Scientific Journal of Impact Factor (SJIF): 4.14
e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406
International Journal of Advance Engineering and Research Development
Volume 3, Issue 10, October -2016

FLIPPED LEARNING FOR THE COURSE -JAVA AND JEE PROGRAMMING

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ABSTRACT:*The programming course in a programme gives an opportunity for students to design and develop a computer based application. Thepaper deals with the flipped classroom approach for JAVA and JEE programming course. Course redesign is a major phenomenon within institutes of higher education. Now a days, Student participation, student involvement,student understanding, Time constraint, blundered learning,ICT tools in education and active learning are frequently used words in teaching-learning process. This paper presents a survey of the common challenges faced while teaching programming courses and how to overcome those problems with the help of Flipped learning approach. Thepapermainly focuses onthe existing problem in teaching programming course JAVA & JEE course and then discusses the flipped classroom approach for better teaching learning experience for the course on JAVA & JEE.*

KEY WORDS: Flipped class room, ICT, BLOOM'S taxonomy, JAVA &JEE

INTRODUCTION

Now a days, ICT(Information Communication Technology) plays an very important role in every aspect of life (areas like work place, universities, health etc) along with the education systems. Itacts as a layer between teaching and learning process. ICT refers to the Computers and Internet connections that help the user to handle and communicate information for learning methodology[1].

The main aim of this paper is to suggest the answer to the questions like: (i) What is the objective to teach programming? (ii) What are the concepts we need to teach in programming? (iii)How to address the most common complications/misunderstandings students come across while learning to program? (iv)How to teach this topic? [2].Learning programming language requires, not only the knowledge of programming syntax, but also the familiarity of programming tools,problem-solving skills, efficient design and implementation. The main aim is to motivate the students to start efficient programming and make the student's success levels to a maximum while developing and increasing the computer programming and students' problem solving skills [3].

Traditional classroom approach concentrates on Teacher-Centric approach. In this approach, Lecture acts as a mode of teaching and the teacher or instructor has to deliver information and has to present topics, summarize the main points of the learning activity and encourage further learning[4]. This is called lecture-explanation technique[5].A programming language course like JAVA &JEE, needs more practice than theories. But traditional classroom approach concentrates more on theories than practical knowledge. So students tend to lose interest and lack initiative to develop an application of their own interest.Learner-Centered Learning approach, concentrates on student engagement and student participation towards the learning task using ICT tools.

OVER VIEW OF FLIPPED CLASS ROOM

Blended Learning is a learning model that combines the Face-to-Face Interaction along with E-Learning solution[5]. E-Learning is a methodology that utilizes the information technologies such as LAN, MAN and WAN for the effective course interaction and delivery for the entire course or only a part of it. Figure 1 depicts a standard model of blended learning.

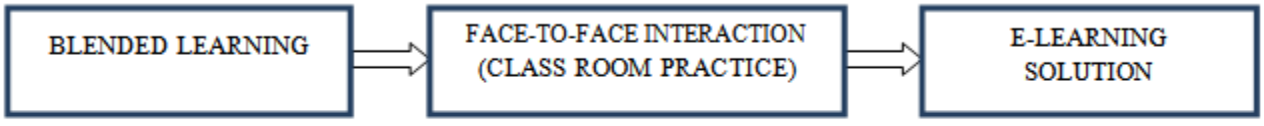

Figure1: Blended Learning

Flipped Learning is an learning approach in which direct instruction moves from the group learning space[6] to individual learning space that will facilitate interactive learning environment where the instructor guide students and engage creatively in subject matters.

The four major components of FLIP based teaching model are shown in figure 2.

