

STRUCTURAL EQUATION MODELING IN  
STUDENTS' MATHEMATICS ACHIEVEMENT:  
A CASE STUDY AT THE LIBYAN SECONDARY  
SCHOOLS

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DOCTOR OF PHILOSOPHY OF SCIENCE  
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The current study offers a comprehensive approach to identify the factors that influence students' achievement in mathematics, and to understand the relationship between these factors and the students' achievement in mathematics. Moreover, to propose a model for students' achievement in mathematics and modeling the students' mathematics achievement at the secondary school in Libya through an attempt to expand the theoretical and experimental evidence concerning the structural relationships between the following eleven constructs: instructional quality, students' attitude, students' beliefs, mathematics anxiety, success attribution, school climate, class climate, self concept, changes in the curriculum, customs and traditions, and students' achievement in mathematics, Also to investigate the effects of these factors on the student achievements using sample data that consists of 406 students from secondary schools in Libya. This study used SPSS 18 and AMOS 18 software. Two statisticssal techniques were employed to

analyse the collected data: exploratory factor analysis (EFA) and structural equation modelling (SEM).

The proposed structural model puts forward some major hypotheses such as the achievements of the students achievement were affected directly and indirectly by the constructs; students' attitude, students' beliefs, mathematics anxiety, success attribution, school climate, class climate, self concept, curriculum, customs and traditions. The indirect effects of students' attitude, changes in the curriculum, school climate, and class climate, on students' achievement are contingent upon instructional quality processes which affect the achievement of the students directly. Also success attribution, customs and traditions, and self concept affect the students' achievement through students' attitude which also affects the students' achievement indirectly via mathematics anxiety.

The results of SEM revealed that: 1) students' beliefs, success attribution, and self-concept have a direct effect on the achievement of the students as well as an indirect effect on their achievement through instructional quality for students' beliefs and via students' attitude for success attribution, and self-concept; 2) the effect of students' attitude and changes in the curriculum had only an indirect impact on students' achievement through instructional quality and through mathematics anxiety; 3) instructional quality and mathematics anxiety had a direct influence on students' achievement; and 4) school climate and customs and traditions had no effect on students' achievement.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk ijazah Doktor Falsafah Matematik.

**PERMODELAN PERSAMAAN STRKTUR DALAM PENCAPAIN MATEMATIK: SATU KAJIAN KES DI SEKOLAH MENENGAH LIBYA**

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Kajian ini menawarkan pendekatan yang komprehensif untuk mengenal pasti faktor yang mempengaruhi pencapaian dalam matematik dan memahami hubungan antara faktor ini dengan pencapaian pelajar dalam matematik. Selain itu, kajian ini mencadangkan satu model pencapaian pelajar dalam matematik dan model pencapaian pelajar matematik di sekolah menengah di Libya melalui usaha untuk mengembangkan bukti teori dan eksperimen mengenai hubungan struktur di antara konstruk yang berikut: kualiti pengajaran, sikap pelajar, kepercayaan, perasaan kebimbangan matematik, sifat ingin berjaya, iklim sekolah, iklim kelas, konsep sendiri, perubahan dalam kurikulum, adat dan tradisi dan pencapaian pelajar dalam matematik serta untuk mengkaji kesan faktor-faktor ini ke atas pencapaian pelajar dengan menggunakan datasampel yang terdiri daripada 406 pelajar dari sekolah-sekolah menengah di Libya. Kajian ini menggunakan perisian SPSS 18 dan AMOS 18. Dua teknik ini telah digunakan dalam proses analisis data: analisis faktor

penerokaan dan model persamaan struktur.

Model struktur yang dicadangkan, mengemukakan beberapa hipotesis utama seperti pencapaian pelajar yang terlibat secara langsung dan tidak langsung oleh konstruk ini; sikap pelajar, kepercayaan pelajar, perasaan bimbang matematik, sifat ingin berjaya, iklim sekolah, iklim kelas, konsep sendiri, kurikulum, adat dan tradisi. Kesan tidak langsung sikap pelajar, perubahan dalam kurikulum, iklim sekolah dan iklim kelas kepada pencapaian pelajar adalah di luar jangkaan terhadap proses kualiti pengajaran yang memberi kesan kepada pencapaian pelajar secara langsung. Demikian juga sifat ingin berjaya, adat resam, tradisi dan konsep sendiri yang memberi kesan secara tidak langsung kepada pencapaian pelajar melalui sikap pelajar yang dianggap menjejaskan pencapaian pelajar secara tidak langsung melalui perasaan bimbangan matematik.

Hasil dari SEM ini mendedahkan bahawa: 1) kepercayaan pelajar, sifat ingin berjaya dan konsep sendiri mempunyai pengaruh secara langsung ke atas pencapaian pelajar serta pengaruh langsung terhadap pencapaian pelajar melalui kualiti pengajaran untuk kepercayaan pelajar dan melalui sikap pelajar bagi sifat ingin berjaya dan konsep sendiri; 2) sikap pelajar afektif dan perubahan dalam kurikulum hanya mempunyai kesan tidak langsung kepada pencapaian pelajar melalui kualiti pengajaran dan melalui perasaan kebimbangan matematik dengan sikap pelajar, 3) kualiti pengajaran dan perasaan bimbangan matematik hanya mempunyai pengaruh langsung terhadap pencapaian pelajar dan 4) manakala iklim sekolah, adat dan tradisi tidak memberi kesan ke atas pencapaian pelajar.