



A COMPARATIVE STUDY ON PERFORMANCES OF STUDENTS ON DISTANCE LEARNING COURSES WITH REGULAR STUDENTS

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Abstract: *Students at higher institutions in Ghana offering distance learning courses precisely University of Education perform poorly as compare to their counterpart in regular students. This study asked the question: is this poor performance due to the fact that there is no face-to-face lecture for them, ineffective use of learning resources or static way of delivering the learning resources? In looking for ways of improving their performance the study asked whether a more web-based adaptive learning environment that addressed individual learning styles might assist individual learners un-ravel the learning challenges and enhance their performance.*

Keywords: *Distance Learning Students, Regular Learning Students, poor performance, Adaptive Learning Environment, Static Learning Environment, Dual Coding Theory and Dual Channel Assumption.*

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INTRODUCTION

It has become obvious that many students at higher institutions in Ghana offering distance learning perform poorly precisely University of Education (UEW). At University of Education distance education Unit (DEU) almost all the instructors/lecturers provide instructional materials in book or lecture note format. The problem may be that individual learners have different learning style and the static way of delivering courses material, for it is apparent that different learners have different ways of receiving and assimilating instruction.

According to Rundle and Dunn (2000), visual text learners remember material best by reading it. Therefore, the matched media experience was a text-only version of the content, which comprised rich text formatting such as annotated source code sections and highlighted key concepts. The same authors (ibid) have emphasized that visual learners prefer information represented in a pictorial fashion and create mental images according to what they hear or see. These learners were accommodated by supplementing the text with illustrations, diagrams, flowcharts or non-interactive animations. Again, Rundle and Dunn (ibid) have claimed that tactile-kinesthetic learners prefer to physically interact with what they learn, and that auditory learners prefer listening to instructional content.

The main objective of the research reported in this paper was to construct and evaluate an e-learning environment, which adapted itself to individual learners' learning styles. The project sought to address the individual learning styles by constructing web-based learning environments that address individual learning styles of the learner. The project aimed to create an individualized learning environment, which accommodated the specific learning styles of learners and to assess whether this led to an improvement in performance. This learner-centred approach aimed to increase learning motivation, retention of knowledge and understanding and a more positive attitude towards the content being taught.

Current learning theories and derived learning techniques were considered the tools to achieve this. The learning environment was a computer-generated and web-based prototype. After a small pilot study with 10 participants, a larger experimental field study with 54 participants was conducted. The aim was to measure the effectiveness of the adaptive learning environment (ALE) in comparison with a static learning environment (SLE).

LITERATURE REVIEW

The theory behind this research work was based on Paivio (1986) dual coding theory, which is incorporated in a web-based environment to create a dynamic environment for learners so as to address learning styles of learners in order to reveal learning challenges of learners.

Dual Coding Theory

Paivio found strong evidence to support his Dual Coding Theory (Paivio, 1986). He postulated that the human brain works with (at least) two cognitive subsystems, one of which deals with language. According to his theory, instruction is more efficient by presenting information in both visual and verbal form.

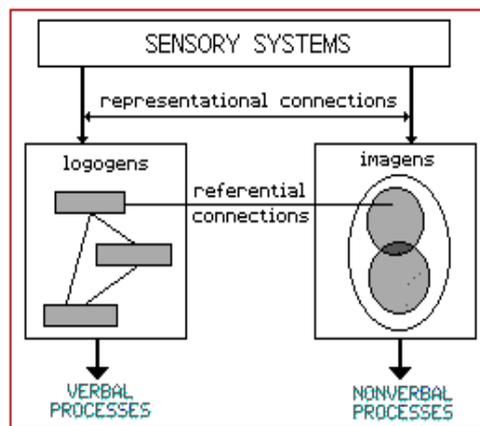


Fig 1. Paivio's Dual Coding Theory

Paivio's research has been recently backed up by Mayer's Comprehensive Cognitive Theory of Multimedia Learning (Mayer, 2001). Mayer's theory consists of three assumptions:

- **Dual-Channel Assumption:** This assumption is closely related to Paivio's findings (Clark & Paivio, 1991). It argues that humans possess separate information processing channels for visual and verbal information. Students learn better if both channels are addressed simultaneously.
- **Limited-Capacity Assumption:** The human brain is limited in the amount of information it can process at any one time per channel. This assumption is backed up by Sweller's Cognitive Load Theory (Sweller 1999) and argues that appropriate structuring and "chunking" of multimedia content is necessary to facilitate learning.
- **Active-Processing Assumption:** Humans actively engage with what they learn and construct their own mental representations. This process involves paying attention,



organizing new content and relating it to prior knowledge. A multimedia environment should therefore encourage and enable students to actively engage with the content taught.

Curry (1991) has suggested that learning style theories can be generally categorized into three different schools of thoughts or dimensions:

- **Perceptual Modality:** The way our body takes in information with our senses: biologically-based reactions to the physical environment.
- **Information Processing:** The way our brain processes information: distinguishes between the way we think, solve problems, and remember
- **Personality Models:** The way we interact with our surroundings could affect our thoughts.

HYPOTHESIS

The hypothesis of this research was that distance learning students perform poorly as compare with their counterpart in the regular universities because the resource material are not varied to address individual learning style of the learner at University of Education distance learning Unit. 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'.

