DESIGN AND IMPLEMENTATION OF INFORMATION PROCESSING MODEL OF SCIENCE AND TECHNOLOGY EDUCATION AND ITS IMPACT ON STUDENTS’ PERFORMANCE IN BIOLOGY
(Senior Secondary Schools II Adamawa State, Nigeria)

A Thesis for the Degree of PhD

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بسم الله الرحمن الرحيم

قال تعالى:

﴿إن في خلق السموات والجحيم نوعان، وخلق الليل والنهار لا يزلان، إن في خلق السموات والجحيم نوعان، وخلق الليل والنهار لا يزلان﴾

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بسم الله الرحمن الرحيم

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ليكن في خلق السموات والجحيم نوعان، وخلق الليل والنهار لا يزلان، إن في خلق السموات والجحيم نوعان، وخلق الليل والنهار لا يزلان

سورة آل عمران: 190-191
DECLARATION

I hereby declare that this thesis was written by me and it is a record of my own research work. It has not been presented before in any previous application for a higher degree. All references cited have been duly acknowledged.

NAME_________________________

DATE__________________________
This thesis entitled “Design and Implementation of Information Processing Model of Science and Technology Education and its Impact on Students’ Performance in Biology” meets the regulations governing the award of PhD Degree of the International University of Africa, Khartoum and it is approved for its contribution to knowledge and literary presentation.

___________________________  ________________
Supervisor                      Date

____________________________  ________________
External Examiner               Date

____________________________  ________________
Internal Examiner               Date
DEDICATION

This work is dedicated to those who have the greatest impact in my life:

my beloved Prophet Muhammad (SAW), my parents (Late Alh. Ahmad wazirin Hashidu and Habiba).
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All praise are due to Allah. We praise Him, seek His help and His ask forgiveness. We seek refuge in Allah from the evil of our souls and the adverse consequences of our deeds. Whoever Allah guides there is none that can misguides him.

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ABSTRACT

The study concerns with design and implementation of information processing models of science and technology education in biology and its impact on secondary school students’ academic achievement in biology in Adamawa state. Four models out of the seven information processing models were designed and implemented. Five objectives were set, five research questions and five hypotheses tested at 0.05 level of significance guided the study. The experimental design of the study was quasi-experimental pretest posttest non-equivalent control group design which involved 280 SSII students from five purposively selected senior secondary schools in Adamawa state. Instrument used for data collection was cognitive test tagged Biology Cognitive Test (BCT) adapted from WAEC past questions from 2010-2015. The instrument was content validated by three experts. The instrument was also tested for reliability, using split half method. The reliability coefficient of 0.78 was obtained. The treatment lasted for eight weeks. The data collected were analyzed using descriptive statistics for the research questions, t-test and Multivariate Analysis of Covariance (MANCOVA) for the hypotheses. The result revealed that, information processing models enhanced students’ performance in biology. Furthermore, post-hoc analysis revealed that, biological science inquiry model group performed better than the remaining models and lecture method group. Recommendations made based on the findings are, information processing models should be incorporated in the teaching of biology in secondary schools, Adamawa state government and schools should organize workshops for practicing teachers to inculcate skills of information processing models.
تناولت الدراسة تصميم وتنفيذ نماذج معالجة المعلومات لتعليم العلوم والتكنولوجيا في علم الأحياء وتاثيرها على التحصيل الدراسي لطلاب المدارس الثانوية في علم الأحياء بولاية أداماوا. ثم تصميم وتنفيذ أربعة نماذج من نماذج معالجة المعلومات السبعة، ثم وضع خمسة أهداف، وخمسة أسئلة بحث وخمسة فرضيات ثم اختبارها في مستوى 0.05 من الأهمية التي استرشدت بها الدراسة. كان التصميم التجريبي للدراسة هو الاختباري التجريبي غير المكافئ الذي اشتمل على 280 طالبا للصف الثاني الثانوي من خمس مدارس ثانوية متصلة بشكل متوقع في ولاية أداماوا. وقد كانت الأداة المستخدمة لجمع البيانات هي الاختبار المعرفي المسمى اختبار البيولوجيا الإدراكية (BCT) المأخوذ من أسئلة امتحانات (WAEC) للسنوات الماضية. وتمت مراجعة الاختبار من قبل الخبراء في المجال، ثم التحقق من صحة هذا الأداة أيضا من أجل الموثوقية باستخدام طريقة تقسيم النصف، ثم الحصول على معامل الموثوقية 0.78. استمرت التجربة لمدة ثمانية أسابيع، ثم تحليل البيانات التي تم جمعها باستخدام الإحصاء الوصفي للفرضيات. وكشف النتائج أن نماذج معالجة المعلومات عززت أداء الطلاب في علم الأحياء. علاوة على ذلك، كشف التحليل اللاحق أن مجموعة نموذج البحث العلمي منها الأفضل من النماذج المتبقية ومجموعة أساليب المحاضرات، وكانت التوصيات المقدمة بناءً على النتائج هي: يجب أن تدرج نماذج معالجة المعلومات في تدريس علم الأحياء في المدارس الثانوية، يجب على حكومة ولاية أداماوا والمدارس تنظيم ورش عمل للمدارسين الممارسين لغرس مهارات نماذج معالجة المعلومات.
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