INTERCONTINENTAL JOURNAL OF EDUCATION, SCIENCE AND TECHNOLOGY ISSN 2659-1085, VOL 8 NO 1. JUL, 2024. USA.

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ASSESSMENT OF THE ACADEMIC PERFORMANCE OF SS II MALE AND FEMALE BIOLOGY STUDENTS TAUGHT USING TALENT LEARNING MANAGEMENT SYSTEMS (LMS) AND THOSE TAUGHT WITH EXPOSITORY METHOD

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ABSTRACT

The study assessed the academic performance of SS II male and female biology students taught using talent learning management systems (LMS) and those taught with expository method. This study adopted quasi–experimental design using non-randomized pre-test post-test control group. This study was conducted in Uyo Local Government Area of Akwa Ibom State. The population of the study consisted of 3,183 SS II Biology students in all the 15 public secondary schools in Uyo Local Government Area of Akwa Ibom State for the 2023/2024 academic session. Purposive sampling technique was used in selecting schools from the target population. A total of 216 respondents formed the sample size of the study which was made up of 110 female and 106 male students The instrument used for data collection was Biology Performance Test (BPT). Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability co-efficient of 0.86 was considered to be highly reliable and useful in collecting the required data for the study. Descriptive statistics of mean, standard deviation and mean gain scores were used in answering all the research questions while Analysis of Covariance (ANCOVA) was used in testing all the null hypotheses at 0.5 level of significance. On this basis it was concluded that Talent LMS enhance academic performance of secondary school students in Biology in Uyo Local Government Area. The study showed that there is a significant difference in the academic performance of SS II Biology students taught with Talent LMS and those taught with expository method and also that there is no significant difference in the academic performance of SS II male and female Biology students taught with Talent LMS and those taught with expository method. The study recommends that the use of Talent LMS should be utilized by teachers in teaching Biology concepts as this will enhance learning and hence facilitate academic performance of students.

Keywords: Academic Performance, SS II Male and Female Biology Students, Talent Learning Management Systems (LMS) And Expository Method

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Introduction

The effectiveness of the teaching and learning process largely depends on the choice of the teacher's teaching method. The effectiveness of the teaching method is reflected in the outcome of the learners in the form of performance. Academic performance of learners is an important indicator of effective teaching, which can be influenced by different factors such as learning methods and individual motivation. The nature of motivation and learning strategy used is vital in improving students' learning outcomes. Unfortunately, the performance of students in Biology in West African Senior Secondary Certificate Examination has not improved in the last decade (Umoinyang, 2018).Poor performance trend in Biology has been linked particularly to the teacher's teaching method and lack of instructional materials in secondary schools due to poor funding.

Biology syllabus is a bulky one, and as such teachers find it convenient to adopt the expository method of teaching to be able to cover the contents. This expository method of teaching used presently by most teachers in secondary schools is teacher-directed where the teacher is the center of knowledge transmission while the students remain passive. The abstract nature of this teaching method does not motivate and sustain learners' attention in retaining concepts taught, hence there is need to adopt a more flexible teaching method to motivate the learners. The expository instructional strategy involves a formal discourse or exposition on a subject matter to attain a stated instructional objective as the teacher does the talking while the learners listen and occasionally take notes (Udosen and Ukpong, 2019). The aim of teaching and learning is to ensure effective classroom communication which involves proper identification, assembly and application of technological principles to facilitate change in behavior and performance. It is therefore, imperative for teachers to develop effective strategies for the teaching and learning of Biology in order to enhance instructional delivery and students' academic performance. To address the issue of students' poor performance in Biology and align with the societal and technological advancements, it is essential to implement innovative and more effective teaching strategies in Biology classrooms.

Pomerantz *et al*., (2018), noted that, learning management systems (LMS) has become vital to teaching and learning. Some widely used learning management systems include Sakai, Edmodo, Moodle, Blackboard, Success Factors, Skillsoft, EdApp, and Talent LMS among others. Talent LMS is a Course/Learning Management System with features such as a course document folder (where PowerPoint slides were uploaded for students to access), discussion boards/fora, email, group fora, and journals/blogs. Talent LMS is a free or open/community source, educational software platform designed to support teaching, research and collaboration. Talent LMS is a learning management system and it is one of the emerging technologies for classroom communication. It is an online collaborative learning platform, course management system, and open-source resource that benefits staff, students, and instructors (Mtebe, 2015). In addition to facilitating interaction, enabling institutional innovations in teaching and learning, and providing tools for active online engagement like chat rooms, wikis, blogs, summative assessments, and discussion, learning management systems (LMSs) are widely used in higher education (Cigdemoglu et al., 2014). According to Wang et al., (2015), LMSs are also helpful for fostering collaboration and reciprocity among students, utilizing active learning strategies, providing timely feedback, stressing the need of staying on task, setting high standards, and appreciating the diversity of skills and learning styles.

