Using Adobe Captivate to creative Adaptive Learning Environment to address individual learning styles: A Case study Christian Service University

Dr. Thomas Yeboah, HOD, Computer Science Dept., Christian Service University College
Christopher A. Abilimi (MPhil), Lecturer, Computer Science Department, Christian Service University College, Kumasi, Ghana.

Abstract

Individual learner can learn best if the learning environment addresses the individual learning style. The project sought to address the individual learning styles by constructing an adaptive learning environment that addresses individual learning style by using adobe captive. The project aimed to create an individualized learning environment, which accommodates the specific learning styles of learners and to assess whether this led to an improvement in performance in terms of learning gain, motivation, progression and enjoyment. This research revealed that when a learner has the choice of varying the learning environment there is significant effect on the learner in terms of learning gain, motivation, enjoyment and progression.

1. Introduction

Every Learner in the academic ladder has a learning style that she/he can learn best. Paivio (1986) dual coding theory indicates that the human brain works with (at least) two cognitive subsystems, one of which deals with language and other with visual. According to his theory, instruction is more efficient by presenting information in both visual and verbal form. Paivio dual coding theory has also been supported by Meyer (2001) dual channel assumption which also argues that humans possess separate information processing channels for visual and verbal information. Students learn better if both channels are addressed simultaneously. However, at Christian Service University College materials given to learners by Course Lecturers only addresses one aspect of cognitive subsystems which is the visual subsystem. According to Rundle and Dunn (2000), visual text learners remember material best by reading it. Furthermore, Rundle and Dunn (ibid) emphasized that visual learners prefer information represented in a pictorial fashion and create mental images according to what they hear or see.. Again Rundle and Dunn (ibid) claimed that tactile-kinesthetic learners prefer to physically interact with

what they learn. Lastly, Rundle and Dunn (ibid) proposed that auditory learners prefer listening to instructional content. It is therefore important for the lecturers to present the course materials in different format in order to satisfy individual learners.

In view of this the research seeks to investigate whether implementation of an interactive learning environment can be used to improve the performance of students at Christian Service University College and also reduce learning tension on students especially the evening students.

2. Problem Statement

Despite the fact that each learner has a learning style that he/she can learn best, it is rather surprising that very few empirical research has actually been conducted at the institution from the perspective of the learner learning style and the grade achievement.

This research seeks to investigate whether the use of Adaptive Learning Environment (ALE) that addresses the individual learning styles can improve the performance of learners and their grade achievement.
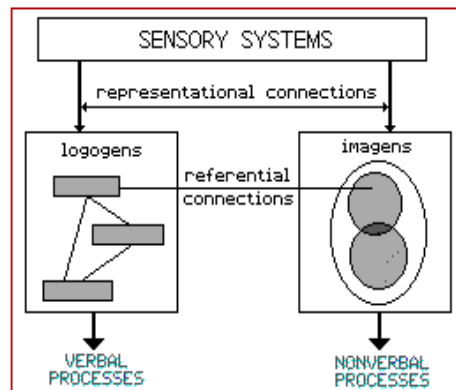
3. Research Questions

A psychoanalysis of the problem indicated that the following research questions were appropriate to form the basis of this study.

i. How does the effective use of learning resources motivates the learners and improves their grade achievement?

ii. Does the adaptive environment provide users with a more satisfying, motivating learning experience thus promoting better retention and better results than the static environment?

4. Research Objectives

The purpose of this research is to investigate whether the use of Adaptive Learning Environment (ALE) that addresses the individual learning styles can improve the performance of learners and their grade achievement. In order to achieve this specific objectives for this research are:

i. Investigate into individual learning styles of students at Christian Service University College.

ii. Investigate into the learning environments of the learners at Christian Service University College.

iii. Investigate into the preferred learning environment of students at Christian Service University College.

Figure 1-1: Paivio Dual Coding Theory

5. Literature Review

5.1 Learning Style Theory

James and Blank (1993) define a learning style as the complex manner in which, and the conditions under which, learners most efficiently and most effectively perceive, process, store and recall what they are attempting to learn. Again Dunn and Dunn (1993) also defined learning style as the way in which each learner begins to concentrate on, process, and retain new and difficult information.

5.1.1 Paivio Dual Coding Theory

Paivio (1986) found strong evidence supporting his Dual Coding Theory. He postulates that the human brain works with (at least) two cognitive subsystems: one specialized on dealing with language. According to his theory, instruction is more efficient by presenting information in both visual and verbal form. The diagram in figure 1-1 illustrates Paivio dual coding theory.

Source: Paivio (1986) Dual Coding Theory

Paivio dual coding theory has also been supported by Meyer (2001) dual channel assumption which also argues that humans possess separate information processing channels for visual and verbal information. Therefore learners can learn better if these cognitive subsystems are addressed in the learning environment of the learners.

