

EFFECTIVENESS OF AN INTEGRATED LEARNER-CENTRIC APPROACH FOR TEACHING COMPLEX ICT CONCEPTS AT A HIGHER EDUCATIONAL INSTITUTION IN BOTSWANA

Sivakumar Venkataraman, Annamalai Alagappan

Botho College (BOTSWANA)

sivakumar.venkataraman@bothocollege.ac.bw, annamalai.alagappan@bothocollege.ac.bw

Abstract

Teaching methodology has a greater impact on the way students learn from teachers and tutors. However traditional class rooms are meant for rote learning, hence, there exists some challenges in promoting “in-depth learning” among the learners when it comes to teaching complex ICT concepts. This paper has been developed based on the experience of introducing an integrated approach towards promoting in-depth learning and understanding by the students. This integrated approach comprises of four stages namely concept based animated slides, interactive role play, multi stage programming activities and formative feedback focused evaluation. Though actually developed for teaching complex ICT concepts, it can also be extended to teaching of other simple concepts depending on the availability of time.

Theoretical understanding of concepts is facilitated by using the concept based animated slides where the process is explained in a stage by stage sequence. The interactive role play with additional assistance from tutors builds up on their understanding levels. Subsequent to the theoretical introduction, learners are introduced to the practical aspects by the way of multi stage programming activities which may provide an in-depth practical knowledge. Finally, formative feedback focused evaluation helps the learners to correct their flaws and guide them towards an improved understanding of the concepts learned.

The practicing of the approach has resulted in sustainable improvements. The authors have practiced this approach in their classrooms for some of the complex ICT concepts at Botho College. They have observed and experienced that the outcomes are in high level of quality. However there are some challenges in practicing this approach amongst the learners and the tutors like preparation of quality and effective animation slides, availability of the resources and deviation for the learners from the concept to the animation on the slides etc. The results obtained and challenges faced in using the approach are discussed in the paper.

1 INTRODUCTION

The awareness of learning ICT concepts in Botswana has been invariantly increased among the learners those who are in the higher education system. The tutors are using either a traditional way of teaching the ICT concepts or their own methodology which may not be comprehensible to the learners who are passive. Learner-Centered teaching [1] represents a paradigm shift from traditional teaching methods by focusing on how students learn instead of how teachers teach. According to Weimer [2] to understand learner-centered teaching, it is necessary to begin with the teacher-centered approach, which is closely related to the behaviorist tradition. It assumes that learners are passive and that they become active by reacting to stimuli in the environment. The integrated learner centric approach makes the process of teaching and learning complex ICT concepts in-depth among the learners and also ensures the teaching satisfaction to the tutors. This integrated approach uses a methodology which makes the learning and teaching interesting and more interactive.

According to Conti, G. J. [3], the term teaching style refers to the distinct qualities displayed by a teacher that are consistent from situation to situation regardless of the material being taught. Based on the literature on teaching styles, Dupin-Bryant [4] defines learner-centered teaching style as “a style of instruction that is responsive, collaborative, problem-centered, and democratic in which both students and the instructor decide how, what, and when learning occurs” (p.42). The integrated learner centered approach is based on the said styles. This approach has been implemented and evaluated in some of the batches that have ICT complex concepts in Botho College, a higher educational institution in Botswana.

2 BENEFITS OF INTEGRATED APPROACH

The integrated approach gives a new learning environment to the learners which differ from the standard teaching technique. Moving towards the new method, it launches a pattern of communiqué among the tutor and the learners. The benefits for the learners through the Integrated Learner Centric Approach are listed below.

- Enhancing the student responsibilities in learning.
- Extending the learning and teaching towards the achievement.
- Enhancing the learning environment stepping towards the learners.
- Cheering up the learning outcomes.
- Enhancing the self-motivation, involvement, communication and learning abilities.

2.1 Need for this approach

Teaching practice in traditional approach is monotonous, where the tutors are captivating more and the learners are listening. This system should have a shift where the learners be mixed up and contributive to teaching. Ramsey & Fitzgibbons [5] thoughtfully suggest, learner-centered teaching requires us to move along a continuum beyond “doing something to students” (teaching) to “doing something with students” (teaching and learning) to “being with students” (learning). The integrated learner centric approach attracts the learners by forcing them in a way to participate in the process of teaching. Teaching might transform the learner’s authenticity and turns as a gigantic challenging profession for the tutors. Thus, the model’s conceptual underpinning is rooted in learning, challenging us to ask the rarely heard question, “How can I improve my students’ learning?” instead of the often asked “How can I improve my teaching?” [1]. Thus, the Integrated approach helps to improve both the learning and teaching in the aspects of learner – tutor interaction, quality learning outcome and learner’s participation in teaching.

