



An investigation into factors affecting Grade 10 & 12 students' mathematics performance in Port Moresby, PNG.

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Outline

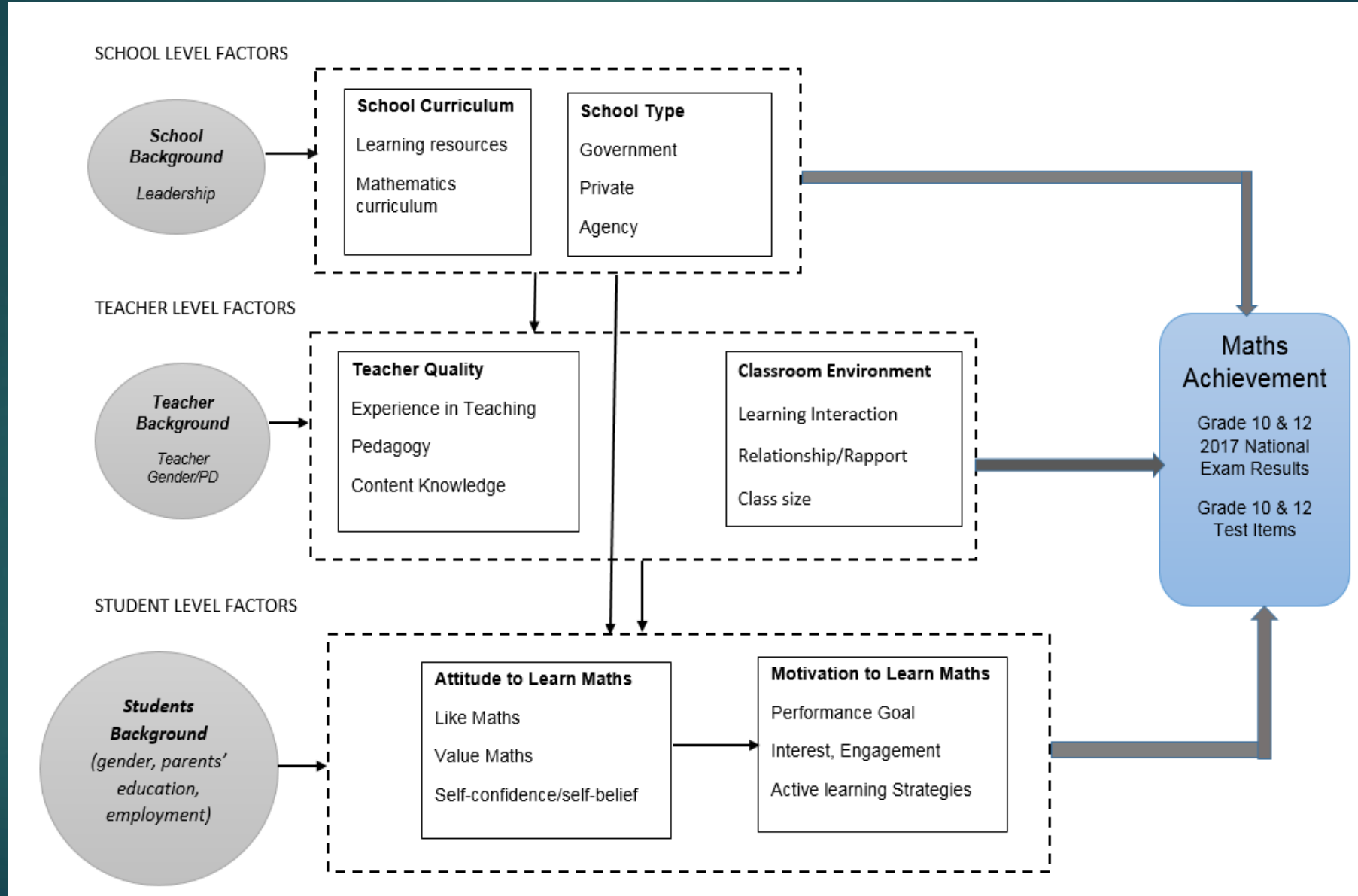
- ❑ Introduction/Background
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Introduction/Background

- ▶ Mathematics contributes to accelerating the development of a nation (Brown, 2013; Mujtaba, Reiss, and Hodgson, 2014).
- ▶ Mathematics results in many countries are declining at an alarming rate (e.g TIMSS & PISA studies) (Kennedy, Lyons, & Quinn, 2014).