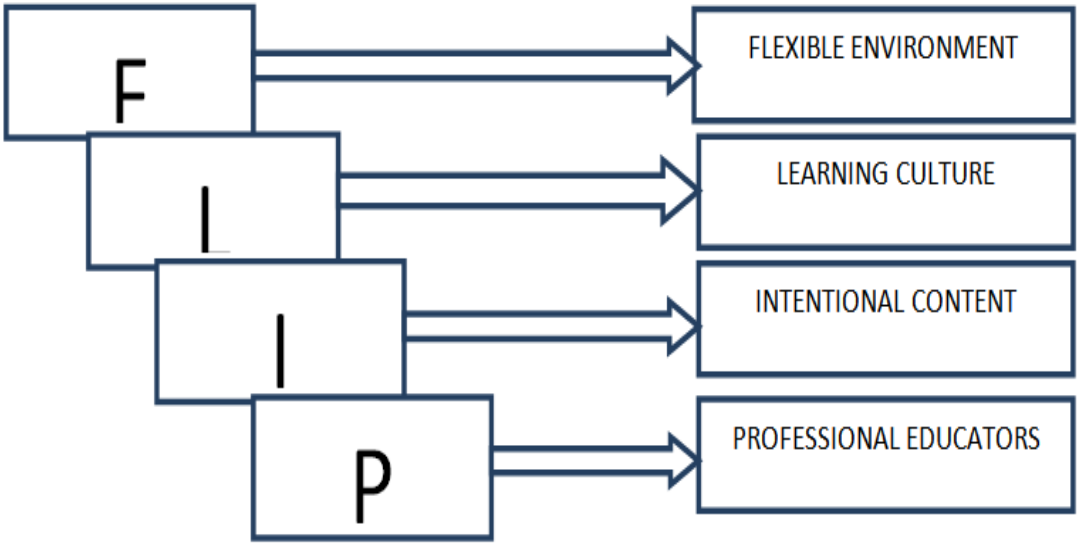

Figure2: Components of FLIP Model

The learning culture is to be Learner-Centered Learning approach.In flipped classroom approach, students will view the lecture videos or prerecorded media lectures more than once outside the classroom. Students may watch, rewind, and fast-forward the lecture videos as needed. This will provide more "Flexible Environment" for the students to learn effectively. Preparation of lecture videos requires lot of effort, time,new skills and technology. In-class and out-of-class elements should be aligned properly to motivate the students to prepare for class.The role of a Professional Educator role is very much important in flipped classroom. During in-class activity, a faculty should observe and assess the students properly and should give effective feedback based on their assessment for the improvement of the student's knowledge and understanding level.

A typical teaching content of JAVA & JEE has five units. Unit1 and 2 units deal with fundamentals of JAVA programming language. 3rd unit deals with advanced JAVA concepts like JDBC, JSP etc.Table1 below, illustrates the mapping of JAVA & JEE course content with BLOOM'S taxonomy level. Bloom's taxonomy[7] is a classification system used to define and distinguish different levels of human cognition—i.e., thinking, learning, and understanding. Bloom's taxonomy is helpful in the evaluation of student learning(assessments) and other learning activities(curriculum).
In 1956, a team of cognitive psychologists led by Blooms developed the original taxonomy at the university of Chicago. The original taxonomy consists of three domains such as Cognitive, Affective, and Psychomotor. Educational systems have mainly focused on the Cognitive model. Cognitive model has six different classification levelssuch as Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation.

Revised Bloom's taxonomy was published in 2001 by another team of scholars- led by Lorin Anderson, a former student of Bloom's, and David Krathwohl. They designed "revised version of Bloom's taxonomy" called A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives and to be more useful to educators.In the revised version, three levels were changed and all the levels were expressed as verbs rather than nouns. Knowledge became to Remembering,Comprehension was changed Understanding, and Synthesis became Creating and Creating became the highest level in the classification system. The revised version of Blooms taxonomy[8] is as follows:Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating.

UNIT	MAIN TOPICS	SUB TOPICS	BLOOM'S TAXONOMY LEVEL(L)
1	Java Programming Fundamentals, Introduction to Classes	Features, Data Types, Variables and Arrays	**L1**
		Operators , Control Statements	**L1**
		Class Fundamentals, Declaring Objects, Assigning Object Reference Variables.	**L1**
		Introducing Methods , Constructors ,Static fields and Methods, Super and this keyword,	**L4**
		Inheritance ,Interface ,Inner-classes,	**L1**
		Package. Example	**L2**
		Class template in Java Programming.	**L4**
		Exceptions, Threads, Java Collections	**L4**
2	Multithreaded Programming	Java Thread Classes, Thread	**L3**
		The Java Thread Model , The Main	**L3**
		Creating a Thread,	**L4**
		Creating Multiple Threads	**L4**
		Using isAlive( ) and join( ),	**L4**
		Thread Priorities	**L4**
		Synchronization, Suspending	**L4**
		Resuming and Stopping Threads, Selfish thread.	**L4**
3	MVC SERVLETS JSP	An overview of application architecture	**L1**
		multi-tier architecture,	**L1**
		Applying Software architecture pattern - MVC Architecture,	**L1**
		The Life Cycle of a Servlet	**L1**
		Using Tomcat for Servlet Development A simple Servlet	**L4**
		The Servlet API, The Javax.servlet Package	**L4**
		Reading Servlet Parameter	**L1**
		The Javax.servlet	**L3**
		Http package,	**L3**
		Handling HTTP Requests and Responses	**L4**
		Using Cookies, Session Tracking	**L3**
		JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects.	**L4**