3 METHODOLOGY

According to McCombs, B.L and Whisler [6], learning is associated with the best available knowledge about learning and how it occurs and about teaching practices that are most effective in promoting the highest levels of motivation, learning and achievement. Additional support for a learner-centered paradigm comes from [7], who assessed how using formative assessment, a component of learner centered teaching, enhanced student learning.

The innovative approach comprises of four steps namely Concept Based Animated Slides, Interactive Role-Play, Multi-Stage Programming Activity and Formative Feedback for evaluation. Benson & Blackman [8] defines “constructive alignment as the explicit formulation of intended learning outcomes, followed by the process of synchronization with constructivist-based learning/teaching activities and assessment tasks likely to lead to attaining the learning outcomes. Constructivism emphasizes that students construct meaning through deep learning from relevant activities”. Fig 1 shows the graphical representation of the Integrated Learner Centric Approach. Implementing the techniques together, the learners might have a change in Learning Environment, Self-Motivation, learner’s contribution in learning and effective assessments. Also in the aspect of tutors they may have a good communiqué among the learners and teaching has a good prominence and obtains a high-quality outcome. Biggs [9] observations that activity-based approaches to teaching research methods better facilitate student learning than the more didactic model that is traditionally applied to this subject matter.

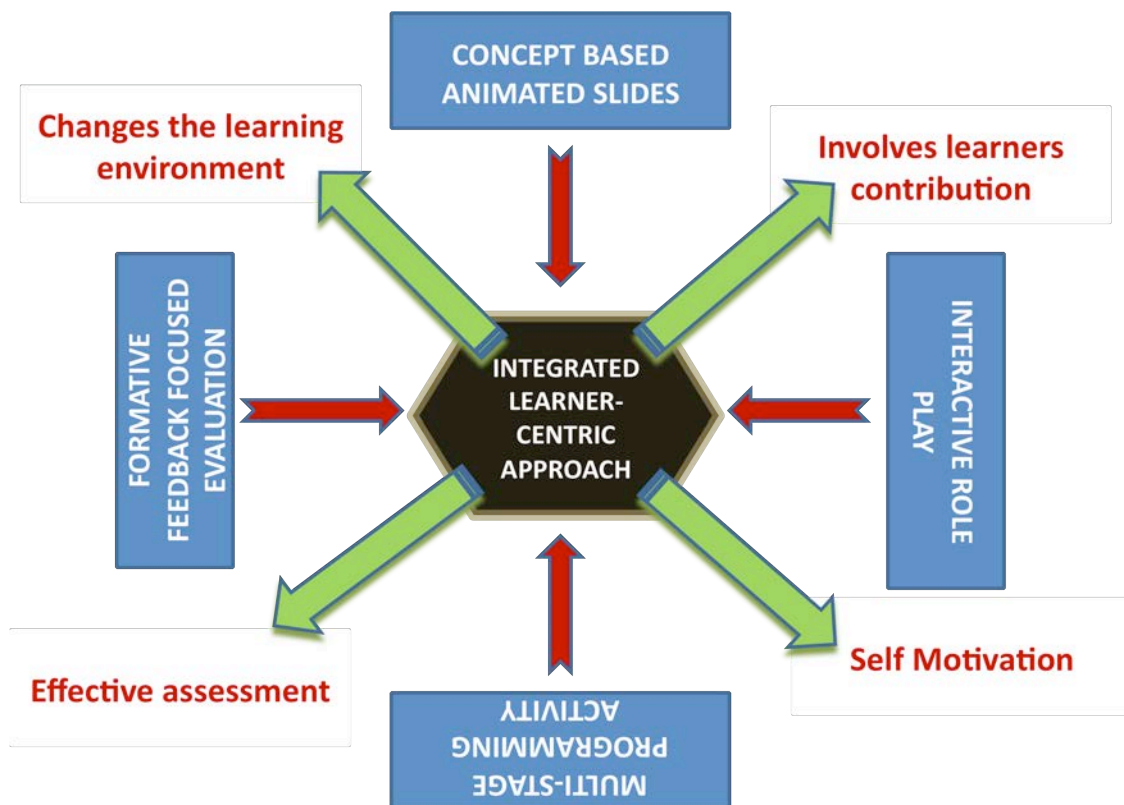


Fig. 1. Graphical representation of Integrated Learner-Centric Approach.

3.1 Concept Based Animated Slides

Most of the lecture is through the chalk and talk in the traditional way. The learner's centric approach defines to change the teaching methodology to the learners understanding. Many tutors have shifted their mode of teaching using the PowerPoint presentations, where to make the learners understand the concept and text clearly. Even though, they face some difficulties in explaining the motion or working flow of the complex concepts. The concept Based Animated Slides overcomes the above problem, by including the animatronics to elaborate the motions and flow of the complex concepts. The slides will have some animatronics movement where the objects are moved to show the flow of the concepts or to explain how the concept works.