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Statement of problems

The teaching and learning of Biology should be effective and efficient but the instructional strategies used presently in secondary schools may not guarantee the optimal results in students' interest as well as their performance in the examinations. Most secondary school teachers are still using the expository method of teaching which is usually ineffective though it facilitates the easy completion of the bulky Biology syllabus. The researcher observes that most Biology teachers resist innovations in the teaching-learning process.

Research objective

To guide the study, the following research questions were raised.
1. Determine the difference in the academic performance of SS II Biology students taught with Talent LMS and those taught using expository method.
2. Assess the difference in the academic performance of male and female SS II Biology students taught using Talent LMS than those taught with expository method.

Research Question
1. How does the academic performance of SS II Biology students taught with Talent LMS differ?
2. In what way does the academic performance differ between male and female SS II Biology students taught using Talent LMS?

Research Hypothesis

Ho_1 There is no significant difference in the academic performance of SS II Biology students taught with Talent LMS and when taught using the expository method.

Ho_2 Male and female SS II Biology students do not significantly differ in their academic performance when Talent LMS is used for instruction.

LITERATURE REVIEW

Talent Learning Management System (LMS)

Talent LMS was founded in 2012 by Athanasios Papagelisin San *Francisco, United States*. LMS is one of the most recent tools in technology that is commonly used to enhance knowledge and skills acquisition by students, academic staff, and other professionals, aside from those in the educational sector, via the Internet (Adams *et al*., 2018; Chopra *et al*., 2019). A Learning Management System (LMS) according to Brush (2019), is a software application or web-based technology used to plan, implement and assess a specific learning process. It is an eLearning-based platform built on two major elements - a server that performs the base functionality and a user interface that is operated by an instructor, students and administrators.

Talent LMS enables an instructor to create and deliver content, monitor students' participation and assess students' performance. According to Brown (2020), Talent LMS provides an avenue for the delivery and tracking of e-learning initiatives in one place.

E-learning Basics (2021), asserts LMS as a platform for digital learning with the key features captured as follows;

    i. Learning - It allows for the creation of a single source of online courses and training materials.

    ii. Management – It allows for the management of both courses and learners.

    iii. System – It makes use of a computer system.

O'Leary and Ramsden (2022), reported the acknowledgment of the advantages of the LMS by academics/instructor premised on its usefulness in improving the learning experiences of

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students. Binti *et al.*, (2016), found that the LMS is capable of motivating students towards learning thereby impacting positively on academic performance. Mödritscher *et al.*, (2018), found a positive correlation between students' commitment to use of the LMS in learning and their academic performance. Oguguo *et al.*, (2021), revealed significant effects of the LMS on students' academic performance Talent LMS has myriads of phenomenal features as follows: it is used for class announcements, quizzes, online video tutorials, plagiarism checking, conducting interim assessments, and student group discussions.

Another interesting feature of LMS is the fact that students can access their results instantly with the aid of the grade book which generates scores of students. Besides, it has a calendar for viewing deadlines, distributes and collects data from course members, among others (Dube and Scott, 2014). Talent LMS can be used to supplement the traditional face-to-face learning. Instructors can use the platform to interact with students and to share relevant course materials and other related information. Similarly, according to Caminero *et al.*, (2018), Talent LMS is one of the most preferred open-source learning management systems due to its flexibility, ease of use, popularity, and compatibility. In the same study, it was further added that the Talent LMS handles large number of users with about three hundred adoptions worldwide.

Academic Performance

Academic performance is the measurement of students' achievements across various academic subjects. Teachers and education officials typically measure achievements using classroom performance, graduation rates and results from standardized tests. Academic performance is also considered to be the center around which the whole education system revolves. Narad and Abdullahi (2014), opined that the academic performance of students determines the success or failure of any academic institution. It is the extent to which a student, teacher or institution has attained their short or long-term educational goals. The completion of educational benchmarks such as secondary school, diploma and bachelor's degree, represents academic achievement.