Theoretical Framework



Research Questions



1. What are the factors that are affecting Grade 10 and 12 students' mathematics achievements/results in Port Moresby?
2. What are the relationships among student, teacher and school level factors that are affecting Grades 10 and 12 students' mathematics achievements/results?

Purpose of the study



- ❑ To investigate the school, teacher and student level factors that affect Grade 10 and 12 students' mathematics achievements in Port Moresby, PNG.
- ❑ To examine these factors at each level, their interrelationships and consider how students' mathematics results are ultimately affected.

Significance of the study



- ❑ No studies are undertaken related to factors affecting students' mathematics results in PNG.
- ❑ Participation of PNG in international studies such as TIMSS and PISA.
- ❑ PNG education leaders, teachers and parents with a better understanding about the factors involved in improving mathematics results.



Methodology

Quantitative dominant mixed method research design (Creswell & Clark, 2007; Onwuegbuzie & Combs, 2011)

Patterned on large-scale international studies such as Trends in International Maths and Science Study (TIMSS).

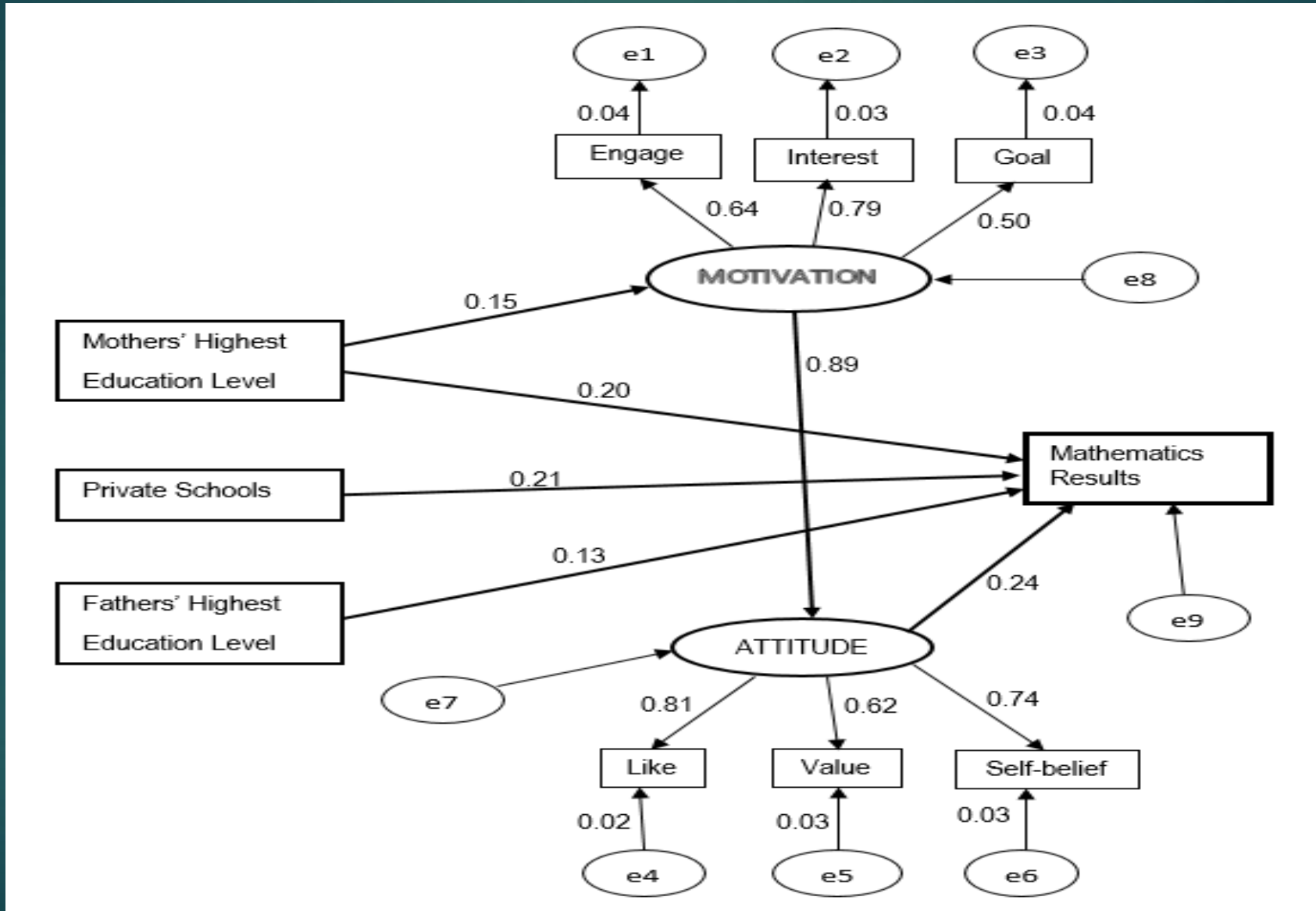
Stratified random sampling technique (Creswell, 2008; Joncas & Foy, 2011).

