration (r=+0.505 representing 25% common variance).

Low positive correlations were found between:
26. Actual Improvements in School Curriculum Due to Formal School Registration and Actual Improvements in the Number of Students Due to Formal School Registration (r=+0.467, representing 22% common variance); and
27. Actual Improvements in School Curriculum Due to Formal School Registration and Actual Improvements in School Financial Viability Due to Formal School Registration (r=+0.390, representing 15% common variance); and
28. Actual Improvements in School Curriculum Due to Formal School Registration and Actual Improvements in Instructional Time Due to Formal School Registration (r=+0.258, representing 7% common variance).

Many school administrators (approximately 80%) made a direct reference to 'giving the school a facelift' just prior to the inspection of the school by the official School Registration Panel. In other words, administrators believed that there were actual improvements in school infrastructure did occur due to formal school registration. A low positive correlation was found between Actual Improvements in School Curriculum Due to Formal School Registration and Actual Improvements in Instruction Time Due to Formal School Registration (r=+0.258, representing 7% common variance). It is possible that this low positive correlation may be attributed to another variable related to the prescribed nature of school instructional times, as they are set by the Minister of Education.

Table 7.5 Correlation Matrix for Aspects 9 and 10 Versus Aspects 1,2,3,4,5,6,7,8 and 9 of School Registration Causing Actual School Improvement (N=59).

PEARSON CORRELATIONS

Aspect	Actual Student Learning Outcomes	Actual Care for Students
School Governance (ACG)	0.496	0.670
School Financial Viability (SFV)	0.452	0.625
School Enrolment & Attendance (ASE&A)	0.533	0.645
Numbers of Students (ANS)	0.659	0.680
Instructional Time (AIT)	0.480	0.486
School Staff Matters (ASS)	0.578	0.726
School Infrastructure(ASI)	0.602	0.639
School Curriculum (ASC)	0.562	0.596
Student Learning Outcomes(ASLO)	1	0.720
Standard Deviations:	ASLO = 3.05	ACfS = 2.71
Std. Deviations: ASG = 3.42, ASFV = 2.86, AE&A = 2.897, ANS = 2.35, AIT = 2.29, ASS = 3.03		

Moderately high positive correlations were found between:

29. Actual Improvements in School Staff Matters Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.726, representing 53% common variance);
30. Actual Improvements in Student Learning Outcomes Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.720, representing 52% common variance);
31. Actual Improvements in Numbers of Students Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.680, representing 46% common variance);
32. Actual Improvements in School Governance Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.670, representing 45% common variance);
33. Actual Improvements in Numbers of Students Due to Formal School Registration and Actual Improvements in Student Learning Outcomes Due to Formal School Registration (r=+0.659, representing 43% common variance);
34. Actual Improvements in School Enrolment & Attendance Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.645, representing 42% common variance);
35. Actual Improvements in School Infrastructure Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.639, representing 41% common variance);
36. Actual Improvements in School Financial Viability Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.625, representing 39% common variance);

37. Actual Improvements in School Infrastructure Due to Formal School Registration and Actual Improvements in Learning Outcomes Due to Formal School Registration (r=+0.602, representing 36% common variance); and
38. Actual Improvements in School Curriculum Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.596, representing 36% common variance).

Moderate positive correlations were found between:
39. Actual School Improvements in School Staff Matters Due to Formal School Registration and Actual Improvements in Student Learning Outcomes Due to Formal School Registration (r=+0.578 representing 33% common variance);
40. Actual School Improvements in Student Learning Outcomes Due to Formal School Registration and Actual Improvements in School Curriculum Due to Formal School Registration (r=+0.562 representing 32% common variance);
41. Actual School Improvements in School Enrolment & Attendance Due to Formal School Registration and Actual Improvements in Student Learning Outcomes Due to Formal School Registration (r=+0.533 representing 28% common variance);
42. Actual School Improvements in School Governance Due to Formal School Registration and Actual Improvements in Student Learning Outcomes Due to Formal School Registration (r=+0.496 representing 25% common variance);
43. Actual Improvements in Instructional Time Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.486, representing 24% common variance);
44. Actual School Improvements in Instructional Time Due to Formal School Registration and Actual Improvements in Student Learning Outcomes Due to Formal School Registration (r=+0.490 representing 23% common variance);
45. Actual School Improvements in School Financial Viability Due to Formal School Registration and Actual Improvements in Student Learning Outcomes Due to Formal School Registration (r=+0.452 representing 20% common variance).