Academic performance plays an important role in the life of a student as it determines his or her placement in the academic institutions or job. Due to this, many parents, teachers, guardians, and well-wishers are concerned about the ways their students can enhance their academic performance. The emphasis on academic performance which is also prevalent worldwide has encouraged many studies about the conditions promoting it. The role of academic performance as one of the predictors of students' success and also in the aspect of academic placement in schools to higher institutions as well as the level of employability in individual's career is inevitable (Osharive, 2015). Academic performance, which is measured by the examination results, is one of the major goals of a school (Tarek and Yasmin, 2015). Schools are established with the aim of imparting knowledge and skills to those who go through them and behind all this is the idea of enhancing good academic performance. Academic performance or achievement is the outcome of education, the extent to which a student, teacher or institution has achieved their educational goals (Raymond and Afua, 2016). Academic performance is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most important, procedural knowledge such as skills or declarative knowledge such as facts (Stacy, 2018).

Expository Method

Expository method of teaching for this study is the chalk and talk method of teaching. The expository method of teaching according to James (2014), is a method where ideas, concepts, generalization and facts are presented by the teachers to the students who are mainly passive

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hearers. The students on their own part are expected to memorize the fact and principles presented to them whether they understood or not and even produce verbatim during examination. James (2014), further stated that the term expository method of teaching is used to describe teaching in which large part or possibly the whole of the lesson is occupied by the teacher in exposition and by the students in listening or making notes.

Ebisin *et al*., (2017), posited that the expository or traditional method of teaching is concerned with the teacher being the controller of the learning environment. Power and responsibility are held by the teacher and they play the role of instructor (in the form of lectures) and decision maker (in regards to curriculum content and specific outcomes). They regard students as having 'knowledge holes' that need to be filled with information. In short, the traditional teacher views that it is the teacher that causes learning to occur. The expository or traditional approach to teaching, as ancient as formal teaching itself, involves the directed flow of information from teacher as sage to student as receptacle.

The expository instructional strategy involves a formal discourse or exposition on a subject matter to attain a stated instructional objective, the teacher does the talking while the learners listen and occasionally take notes (Udosen and Ukpong, 2019). The authors further asserted that in this method, the teacher or some other knowledgeable person supplies information to the students. Etim *et al*., (2016), explained that the expository method is a teaching method whereby the teacher transmits information (subject matter, content) verbally to the students. Sometimes, it involves writing on the chalkboard or using instructional materials. The students listen and take notes of facts that are considered important; sometimes the students are allowed to ask questions for clarification.

Talent LMS and academic performance of students

Talent LMS is an online-learning tool that connects teachers with students beyond the traditional classroom for effective learning activities. Teachers use the LMS to achieve their stated instructional goals through several activities that happen in the classroom. According to Ben *et al*., (2018), online-learning is an essential medium and constitutes a critical factor in virtual learning. The main purpose behind its adoption is to replace face-to-face teaching and learning. Scholars, while advancing the need to adopt the LMS as an instructional strategy, have identified some of its significance. Alecu *et al*., (2017), revealed the ability of the LMS to make learning easier and faster when compared with traditional classroom learning, promote interactive and collaborative learning experiences, encourage one to learn at his/her own pace, enhance flexible learning systems and give opportunities to learners to access the latest materials.

Talent LMS is a flexible, open-source LMS that supports teaching and learning that is grounded in collaboration, co-creating, and open sharing of knowledge. The key feature of LMS is the flexibility to incorporate wide variety of learning tools and technology-enabled instructional approaches; for students, Talent LMS encourages team-based learning, flipped classrooms, and other modes of instruction that engage students actively and deeply in the learning process; and for the institution, Talent LMS provides a sense of community, prestige, and quality assurance. The use of LMS in education for teaching and learning plays a key role in the effectiveness of content delivery to students in higher education and to the experiences of people/students, faculty, and administrators in the academic spaces. The use of LMS therefore has implications for productivity and learning. Apart from electrical power and internet bandwidth, capacity development–training and professional development of faculty, the fourth most important hindrance to the pervasive adoption of educational technology in the classrooms in developing

world including Nigeria is that of negative perceptions of secondary school teachers and students who has been brought up in a world with limited technology and find it difficult to fully embrace the new change where technology is largely used to engage and support teaching and learning.

Talent LMS can be used by Biology teachers to supplement the traditional face-to-face teaching method. Instructors use the platform to interact with students and to share relevant course materials and other related information. According to Oheneba-Sakyi and Amponsah (2018), the LMS can also make it possible for Biology teachers to transform teaching from paper-based modules to a multi-mode format where web-based (online) teaching can been integrated with the face-to-face method of lesson delivery. Technology-based learning tools have the potential to improve students' engagement, facilitate more personalized learning, and improve the accuracy of assessment. Technology-based tools also provide students with access to a wide range of instructional materials that are available online, allowing students to learn at their own pace.

Gender and Academic Performance of students

Gender for this study is the state of being a male or a female student. Gender, according to Goni *et al*., (2015), refers to the social attributes and opportunities associated with being male and female and the relationships between women and men; girls and boys, as well as the relations between women and those between men. These attributes, opportunities and relationships are socially constructed and are learned through socialization processes.