□ Sample size: 729 students + 41 Teachers = 770

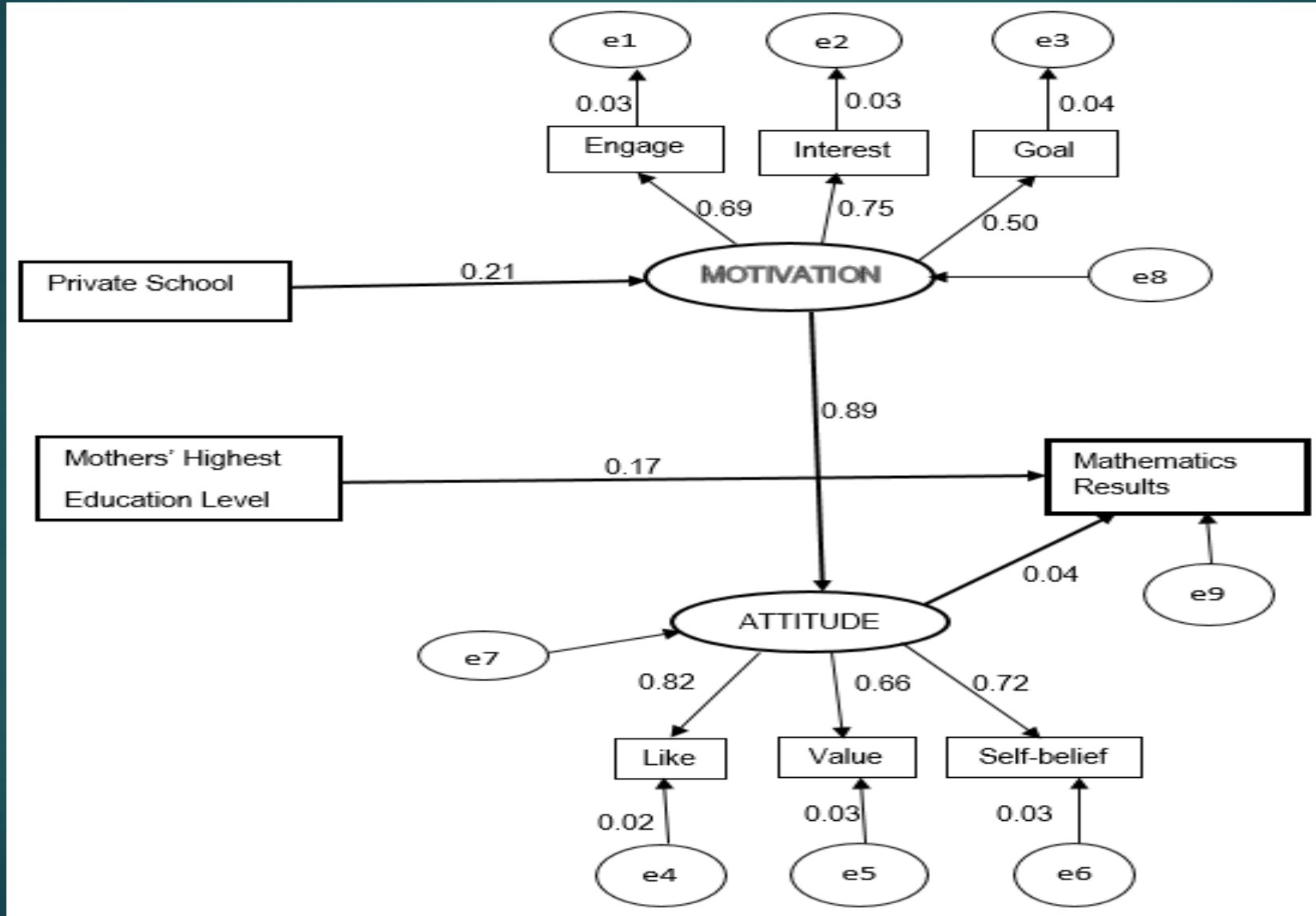
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Gr 10 (354) & Gr 12 (375)