DATA AND METHODOLOGY

Data for the study have been collected through a face-to face interview with some of the lecturers who teaches both the distance learning students and the regular students. A sample size of 54 lecturers has been used in the study. This sample size has been chosen based on the ability to reach the lecturers at the university at time of the research. The figure 2 shows the lecturers who were interviewed during the data collection process.

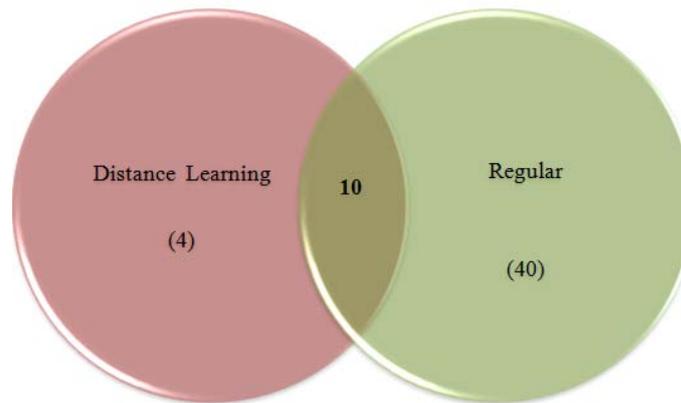


Fig 2: Lecturers interviewed

RESULTS AND DISCUSSIONS

The descriptive statistics of categorical and continuous data have been presented in tables 1 and 2 respectively.

Table 2 displays the descriptive statistics of the categorical data. It shows that out of 54 lecturers were interviewed about the better performance of regular students over distance learning students; 4 lecturers only for distance learning students, 10 lectures for both distance learning students and 40 lectures only for regular students.

Table 1: Descriptive Statistics of categorical Data

Categories	Frequency
Distance Learning (DL)	4
Both distance Learning & Regular(DRL)	10
Regular Learning (RL)	40

Table 2: Responses from lecturers on better performance of regular Students over distance learning Students.

	DL	DRL	RL
Yes	2	4	30
No	2	6	10



In testing of the hypothesis on better performance of regular students over that of distance learning students a chi square was used. The following gives the details: Table 4 and Table 5 give the Data Contingency table and Expected values contingency table respectively.

Table 3: Data Contingency table

	DL	DRL	RL
Yes	2	4	30
No	2	6	10

Table 4: Expected Values Contingency Table

	DL	DRL	RL
Yes	2.67	6.67	26.7
No	1.33	3.33	13.3

Degrees of Freedom (DF) = (3-1) * (2-1) = 2

Chi Square value Calculated (X^2) = 4.95

Chi Square Distribution Table is shown in table 6

Table 6: Chi Square Distribution Table

Df	0.5	0.10	0.05	0.02	0.01	0.001
1	0.455	2.706	3.841	5.412	6.635	10.827
2	1.386	4.605	5.991	7.824	9.210	13.815
3	2.366	6.251	7.815	9.837	11.345	16.268
4	3.357	7.779	9.488	11.668	13.277	18.465
5	4.351	9.236	11.070	13.388	15.086	20.517

Since the Chi Square (X^2) 4.95 did not exceed critical value for 0.05 probability level (5.991) the hypothesis can be accepted that regular students performance is better than distance learning students.

CONCLUSION

The study seeks to find evidence of better performance of regular students over distance learning students due to the fact that learning material that instructors/lecturers give to the learners who are offering distance learning course are only text based which satisfy only the



visual cognitive subsystem of the perform. Revert to Paivio's Dual Coding Theory (Paivio, 1986; Clark & Paivio, 1991) which suggests that instruction is more efficient by presenting information in both visual and verbal form and also Mayer's Comprehensive Cognitive Theory of Multimedia Learning (Mayer, 2001) on Dual-Channel Assumption which also indicates that humans possess separate information processing channels for visual and verbal information. Students learn better if both channels are addressed simultaneously. This means that the distance learning students performance can be improved if these two theorems are considered when preparing course materials for students especially those who are offering distance learning courses.

REFERENCES

1. Ainsworth, S. E. (1999): A functional taxonomy of multiple representations, *Computers and Education* 33(2/3), 131-152.
2. Ausubel, D. (1968): *Educational Psychology, A Cognitive View*, Holt Rinehart and Winston, New York.
3. Banahene, S. (2003): *Principle and Practice of Educational Psychology*, Kasbed, Kaso
4. Boateng, A. (1998): *Introduction to Educational psychology*, 2nd Edition, University Press, Ghana.
5. Bruner, J. (1968). *Toward A Theory Of Instruction*. Norton, New York.
6. Clark, J. M., & Paivio, A. (1991). *Dual coding theory and education*. *Educational Psychology Review* 3(3), 149-170.
7. Mayer, R. E. (2001). *Multimedia learning*. Cambridge, U.K.; New York: Cambridge University Press.
8. Paivio, A. (1986). *Mental representation: A dual coding approach*. Oxford: Oxford University Press.
9. Pollock, E., Chandler, P., & Sweller, J. (2002). Assimilating complex information. *Learning and Instruction*, 12, 61–86.
10. 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.
11. Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science*, 12(2), 257-285.