According to Mbajiorgu (2013), female enrolment in Commerce and social science subjects in general is very poor. This is in line with the study by Gonzuk and Chargok (2014), which revealed that the number of female students who study Commerce in secondary and tertiary institutions is small compared to the number of boys. This difference in the number of female and male students in the study of Commerce has created gender disparity in the academic performance of students in Commerce and social science subjects as a whole. Gender difference was first investigated by a sociologist of education. The focus was largely on the female under performance at every level of the educational system.

Gender is one of such factors also mentioned in literature to have considerable effects on students' academic performances in secondary schools. Gender is the range of physical, biological, mental and behavioural characteristics pertaining to and differentiating between the feminine and masculine (female and male) population. The importance of examining performance in relation to gender is based primarily on the socio-cultural differences between girls and boys. Some vocations and professions have been regarded as men's (Engineering, Arts and crafts, Agriculture among others) while others as women's (catering, typing, nursing among others). In fact, parents assign tasks like car washing, grass cutting, bulbs fixing, climbing ladders to fix or remove things among others to the boys. On the other hand, chores like dishes washing, cooking, cleaning and so on are assigned to the girls. In a nutshell, what are regarded as complex and difficult tasks are allocated to boys whereas girls are expected to handle the relatively easy and less demanding tasks. As a result of this way of thinking the larger society has tended to see girls as "the weaker sex". Consequently, an average Nigerian girl goes to school with these fixed stereotypes.

Irem (2017), defined gender as a psychological term used in describing behaviours and attributes expected of individuals on the basis of being born as either male or female. Okeke citing Irem (2017), specifically noted that the study of gender means the analysis of the relationship of men and women including the division of labour, access to resources and other factors which are determined by society as opposed to being determined by sex. It further involves the study of the socio-cultural environment under which responsibilities are assigned and the relationships emanating from it. Thus, gender equally projects the properties that distinguish and classify

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organisms on the basis of their reproductive and cultural expectant roles. It relates to the cultural and psychological attributes of men and women through their socio-economic contributions, expectations and limitations.

METHODOLOGY

This study adopted quasi–experimental design using non-randomized pre-test post-test control group. This study was conducted in Uyo Local Government Area of Akwa Ibom State. The population of the study consisted of 3,183 SS II Biology students in all the 15 public secondary schools in Uyo Local Government Area of Akwa Ibom State for the 2023/2024 academic session. Purposive sampling technique was used in selecting schools from the target population. A total of 216 respondents formed the sample size of the study which was made up of 110 female and 106 male students. The instrument used for data collection was Biology Performance Test (BPT) and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability co-efficient of 0.86 was considered to be highly reliable and useful in collecting the required data for the study. Descriptive statistics of mean, standard deviation and mean gain scores were used in answering all the research questions while Analysis of Covariance (ANCOVA) was used in testing all the null hypotheses at 0.5 level of significance.

RESULTS AND DISCUSSIONS
Research Question 1

What is the difference in the academic performance of SS II Biology students taught with Talent LMS and those taught using expository method?
Mean and Standard Deviation were used in answering the research question and the summary is presented in Table 1.

Table 1: **Mean and Standard Deviation of SS II Students taught Biology with Talent LMS and those taught with expository method.**

Treatment Groups	n	Pre-test $\bar{X}$	SD	Post-test $\bar{X}$	SD	Mean Gain
Talent LMS (Experimental)	110	22.84	4.64	63.41	6.47	40.57
Expository (Control)	106	22.63	5.28	51.37	7.42	28.74
Total	**216**					

Source: Field data (2024)

Data in Table 1 revealed the pre-test and post-test mean scores of experimental students taught Biology with Talent LMS of 22.84 and 63.41 with their respective standard deviations of 4.64 and 6.47. The result further shows the pre-test and post-test mean scores of students taught using expository method of 22.63 and 51.37 and their respective standard deviations of 5.28 and 7.42 respectively. This shows that there was a higher performance in the post-test scores of the two groups but the experimental group has the highest mean gain score of 40.57 as against 28.74 of the expository group. This means that utilization of Talent LMS in teaching Biology enhanced students' performance more than the expository method. This finding is in line with the position

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of Mtebe (2015), who posited that chat tool allows for chatting between lecturers and students, among course mates and between individual participants on the Talent LMS platform.

Research Question 2

What is the difference in the academic performance of male and female SS II Biology students taught using Talent LMS?

Mean and Standard Deviation were used in answering the research question and the summary is presented in Table 2.

