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### RESEARCH ARTICLE

## EFFECTIVE LEARNING OF CHEMISTRY AMONG SECONDARY SCHOOL STUDENTS: THE ROLE OF LOCALLY SOURCED INSTRUCTIONAL MATERIALS

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### Abstract

The present study aimed to examine the predictive role of locally sourced instructional materials on the practical learning of chemistry among secondary school students. A total of two hundred and eighteen secondary school students participated in the study. A cross-sectional survey design was adopted. The participants responded to a self-report measure on their experience of locally sourced instructional material and the perceived learning outcome. A simple linear regression was conducted on the data, and the result showed that locally sourced instructional material statistically predicted effective learning of chemistry. Finding and conclusions are discussed.

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### Introduction: -

Chemistry is among the compulsory science subjects considered crucial in the academic setting. Chemistry is the branch of natural sciences that occupies an essential position in the secondary school curriculum (Igwe, 2015). Chemistry is a central science subject required at senior school certificate level for entry into nearly all basic and applied sciences courses at the tertiary level of education (Zephrius et al., 2015). Chemistry Education is considered an essential development subject to develop human capacity, increase the skilled workforce for modernization or personal freedom, and develop capability and empowerment (Ayodele, 2018). The knowledge of chemistry is an essential component in diverse vocations, including health, petrochemical, and food processing (Bamidele et al., 2013). Perhaps, chemistry is vital in the growth and development of the economy. The teaching of chemistry helps imbibe scientific knowledge and stimulate science-oriented learners' attitudes (Igwe, 2015).

However, there is a growing concern about the perceived interest decline in chemistry among secondary school students in Nigeria. This phenomenon could be attributed to the complexity of the teaching material and practice. Zephrius et al. (2015) implicated the high level of abstraction of chemistry concepts with no or inadequate laboratory resources for demonstration and experimentation as responsible for the interest decline in chemistry among young learners. An oral discussion with secondary school students revealed that the students perceive chemistry and other related subjects such as mathematics and physics as the most challenging subject in the curriculum. This perception could be traced to the instructional materials' ambiguity and complexity, including the teacher's methodology. Igwe (2015), Achimugu (2009) blamed non-provision of classrooms and laboratory facilities, the inadequacy of qualified chemistry teachers, lack of motivation to chemistry teachers, and inadequate provision of instructional materials as the challenges of learning chemistry.

The current study assumes that locally sourced instructional material remains a veritable tool in teaching and learning chemistry at the secondary level of education in Nigeria. To ensure that chemistry concepts are

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comprehensible to students, instructors must employ creative teaching methods (Nbina, 2012). Olayinka (2016) noted that instructional materials are essential and significant tools needed for teaching and learning school subjects to promote teacher's efficiency and improve student's performance. Chemistry teaching aids can help relate chemistry with the phenomena of everyday life (Priyambodo & Wulaningrum, 2017). Accordingly, Fadeiye (2005) referred to instructional materials as visual and audio-visual aids, concrete or non-concrete, applied by teachers to improve teaching and learning quality. Thus, the current study aimed to assess student's perception of the role of locally sourced instructional learning tools on the learning outcome of chemistry at the secondary school level.

### Method: -

The current study adopted a cross-sectional survey design. The population included secondary school students in Enugu State, Nigeria. Two hundred and eighteen (218) students were randomly drawn from the selected schools with the study parameter.

### Measures: -

A self-report measure designed to elicit student's experience of locally sourced instructional material and their perceived learning outcome was developed for the study. The Likert-type scale scored in a five-point scale comprised two parts with a total of fifteen items. The reliability of the scale was determined at .87 Cronbach alpha coefficient.

### Result: -

**Table 1:** -Table showing the result of simple regression analysis on the role of locally sourced instructional material in the effective learning of chemistry.

Model	B	SEB	$\beta$	$R^2$	t	Sig
(Constant)	-.822	0.98				
Locally Sourced Material	.653	.098	.653	.416	6.667	.000

a. Dependent Variable: Effective learning of chemistry.

A simple linear regression was conducted to determine the effective learning of chemistry based on locally sourced instructional materials. The result showed that locally sourced instructional materials positively predicted adequate understanding of chemistry at ( $F(2, 65) = 23.169, P < .000$ ), with an  $R^2$  of .416. The result showed that locally sourced instructional materials significantly predicted effective learning of chemistry.

### Discussion: -

The present study aimed to investigate the role of locally sourced instructional material in the effective learning of chemistry among secondary school students. The result showed that locally sourced instructional materials statistically contributed 41.6% of the variance in an adequate understanding of chemistry. The study's finding is aligned with the reports of previous studies (e.g., Oladejo et al., 2011; Esu et al., 2004; Ifeoma 2013; Olayinka 2016; Atanda and Jaiyeoba 2011). Accordingly, the above studies found improvisation of the instructional material to be more effective for teaching and learning, especially in science subjects. A probable explanation for the effectiveness of locally sourced instructional material is that it conforms to the learners' norms, whereas the conventional learning material is designed from western principles. In other words, locally sourced instructional materials are custom-made materials aimed at a particular individual considering their learning styles.

### Strength, Weakness, and Suggestion for Further Studies

The study further provided evidence supporting applying locally sourced instructional material in teaching and learning chemistry and related subjects at the secondary school level. It further revealed that students hold a positive perception of the practice. It is essential to state the limitations of this study. First, the study adopted a cross-sectional survey design and did not conduct experimentation on the possible cause-effect relationship. Secondly, the sampling method may not be suitable for the generalization of the result of the study. Nevertheless, it is suggested that future researchers adopt a more robust sampling approach and conduct experimentation on a broader scope.

**Conclusion:-**

The current study examined the predictive role of locally sourced material in the effective learning of chemistry. The simple linear regression result revealed a statistically significant association between locally sourced instructional material and the effective understanding of chemistry. Hence, it is concluded that locally sourced instructional materials are an indispensable tool in chemistry learning. Therefore, it is recommended that the trend be effectively adopted in the curriculum and across the secondary school level.

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