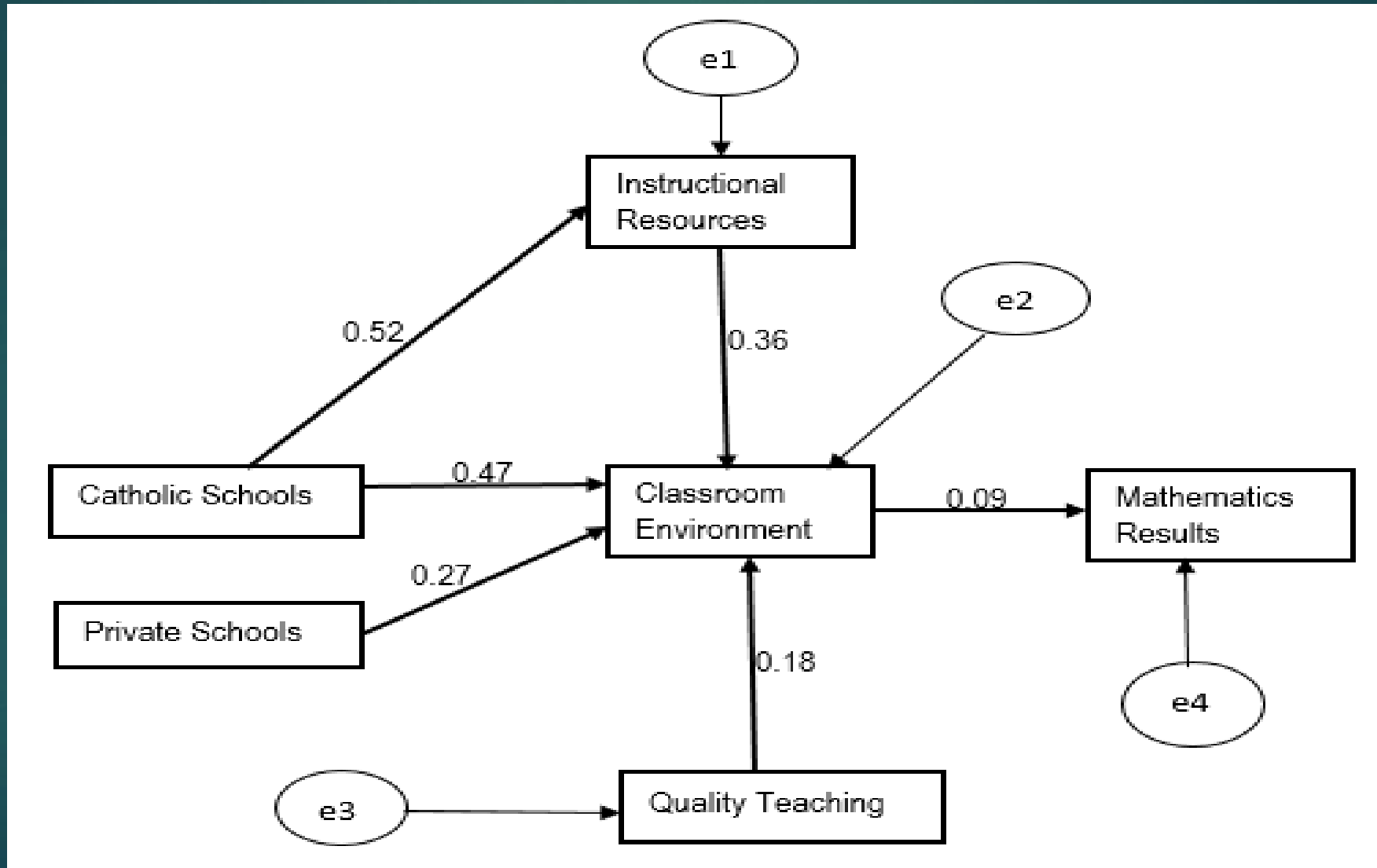
Student Level-Grade 10 SEM results



Student Level-Grade 12 SEM results



Teacher Level SEM results





Limitations

- ❑ Generalisation of finding (restricted to Port Moresby).
- ❑ All the other factors at student and teacher level factors are not included.
- ❑ Longitudinal study is ideal to collect data overtime.

Conclusion

- ❑ Attitude, FHEDUL, motivation, instructional resources, and classroom environment have significant effect on Grade 10 and 12 students mathematics results.
- ❑ MHEDUL and Private Schools stand out the most critical factors

Recommendations



1. Teacher Training uni/institutes should enroll students with strong analytical and mathematical skills
2. Create a conducive learning environment
3. Empower more women for higher education
4. Promote and maintain positive attitude in mathematics
5. Government and Catholics schools should learn from Private schools teaching practices
6. Motivation of students (Student-Centred teaching)
7. Part of international studies (TIMSS & PISA)
8. Encourage rigorous empirical studies



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Thank you

Questions and Comments

Sampling Framework



NO	Schools	SCHOOL TYPE			GRADE 10			GR. 12 (ADV MAT)			GR. 12 (GEN MAT)			TEACHERS