The method creates a center of attention to the learners to realize the importance of the concept they are learning. The slide encompasses the factual flow of the idea, transmits an obvious passage wherever needed and also provides the well visibility of the concept.

3.2 Interactive Role-play

The tutor should plan how to provide an effective lecture for every learner in the classroom. The tutor has to change the learning environment which adapts to meet the student needs. The Interactive Role-play is one of the best ways to transfer the learning environment from the standard teaching method, where the learners are invited to contribute in learning and teaching. By providing opportunities for students to create and participate in role-playing scenarios, instructors can gain a sounder knowledge of each student and students can benefit through increased interaction with the material and with each other Tisha Bender [10]. The teaching becomes more interesting when the learners contributes or interacts with the tutor in learning.

In the Interactive Role-play the tutors puts the plain words to explain the concept, where the learners are to perform the act or play related to the elucidation. The role play is one of the best activities to put together the learner's contribution and also provides an enjoyable learning experience to the learners. This technique provides a real visibility on how the concept works.

3.3 Multi-Stage Programming Activity

A dedicated tutor has to facilitate the learners to have good knowledge mutually in both theoretical and practical aspects. All the way through the exceeding techniques, the learners will boast a strong hypothetical background on the initiative. As to that the learners are supposed to have the same in the programming part. The Multi-Stage Programming Activity encompasses three stages like

Demonstrating the code of a concept with allied annotations: A complete set of code of the concept is demonstrated to the learners with comments throughout. This will facilitate the learners to understand the programming concept very clearly.

Provide a complete code with number of questions: A complete set of code of the concept is given to the learners to annotate 'what is what and which is where' with a set of questions for them to point out the answer out of the given code. This will bring out the learners knowledge of the concept and will help the tutors to know the learners level of understanding.

Invite the learners to write a code of the concept on their own: The learners are invited to write a complete set of code by providing them with a scenario based on the concept. This may facilitate the learners to know their own understanding level of the concept after they complete their own code and a subsequent discussion of the answer by the tutor.

The above mentioned stages of programming activity may increase the learners understanding towards the concepts. And also it may increase the learner's confidence level and motivates to develop their own programming skills.

3.4 Formative Feedback for evaluation

An essential starting point is to be aware of the reasons why we assess the students and how to assess the learners so that they can understand the concepts more in depth. Formative assessment is designed to assist the learning process by providing feedback to the learner, which can be used to highlight areas for further study and hence improve future performance [11]. In Botswana, the majority of the learners have poor presenting skills and writing handiness. Though understanding the concept most of the learners are not skilled in presenting it in their assessments. The Formative Feedback for evaluation is the final activity that lends hands to the learners to triumph over these kinds of issues among the learners.

The learners need to know where they have gone wrong in their ICT assessments. They may be evaluated after the completion of the first three stages of this integrated approach by conducting a number of class assessments or scenario based programming tests. The tutors may evaluate their scripts by providing in the midst of the needed comments which facilitates them not to repeat the similar kind of inaccuracy if any in subsequent assessments. This Formative Feedback for evaluation activity facilitates the learner to achieve an excellent outcome in the assessments.

4 IMPLEMENTATION

The integrated Learner-Centric approach has been implemented practically to teach the ICT concepts at a higher educational institution in BOTHO College at Gaborone, Botswana. The BOTHO College is a reputed institution with about 4,000 students who are in the level of higher education in the academic year which is conducting various ICT programs for the learners.

The approach has been implemented and evaluated in the course of the Advanced Java Programming, where there is a collection of complex concepts like Servlets, Remote Method Invocation (RMI), CORBA, JavaBeans and JSP. As discussed earlier, the traditional approach might be difficult for the learners to understand the concepts clearly. Subsequent to new approach the authors found considerable change among the learners like active participation in the session, regular attendance, enthusiasm, keen observation and good understanding of the concepts taught.

5 EVALUATION

The above discussed integrated approach has been implemented in two of the batches out of 12 batches in the academic year 2011 at Botho College, Botswana and the implementation statistics are shown in Table 1 below.

Table 1 – Implementation statistics.

Implementation Statistics	
Course	Software Quarter 9 - Advanced Java Programming
Topic chosen	Servlets, RMI and CORBA
Module Covered	Module - 1 & Module – 2
Number of Students	360 students
Number of batches	12 Batches with 30 Students each.
Total number of batches implemented	Two Batches (Batch 4 and Batch 7) with 30 Students each
Time	Class Session (2 Hrs 40 Mins/Day)

The results were released after three weeks from the examination and the pass percentage of the examination was 38% overall. After analyzing the results the following information has been extracted out of that.