5.1.2 Curry Learning Style Theory

Curry (1991) suggested after extensive reviews of the cognitive and learning styles literature, that learning style theories can be generally categorized into three different schools of thoughts or dimensions:

i. *Perceptual Modality: The* way our body takes in information with our senses: biologically-based reactions to the physical environment.

ii. *Information Processing:* The way our brain processes information: distinguishes between the way we think, solve problems, and remember

iii. *Personality Models* The way we interact with our surroundings: could be thought

Furthermore, curry categorized learning styles into three different layers that is compared with onion. Figure 1-2 illustrates the layers of learning styles compared with onion by Curry.

Figure 2-2 Curry's onion Model of learning style theory
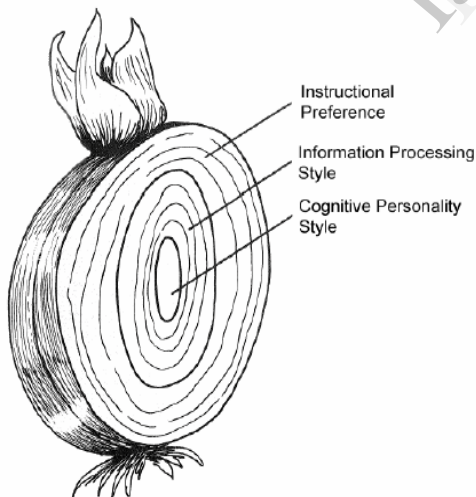
Source: Curry (1991) Onion Model of learning style

The outer shell of the onion model contains instructional preferences. Styles in this layer are concerned with ―an affinity for various modes of information delivery‖ (Curry, 2000, p. 239). They are believed to be the least stable over time and easy to alter through interactions with other variables.

The middle layer of the onion model holds information processing styles. These styles deal with the way our brain processes information. Information processing influences the way learners think, solve problems, and remember. These styles are believed to be more time stable.

The core of the onion consists of cognitive personality styles. Styles in this layer are concerned with deep personality traits that indirectly influence how learners interact with their environment. These styles are believed to be the most time stable

5.1.3 Kolb Learning Style Theory

Kolb (1984) theorized that four combinations of perceiving and processing determine four learning styles that make up a learning cycle. According to Kolb, the learning cycle involves four processes that must be present for learning to occur:

i. *Diverging (concrete, reflective)* - Emphasizes the innovative and imaginative approach to doing things. Views concrete situations from many perspectives and adapts by observation rather than by action. Interested in people and tends to be feeling-oriented.

ii. *Assimilating (abstract, reflective)* - Pulls a number of different observations and thoughts into an integrated whole. Likes to reason inductively and create models and theories.

iii. *Converging (abstract, active)* - Emphasizes the practical application of ideas and solving problems. Likes decision-making, problem-solving, and the practicable application of ideas. Prefers technical problems over interpersonal issues.

iv. *Accommodating (concrete, active)* - Uses trial and error rather than thought and reflection. Good at adapting to changing circumstances; solves problems in an intuitive, trial-and-error manner, such as discovery learning. Also tends to be at ease with people.

Figure 1-3: Kolb Learning Style Theory
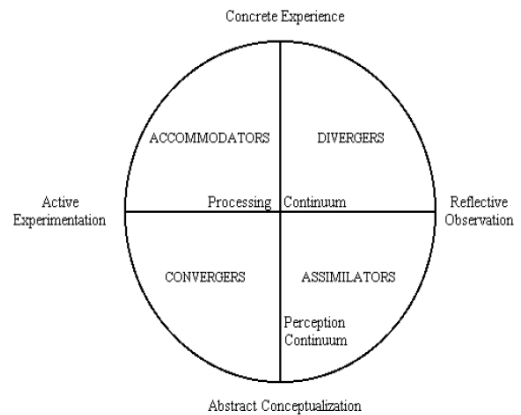
Source: Litzinger and Osif (1992, p. 79)

6. Methodology

6.1 Population

The population of the study consists of the Level 300 Bachelor of Business Administration students of the 2013/2014 academic year at Christian Service University College. The reason for including only these students was to delimit the study and minimize certain differences that could emerge due to academic differences of the students. A total population of three hundred (300) students was used for the study.

6.2 Sampling Techniques

In this study the sampling techniques used was Stratified Sampling techniques. This method is used when the parent population or sampling frame is made up of sub-sets of known size. These sub-sets make up different proportions of the total, and therefore sampling should be stratified to ensure that results are proportional and representative of the whole. The reason why this sampling technique was appropriate for this study is to get students who attended all the lectures during the study of Information Systems when they were in level 200.

