A Survey Report on the Effectiveness of Advance Organizers Research as a Teaching Strategy

Josephat K. Kigo[1*], Mark Okere[2], Christopher M. Maghanga[3]
[1]School of Education, Kabarak University
[2]Faculty of Education and Community Studies, Egerton University
[3]Department of Physical & Biological Sciences, Kabarak University

Abstract

The effect of various types of advance organizers on students' achievement and retention in various subjects and at various learning levels has been a vibrant area of research in education. Use of advance organizers has been attributed to overcoming low performance of students in subjects like chemistry, physics and others. The causes of low performance has been attributed to insufficient man power, lack of equipment, poor attitude of students, poor understanding of concepts involved and even overloaded curriculum and ineffective teaching. This paper reports on the survey of most recently published research results on the effectiveness of advance organizers in teaching. Integration of technology for the construction and use of advance organizers will also be discussed. If seen as an intervention to improving performance and retention, teachers and tutors will be encouraged to adopt advance organizer teaching strategy.

Key Words: Advance organizer, types of advance organizer, achievement, retention, technology

Introduction

Science teaching and learning process is mandatory part of education in many countries of the world. The Kenya National Examination Council issues certificates at Kenya Certificate of Secondary Education (KCSE) if one sat for at least two science subjects from among biology, chemistry and physics. Efforts are being made to improve the learning of students in all science subjects.

Advance organizers theory supports effective teaching and learning process. It is an appropriate instructional strategy for teaching science concepts (TannveerUzZaman, Choudhary & Qamar, 2015). An advance organizer is not a summary or review of a previous lesson. It does not provide a structure for the current lesson but provides a structure for student thinking and acts as a conceptual bridge from the old information to the new information. Curzon (as cited in TanveerUzZaman et al, 2015) states that an advance organizer is designed to cue the relevant prior knowledge of the student and it is normally presented at a higher order abstraction level. Analogies and metaphors are frequently used as advance organizers because they help students recognize that the topic they are beginning to learn is not totally new, but rather can be related to something they are already comfortable with. Advance organizers provide frame works to enable students learn new ideas or information by meaningfully linking these ideas to the existing knowledge (TanveerUzUzaman et al. 2015)

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* *Corresponding author email kakmg2003@yahoo.com*

Advance Organizers

Use of advance organizers is one of the evidence-based pedagogical strategies to promote meaningful learning in traditional classrooms. An advance organizer is defined as relevant introductory materials presented in advance of a lesson of higher abstraction, generality and inclusiveness than the learning tasks itself (Ausubel, 2000). This learning strategy has been proven to be an effective learning strategy to activate existing knowledge and to provide information to incorporate details of new lessons in traditional classroom environments (Ausubel, 1968; Hirumi & Bowers, 1991; Kenny, 1992; Luiten, Ames, & Ackerson, 1980; Mayer, 1979b; Stone, 1983). Among the different formats of advance organizers, the concept map, a visual advance organizer, has been widely used in classrooms and noted with positive effects on learning (Gil-Garcia & Villegas, 2003; Kang, 2002; Millet, 2000). Recent studies conducted on the use of advance organizers, including both text advance organizers and concept maps in computer-based classes, reveal a mild but positive effect on learning and retention (Calandra,2002; McManus, 2000; Tseng, Wang, Lin, & Hung, 2002; Yeh & Lehman, 2001). Although many of the researchers claim that their studies tested the use of advance organizers in online learning, all identified research studies took place in physical computer-equipped face-to-face classrooms or labs where students and teachers were both present during a limited duration of time. None of the study was conducted in a fully Web-based environment where the instructor was physically and geographically separated from the learners.

Types of Advance Organizers

Citing, East Carolina University College of Education, Instructional Strategy Lessons for Educators in Secondary Education, (2014) describes the following varieties of advance organizers:
Expository, this is a description of a new concept to be presented, highlighting important content.
Narrative, the anecdote that connects personal experiences or real world events to the new concept to be presented.
Skimming, this are previews of readings that will occur later in the lesson, paying special attention to headings, bold print, etc.
Graphic, examples, such as KWLs, flow charts, and other visual tools that tap into prior knowledge or imply the scope and organization of new content.
From varies researches, advance organizers come at the beginning of a lesson or during the statement of lesson objectives before the new learning. Advance organizers can be compared with a meeting permeable where the agenda outlines the meeting deliberations. Advance organizers help students prepare their brains to receive and make sense of the new information. Successful advance organizers forecast or access the prior knowledge to discern what is important in the lesson and learning it to the point of recall.

Constructing Advance Organizers
The basic questions an instructor needs to ask while preparing an advance organizer includes the following among others:
1. How will this organizer...
• engage students?
• help students connect to prior learning/existing cognitive structures?

• discern what is important in the lesson?
• organize content from the lesson?
2. How will I reference this organizer during or after instruction?
3. How will the advance organizer be implemented in advance?