Although uncertain, it is strongly possible that these variables are linked together by a third variable relating to school improvement. A high number of school administrators (approximately 70%) made a direct reference to Care for Students in the development of school policies related to Actual School Improvements that were due to Formal School Registration. In Table 7.5, Aspect 9, Care for Students, exhibits the highest-overall positive correlations between it and the other Aspects of formal school registration. It is conceivable that the unique character of many independent schools, schools with a specific philosophy or ethos with a religious persuasion, may have contributed to the strong correlations for variables relating to Actual Improvement in Care for Students Due to Formal School Registration.

In Table 7.6 moderately high positive correlations were found between:
46. Actual Improvements in School Staff Matters Due to Formal School Registration and Actual Improvements in Disputes and Complaints Due to Formal School Registration (r=+0.734, representing 54% common variance); and
47. Actual Improvements in Care for Students Due to Formal School Registration and Actual Improvements in Disputes and Complaints Due to Formal School Registration (r=+0.691, representing 48% common variance).

Moderate positive correlations were found between:
48. Actual School Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvements in Numbers of Students Due to Formal School Registration (r=+0.669 representing 45% common variance);

Table 7.6
Correlation Matrix for Aspect 11 Versus Aspects 1,2,3,4,5,6,7,8,9 and 10 of School Registration Causing Actual School Improvement (N=59).

PEARSON CORRELATIONS

Aspect	Actual Disputes and Complaints
School Governance (ACG)	0.532
School Financial Viability (SFV)	0.592
School Enrolment & Attendance (ASE&A)	0.612
Numbers of Students (ANS)	0.669
Instructional Time (AIT)	0.270
School Staff Matters (ASS)	0.734
School Infrastructure(ASI)	0.497
School Curriculum (ASC)	0.589
Student Learning Outcomes(ASLO)	0.594
Care for Students(ACfS)	0.691
Standard Deviations:	ADC = 2.66
Std. Deviations: ASG = 3.42, ASFV = 2.86, AE&A = 2.897, ANS = 2.35, AIT = 2.29, ASS = 3.03	

49. Actual School Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvements in School Enrolment & Attendance Due to Formal School Registration (r=+0.612 representing 37% common variance);
50. Actual School Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvements in Student Learning Outcomes Due to Formal School Registration (r=+0.594 representing 35% common variance);
51. Actual School Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvements in School Financial Viability Due to Formal School Registration (r=+0.592 representing 35% common variance);
52. Actual School Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvements in School Curriculum Due to Formal School Registration (r=+0.589 representing 35% common variance);
53. Actual School Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvements in School Governance Due to Formal School Registration (r=+0.532 representing 28% common variance); and
54. Actual School Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvements in School Infrastructure Due to Formal School Registration (r=+0.497 representing 25% common variance).

Low positive correlations were found between:
55. Actual Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvements in Instructional Time Due to Formal School Registration (r=+0.270, representing 7% common variance);

The highest positive correlation was found between Actual Improvements in Disputes and Complaints Due to Formal School Registration and Actual Improvement in School Staff Matters Due to Formal School Registration (r=+0.734, representing 54% common variance). This suggests that in independent schools where staff care for students more and where school staff matters, there are improvements in school learning outcomes and reductions in school disputes and complaints, and that formal school registration relating to these aspects has a causative positive influence on schools and students.

In Table 7.7 moderately high positive correlations were found between:
56. Actual Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in Care for Students Due to Formal School Registration (r=+0.676, representing 46% common variance);
57. Actual Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Governance Due to Formal School Registration (r=+0.624, representing 39% common variance);

Table 7.7
Correlation Matrix for Aspect 12 Versus Aspects 1,2,3,4,5,6,7,8,9,10 and 11 of School Registration Causing Actual School Improvement (N=59).

PEARSON CORRELATIONS

Aspect	Actual Legal Compliance
School Governance (ACG)	0.624
School Financial Viability (SFV)	0.466
School Enrolment & Attendance (ASE&A)	0.464
Numbers of Students (ANS)	0.428
Instructional Time (AIT)	0.349
School Staff Matters (ASS)	0.594
School Infrastructure(ASI)	0.563
School Curriculum (ASC)	0.595
Student Learning Outcomes(ASLO)	0.487
Care for Students(ACfS)	0.676
Disputes and Complaints(ADC)	0.546
Standard Deviations:	ALC = 4.04
Std. Deviations: ASG = 3.42, ASFV = 2.86, AE&A = 2.897, ANS = 2.35, AIT = 2.29, ASS = 3.03	

58. Actual Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Staff matters Due to Formal School Registration (r=+0.594, representing 35% common variance); and
59. Actual Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Curriculum Due to Formal School Registration (r=+0.595, representing 35%

common variance);

Moderate positive correlations were found between: 60. Actual School Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Infrastructure Due to Formal School Registration (r=+0.563 representing 32% common variance);
61. Actual School Improvements in legal Compliance Due to Formal School Registration and Actual Improvements in Disputes and Complaints Due to Formal School Registration (r=+0.546 representing 30% common variance);
62. Actual School Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Learning Outcomes Due to Formal School Registration (r=+0.487 representing 24% common variance);
63. Actual School Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Financial Viability Due to Formal School Registration (r=+0.466 representing 22% common variance);
64. Actual School Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Enrolment & Attendance Due to Formal School Registration (r=+0.464 representing 22% common variance); and
65. Actual School Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Financial Viability Due to Formal School Registration (r=+0.428 representing 18% common variance).