Table 2:   Mean and Standard Deviation of SS II Male and Female Students' taught Biology with Talent LMS.

Gender	n	Pre-test		Post-test		Mean Gain
		$\bar{X}$	SD	$\bar{X}$	SD	
Male	54	22.83	4.91	63.76	6.46	40.93
Female	56	22.84	4.42	63.48	6.53	40.64
Total	110					

Source: Field data (2024)

The result in Table 2 revealed the pre-test and post-test mean scores of male students taught Biology with Talent LMS of 22.83 and 63.76 with their respective standard deviations of 4.91 and 6.46. The result further shows the pre-test and post-test mean scores of female students taught with Talent LMS of 22.84 and 63.48 with their respective standard deviations of 4.42 and 6.53 respectively. This shows that there was equal performance in the post-test scores of male and female students with a slight higher mean score in favour of male students, though not significant. Both male and female students performed almost equally as seen in their mean gain scores. This means that the use of Talent LMS in teaching Biology enhanced both male and female students performed almost equally. The outcome of this study is in agreement with the findings of Attah and Ita (2017), whose finding showed that gender has no significant influence on academic performance of students.

Hypothesis Testing

Research Hypothesis 1

There is no significant difference in the academic performance of SS II Biology students taught with Talent LMS and when taught using the expository method.

ANCOVA was used in testing the hypothesis and the summary is presented in Table 3.

Table 3:

Summary of ANCOVA analysis of SS II Students' taught Biology with Talent LMS and those taught with expository method (n=216).

Source	Type III Sum of Squares	df	Mean Square	F-ratio	P-value	Decision
Corrected Model	7775.496	2	3887.748	79.743	.001	
Intercept	34346.381	1	34346.381	704.490	.001	
Pre-test	38.800	1	38.800	.796	.373	
Main Effect*	7733.081	1	7733.081	158.616	.001	Sig.
Error	10384.504	213	48.754			
Total	732310.000	216				

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| Corrected Total | 18160.000 | 215 | | | | |

Source: Field data (2024)

The result in Table3 reveals that {F-ratio (2, 216) is 158.616, p=.001<0.05}. The implication of this, is that the significant value (.001) was found to be less than the alpha value (0.05) on which the decision was based. With this result, the null hypothesis of no significant difference in the mean performance scores of SS II students taught Biology using Talent LMS and those taught using expository method was rejected. This implies that there is a significant difference in the mean performance scores of SS II students taught Biology with Talent LMS and those taught with expository method. The result points to the fact that the experimental group taught with Talent LMS had a significant performance over the control group which is the expository group.

Research Hypothesis 2

Male and female SS II Biology students do not significantly differ in their academic performance when Talent LMS is used for instruction.

ANCOVA was used in testing the hypothesis and the summary is presented in Table 4.

Table 4: **Summary of ANCOVA analysis of SS II male and female students taught Biology with Talent LMS (n=110).**

Source	Type III Sum of Squares	df	Mean Square	F-ratio	P-value	Decision
Corrected Model	1.091	2	.545	.013	.987	
Intercept	17642.446	1	17642.446	414.387	.000	
Pre-test	.833	1	.83	.020	.889	
Main Effect*	.243	1	.243	.006	.940	Not Sig.*
Error	4555.500	107	42.575			
Total	446835.000	110				
Corrected Total	4556.591	109				

Source: Field data (2024)

The result in Table 4 reveals that {F-ratio (2, 110) = .006, p= .940>0.05}. The implication of this is that the significant value (.940) was found to be greater than the alpha value (0.05) which the decision is based. With this result, the null hypothesis of no significant difference in the academic performance of male and female SS II students taught Biology with Talent LMS was retained. This implies that there is no significant difference in the academic performance of male and female SS II students taught Biology with Talent LMS. This result is an indication that the difference in performance between male and female students when taught Biology using Talent LMS is not significant.

Conclusion

The study concludes that Talent LMS enhance academic performance of secondary school students in Biology in Uyo Local Government Area. The study showed that there is a significant difference in the academic performance of SS II Biology students taught with Talent LMS and those taught with expository method and also that there is no significant difference in the academic performance of SS II male and female Biology students taught with Talent LMS and those taught with expository method.

Recommendations

1. The use of Talent LMS should be utilized by teachers in teaching Biology concepts as this will enhance learning and hence facilitate academic performance of students.
2. Biology teachers should motivate boys and girls to learn effectively to avoid gender disparities in performance and retention.

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INTERCONTINENTAL JOURNAL OF EDUCATION, SCIENCE AND TECHNOLOGY ISSN 2659-1085, VOL 8 NO 1. JUL, 2024. USA.

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