The ASSURE model for teachers' planning for media use recommends the following steps:
* Analyze learners
* State objectives
* Select media and materials
* Utilize media and materials
* Require learner participation

Evaluate and revise (Heinich, Molenda,& Russell,1993,pp.34-35)

It is generally accepted that advance organizers should foster student engagement, activate prior knowledge, help students identify and organize important information and meet the needs of students.

Studies on Advance Organizer Effect

Many studies on the effect of advance organizer have been done. The ultimate end is to construct knowledge instead of rote memorization by using activity based methods and inquiry based methods. Learning is effective while meaningful; improvement of science education in this era of technological innovations is a dire need. Safdar (as cited in Tanveer UzZaman, et al, 2015) stated that "how to learn is equally important with what to learn but how to teach is more important than what to teach.'' Using the variate of "voting techniques', of 32 advance organizer studies classified as having significant and no significant effects, Barnes and Clawson (as cited in Luiten, Ames,& Ackerson, 1980) noted that no significant studies outnumbered significant ones and hence concluded that advance organizers as constructed generally do not facilitate learning. Inaccuracies and inconsistencies in the voting technique were noted by Lawton and Wanska (as cited in Luiten et al. (1980). Techniques by which treatment effects may be quantified and standardized and compared were proposed.

In a study to analyze the effectiveness of advance organizer studies covering the period from 1960 to 1979, Glass, 1978(as cited in Lutein, Ames and Ackerson, 1980) used "effect size" Statistics (E.S).

E.S$=\frac{X_t - X_c}{SDc}$

where: X_t= mean of treatment group, X_c = mean of control group and SD_c = Standard deviation of control group, is a standardized measure of treatment effect that may be applied to a single study or averaged across several studies of similar type to provide a composite figure.

The use of E.S avoided the bias of the voting technique used by Barnes and Clawson (as cited by Lutein et al. 1980) and the detection of small, but consistent treatment effects are made possible across studies. The analysed results for the period 1960 to 1979 considered mainly the effect of the advance organizer on learning and retention. Other possible influencing variables such as

grade level, subject area studied, organizer presentation mode and subject ability level were also considered (Lutein et al, 1980).

Table 1:

Summary of recent studies

AO	LEVEL	RESULTS	GENDER EFFECT	AUTHOR
Pictorial & Written	Senior Secondary	Enhanced achievement and Retention of learning materials in chemistry	No significant difference between the achievement of males and females	O.L. Oloyede
Graphics, Graphic and Text and multimedia instructional organizers.	Undergraduate course on health care ethics.	No statistically significant difference regarding the use of AOs among treatment groups and the control group, additional qualitative data indicated that students held overwhelmingly positive attitudes towards using AOs, especially the concept map, in online learning		Baiyun Chen, Atsusi Hirumi University of Central Florida
expository and comparative advance organizers also used were Pictorial and written advance organizers	students of 9th grade	the use of Advance Organizers Strategy had a positive effect on the performance of experimental group. The use of Advance Organizers Strategy found to be helpful for enhancing retention ability of the students.		Dr. TanveerUzZaman, Farkhunda Rasheed Choudhary, Arshad Mahmood Qamar
'Microteaching' for AOM which included the skill of introduction,	*prospective teachers in physical science education.*	there is 1.significant difference in post-test scores between the experimental group I taught by AOM and experimental group II taught by ITM.		P.B. Beulahbel Bency and K. Nagarajan

skill of explaining, skill of stimulus variation, skill of reinforcement, skill of questioning, skill of using blackboard, skill of demonstration and skill of achieving closure.		2.there is significant difference in gain scores between the experimental group I taught by AOM and experimental group II taught by ITM. 3.The experimental group I taught by AOM retained more in physical science education than experimental group II taught by ITM.		
Pictorial, written and verbal advance organizers	Senior Secondary School two	1.Pictorial Advance Organizers (PAO) is most facilitating in enhancing the performance and Retention of concepts in electromagnetism. 2.No significant difference existed between the mathematical abilities of students taught using the advance organizers and those taught without advance organizers in their performances on the concepts of electromagnetism		Okey, I. F. and Avwiri, E**.**
Water flow	Secondary schools	1.Enhances student's achievement in electric current flow 2.Achievement greater for the pre-tested groups than for those not pre-tested	No significant difference between the achievement of males and females	Josephat k. kigo
a visual concept map and a text outline	college students	1.not statistically significant AO effect among the treatment groups and the control group. 2.a positive but inconclusive benefit of using AOs for students'		Baiyun Chen

		short-term knowledge acquisition. 3.More importantly, this study reiterated the proposition that students of lower-learning abilities benefit more from using an AO for online learning than those of higher-learning abilities.		

Conclusion

Notice that, without the advantage of any setup, without any forecasting of content or accessing of prior knowledge, discerning what is important and learning it to the point of recall is rather challenging.

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