A low positive correlation was found between:
66. Actual School Improvements in Legal Compliance Due to Formal School Registration and Actual Improvements in School Instructional Time Due to Formal School Registration (r=+0.349 representing 12% common variance).

The highest positive correlation in this group again involved Actual Improvements in Care for Students (r=+0.676, representing 46% common variance). This is consistent with the previous correlations suggesting that in independent schools where staff care for students more and where school ethos is often based on religious grounds, there are improvements in school learning outcomes and reductions in school disputes and complaints, and that formal school registration relating to these aspects has a causative positive influence on schools and students.

Summary of Main Findings

Using Guttman Scale non-linear measures ((Fabrigar & MacGregor, 2007; Guttman, 1950; Guttman, 1944), this paper examined the inter-relationships between and amongst the twelve aspects of School Administrators Beliefs that Actual School Improvements Were Due To Formal School Registration. The Guttman Scale scores were used to calculate the zero-order inter-correlations (Pearson Product-Moment Correlations) between and amongst the twelve Guttman Scale scores that directly measured each of the twelve aspects. The zero-order inter-correlations ranged from a low positive value (r=+0.249, representing 6% common variance) to a moderately high positive value (r=+0.734, representing 54% common variance). While correlations are generally considered a necessary, but not sufficient condition, for suggesting a causal inference, other evidence given by a previous Rasch Measurement strongly suggests that formal registration did have a positive influence on various aspects of school improvement. For aspects such as Care for Students and School Staff Matters which often have a special significance in many independent schools, because the schools are based on a particular religious ethos, some of the correlations were moderately highly positive and causally suggestive.

The main findings are briefly summarised.

1. The twelve Guttman Scales measures have an acceptable step-type arrangement, giving strong evidence of a unidimensional scale for each of the twelve aspects of Actual School Improvements Due to Formal School Registration (see Table 7.1 & Table 7.2).

2. There was agreement between the Guttman Scale measures and the Rasch Measurement Model in a previous paper, regarding the order of difficulty for the items related to the Actual School Improvements Due to Formal School Registration. For example, both measures listed item 6, *the Actual School Council's community and public relations,* as the hardest School Governance improvement item.
3. Moderately high positive correlations were found between the following twelve aspects of formal school registration;
   School Governance & School Staff (r=+0.749, rep. 56% common variance)
   School Governance & Finance Viability (r=+0.658, rep.43% common variance)

   Disputes & Complaints & School Staff (r=+0.734, rep. 54% common variance)
   School Staff & Care for Students (r=+0.726, rep. 53% common variance)
   Care for Students & Learning Outcomes (r=+0.720, rep. 52% common variance)
   Care for Students & Disputes & Complaints (r=+0.691 rep. 48% common variance)
   Learning Outcomes & School Curriculum (r=+0.562 rep. 32% common variance)
4. Moderately low positive correlations were found between two of the twelve aspects of formal school registration;
   Instructional Time & School Staff Matters (r=+0.265, rep. 7% common variance)
   Instructional Time and School Governance (r=+0.249, rep. 6% common variance).

Conclusion

This investigation has suggested that School Administrators do believe that the school registration process does lead to school improvement. It has presented moderately high positive zero-order inter-correlations amongst and between the twelve aspects of school registration, which strongly suggests that formal school registration does help schools to improve. The study has revealed school registration as an element of school improvement for non-government schools.

Using a Guttman Scale Measurement to analyse the attitudes of School Administrators concerning twelve aspects of formal school registration in relations to the standard of education for students enrolled in non-government schools, this study constructed a unidimensional scale. The possible application of a unidimensional scale related to school improvement creates new opportunities for School Administrators. For example, knowledge about which school improvements are considered to be easy or hard, due to the formal school registration process, will assist non-government schools to target improvements for those schools. Through the unidimensional scale of the aspects present in the school registration process, School Administrators will use this knowledge to identify which aspect of the school operations will require greater assistance when striving to help those schools improve.

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