		CHURCH	PRIVATE	GOVNT	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	
1		1			21		21	9		9	11		11	3
2			1		20		20	10		10	15		15	3
3			1									15	15	1
4		1				25	25		7	7		7	7	3
5			1		8	10	18	1	1	2	1	1	2	3
6		1			5	7	12	5	5	10	7	5	12	3
7				1	17	15	32	9	7	16	8	12	20	3
8			1		10	9	19	8	4	12	7	8	15	3
9				1	20	18	38	7	5	12	4	3	7	3
10				1	12	16	28	5	4	9	5	7	12	3
11				1	15	15	30	12	14	26	13	12	25	3
12			1		8	6	14	7	7	14				2
13				1	13	11	14	8	6	14	10	7	17	3
14				1	17	17	34	14	12	26	15	13	28	3
15			1		9	11	20							1
16					9	10	10	12	14	26				2
	TOTAL	3	6	6	184	170	354	105	87	192	87	96	183	41
TOTAL PARTICIPANTS		729 (354 + 375 students) + 41 (teachers) = 770 participants												

Statistical techniques and software



- **Confirmatory factors analysis (Mplus & Amos)**
- Test the structure/relationship of the observed variables/items with the latent constructs/scales.

Rasch Measurement Model (ConQuest 12.0)

- Validate the instruments at the item level

Structural Equation Modelling/Path analysis (Mplus)

Test the relationship among the observed variables and their latent variables to predict the outcome at each level.

Hierarchical Linear modelling/ Multi-level analysis (HLM 6.0)

Simultaneously investigates relationships within and between hierarchical levels of grouped data levels.