6.3 Sample Size

As the sample was selected by stratified sample technique; two strata of students were made. One of the strata constitutes those students started the course from level 100 and attended all the lectures for the course CSAD 247 Information Systems whiles the other constitutes students who joined the class at level 200 and attended all the lectures for the course CSAD 247 Information Systems during 2012/2013 academic year. In view of this a sample size of two hundred and twenty eight (228) was obtained for the study which constitutes 76% of the total population for the study.

6.4 Instrument for the Study

In order to obtain the data for the study the instrument used for the study was questionnaire.

6.5 Conceptualized Framework

In the Adaptive Learning Environment (ALE) the learner needs to login with the user name and password, afterwards the learner select a topic to study and the learning style he or she can learn best. Figure 1-4 shows the activity diagram of a learner using the adaptive learning environment (ALE).

Figure 1-4: Conceptualized Framework for ALE
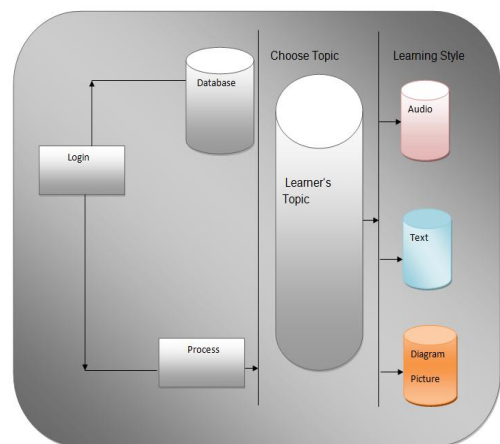
Source: Author's Construct

7. Results

In order to test for any differences between a situation whereby the learner has the option to choose the learning style that he/she can learn best (C) and whereby no choice can be made on learning styles (NC) of conditions regarding the dependent variables (learning gain, enjoyment, progress, and motivation), mean and standard deviation calculations were performed. The results are listed in Table 1-1:

Table 1-1: Mean Comparisons between Choice/No Choice of learning style

Dependent variable[a]	Mean			SD	
	C[b]	NC	Diff.	C	NC
Learning gain[c]	1.14	1.47	-0.33	1.49	1.71
Enjoyment	3.15	3.08	0.07	1.26	1.47
Progress	3.23	3.28	-0.05	1.23	1.45
Motivation	2.91	2.75	0.16	1.32	1.39

Furthermore, in order to establish a concrete decision on the effect that the choice of learning style has on the learner a p-values were also calculated. Table 1-2 lists p-values and the on learner.

Table 1-2: P-values and Effect for Choice of learning styles on learner.

Dependent variable[a]	t	r	p	d^{b}
Learning gain	-1.39	0.71	.18	-0.20#
Enjoyment	0.40	0.84	.69	0.04
Progress	-0.31	0.80	.76	-0.04
Motivation	1.49	0.91	.15	0.12

.

It can be observed from both Table 1-1 and Table 1-2 that mean scores indicate that the choice condition had a slightly negative influence on learning gain and progress, but a slightly positive influence on enjoyment and motivation. Even though the paired-samples t-tests between the choice and no choice condition revealed no significant differences for any of the dependent variables, a small negative effect was found for the choice/learning gain interaction.

8. Conclusion

The study was carried out to find out the correlation between the choice of learning style and its effect on the learner in terms of learning gain, enjoyment, progression and motivation. It was observed from the study that most of the learners studying Bachelor of Business Administration at Christian Service University College preferred choice

of learning styles and therefore lecturers should vary their learning environment to address individual learning styles of a learner in order to improve students' performance at Christian Service University College..

9. References

i. Ainsworth, S. E. (1999):*A functional taxonomy of multiple representations*, Computers and Education 33(2/3), 131-152.

ii. Ausubel, D. (1968): Educational Psychology, A Cognitive View, Holt Rinehart and Winston, New York.

iii. Banahene, S. (2003): Principle and Practice of Educational Psychology, Kasbed, Kasoa

iv. Boateng, A. (1998): Introduction to Educational psychology, 2nd Edition, University Press, Ghana.

v. Bruner, J. (1968). Toward A Theory Of Instruction. Norton, New York.

vi. Clark, J. M., & Paivio, A. (1991).*Dual coding theory and education.* Educational Psychology Review 3(3), 149-170.

vii. Mayer, R. E. (2001). Multimedia learning. Cambridge, U.K.; New York: Cambridge University Press.

viii. Paivio, A. (1986). Mental representation: A dual coding approach. Oxford: Oxford University Press.

ix. Pollock, E., Chandler, P., & Sweller, J. (2002). Assimilating complex information. Learning and Instruction, 12, 61–86.

x. Shin, E. C., Schallert, D. L., & Savenye, W. C. (1994). Effects of learner control, advisement, and prior knowledge on young students' learning in a hypertext environment. Educational Technology Research and Development, 42, 33-46.