Total pass rate of all the Batches : 38% (Overall pass rate)

Batch 4 and Batch 7 pass rate

[Where the approach is implemented] : 28% [out of 38%]

The preceding batch wise performance report confirmed that the two batches which has been implemented with the integrated learner centric approach (Batch 4 and Batch 7) has scored the top two positions among all the 12 batches. The statistics clearly shows that the implementation of the integrated learner centric approach has improved the performance of those two batches.

6 LIMITATIONS

Despite the fact of implementation of the integrated learner centric approach, the authors faced a number of problems like,

- Desires additional time in preparation of concept based animation slides.
- Concept based animation may diverge the learners towards the animatronics.
- Needs some more time apart as of the schedule.
- Needs additional resource and handouts.
- Needs to use up additional time to organize and evaluate the assessments.
- Evaluation measures should be related to the accomplishments.

7 FEEDBACK

Patel [12] wrote “The interaction between the teacher and the student is a social act that needs to encompass the personal, professional, social, and human needs of the learner. These needs are not merely the need to learn knowledge, but also the need to be heard, the need to be praised, the need to be accepted into the community of the learners, as well as other human needs”. The integrated approach motivates the learners to enhance their self-responsibly, makes them to interact with the tutors and the class and contribute in learning. When a new methodology has been introduced it is necessary for a general feedback from the learners. After the implementation of this approach the feedback from the learners and tutors were much satisfactory. The feedbacks from the learners are shown in Table 2 and the feedbacks from the tutors are shown next to that.

Table 2 – Learner’s Feedback.

Feedback from the Learners (Batch 4 and Batch 7) Feedback given by 48 students					
Integrated Approach Methods	Excellent	Good	Satisfied	Poor	Not satisfied
Concept Based Animated Slides	41	7	–	–	–
Interactive Role-Play	34	12	2	–	–
Multi-Stage Programming Activity	28	11	8	1	–
Formative Feedback for evaluation	19	17	9	3	–
Collective feedback comments: • Should be used for all subjects. • Motivates to attend the class regularly. • Can understand the concept clearly including programming. • Enjoyable and interesting. • Makes good understanding of the concepts.					

General Feedback from the tutors:

- Requires more time to spend in preparation.
- Good approach to make students to learn.
- Brings a good relation among learners and tutors.
- Can attract the learner’s participation always.
- Good way of interactive teaching.

8 CONCLUSION

This paper describes why and how the integrated Learner-Centric Approach supports the tutor to teach the complex concepts in ICT programs. The study depicts the importance in changing the learning environment, how the tutors are motivating the learners to enhance their learning towards understanding the concepts. The outcome of this approach has exposed a great reflection which has been thrashed out in the implementation and evaluation part. The success of the integrated approach encourages the authors to implement and evaluate the same in other batches as well.

Further the integrated approach has been implemented in some of the other batches and the results are awaited to see the outcome and the weightage of this approach. Based on the final outcomes the authors have decided to take this approach to the internal quality department for consideration to be implemented throughout the institution.

REFERENCES

- [1] Weimer, M. (2000). Guide to support the implementation of the learning and teaching plan year 2000. ACUE, The University of Adelaide.
- [2] Rong Liu, Xiaomei Qiao & Yingliang Liu (N.D.). A paradigm shift of learner-centered Teaching style: reality or illusion?. *Arizona Working Papers in SLAT – Vol. 13*
- [3] Conti, G. J. (2004). Identifying Your Teaching Style. In Galbraith, Michael W.(ed) (pp. 76-91). Malabar, FL: Krieger Publishing Company.
- [4] Dupin-Bryant, P. A. (2004). Teaching Styles of Interactive Television Instructors: A Descriptive Study. *The American Journal of Distance Education*, 18 (1), pp. 39-50.

- [5] Ramsey, V. J. & Fitzgibbons, D.E. (2005). Being in the classroom. *Journal of Management Education*, 29(2), pp. 181 – 194
- [6] McCombs, B.L and Whisler. (1977). *The learner-Centered Classroom and School*. (5th ed.). Jossey- Bass, San Francisco.
- [7] Steckol, K. F. (2007). Learner centered teaching in higher education: formative assessment study turns classroom into research lab. *The ASHA Leader*. 12(5), pp. 14-15
- [8] Biggs J. (1996). Enhancing Teaching Through Constructive Alignment. *Higher Education* (32), pp. 347 – 364.
- [9] Benson, A. & Blackman, D. (2003). 'Can research methods ever be interesting?'. *Active Learning in Higher Education* 4 (1), pp. 39-55.
- [10] Tisha Bender. (2005). *Role Playing in Online Education: A Teaching Tool to Enhance Student Engagement and Sustained Learning*.
- [11] Mahairi McAlpine. (2002). *Principles of Assessment*. Robert Clark Centre for Technological Education, University of Glasgow.
- [12] Patel N V (2003), A Holistic Approach to Learning and Teaching Interaction: Factors in the Development of Critical Learners. *International Journal of Educational Management*, 17(6/7): 272-284.