Implications



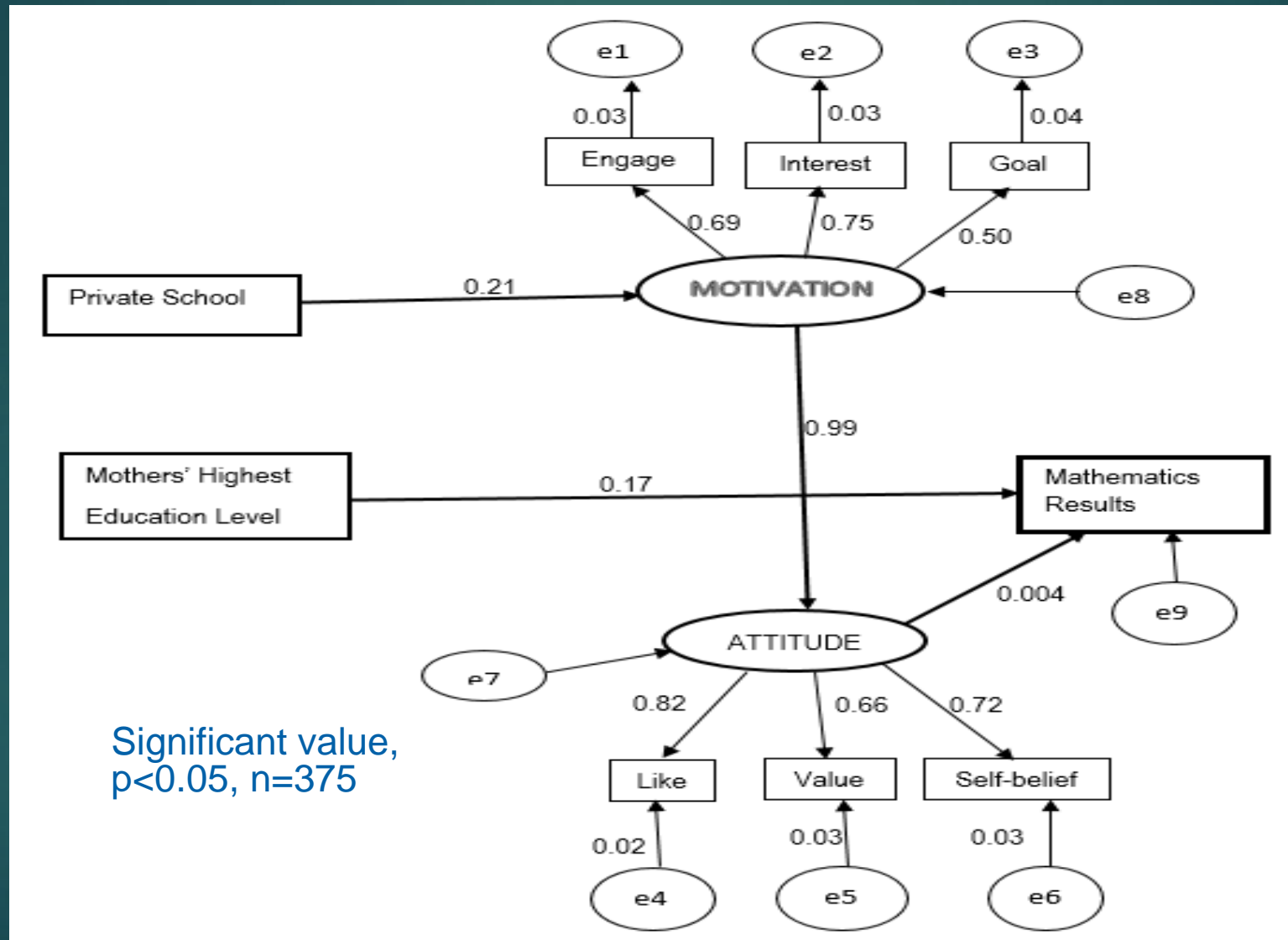
Practical implications

- Evidence of factors affecting Grade 10 and 12 students maths results
- Both student and teacher factors have equal importance.

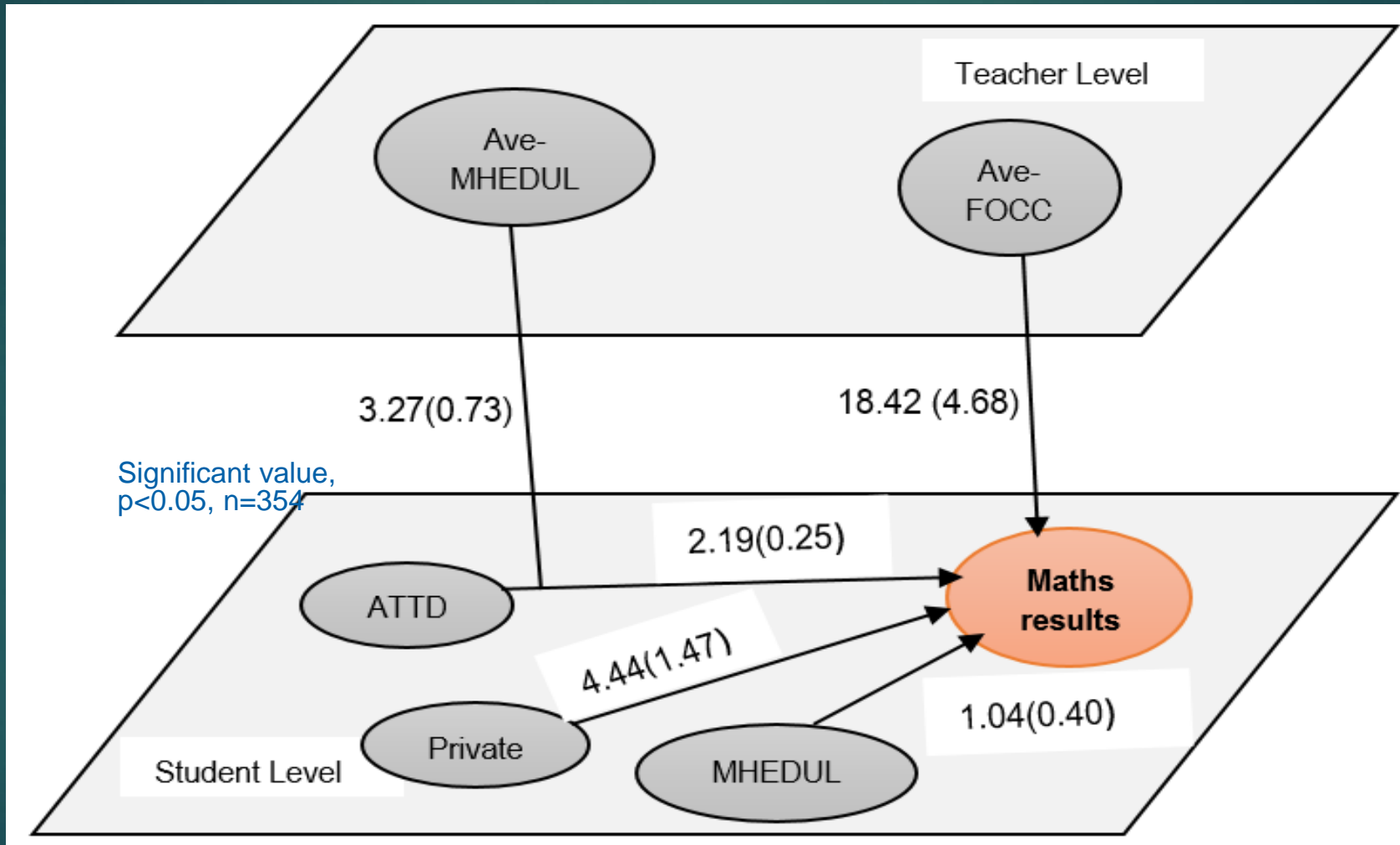
Methodological/Theoretical implications

- ▶ Empirically based analytical procedures (RMM, SEM and HLM) to test and extend the existing research framework and model
- ▶ Add on to the existing literature

Grade 12 model SEM results



Grade 10 model HLM result



Combined model HLM results