Table 1: SampleTeaching content of JAVA & JEE

The major challenges encountered, while teaching programming language like JAVA & JEEare:

1.Most of the students feel programming to be a complex task.
2. Inadequate time(Majority amount of time spent teaching programming syntax than program development) .
3.Lack of interest and motivation towards learning programming language[8]

With the help of Flipped learning approach, we are trying to overcome above challenges while teaching programming language like JAVA&JEE.In this approach, students are insisted to watch video lectures at home(out-of-class activity) and

discuss the same during class session(in-class activity).Instructors prepare video lectures on JAVA fundamentals and advanced java technologies like servlet and jsp based on the learning task of JAVA&JEE course. Instead of preparing lecture videos, provideyoutube video links to the students which are created under creative common license in public domain. Class room session is fully dedicated to student's interaction, discussion, evaluation based on quiz,question and answer, and doubt clarification. This flipped classroom approach would make students feel more comfortable while learning programming language than traditional approach.

The flipped classroom is a pedagogical**(**the art or method of teaching-concerns the study and practice of how best to teach**)** model[9], that describe almost any class structure that provides prerecorded lectures followed by in-class exercises. Before the class session, students watch small video lectures at home. Out of class activity is devoted to watch video lectures. In class activity is used to facilitate active learning. In-class time is devoted only for open discussion, communication and presentation of results, evaluation and summary.Figure 3 shows the difference between IN CLASS and OUT OF CLASS activity.

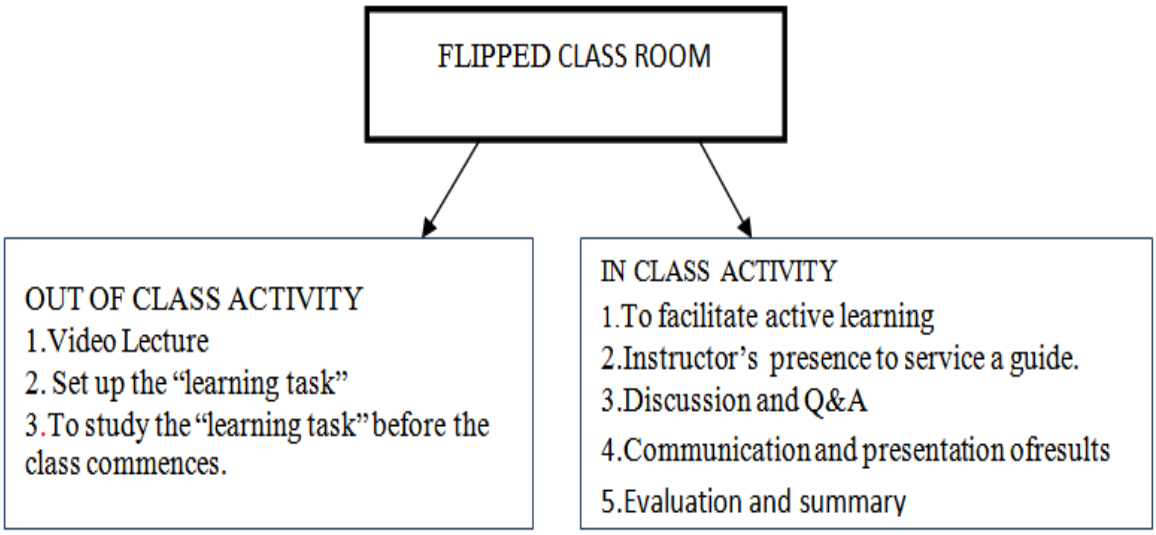

Figure 3:Flipped Class Room Model

CONCLUSION

JAVA& JEE is the fundamental course for computer science students and it needs lot of time to teach and demonstrate each and every concept. It is very difficult to complete the course with in the allotted time period because of less teaching hours, more concepts and strong practicality. So flipping the class is a better way to teach effectively and efficiently for the students for better understanding of all the concepts in JAVA &JEE course, because Class room session is fully dedicated to student's interaction, discussion,evaluation based on quiz, question and answer, and students doubts clarification. This flipped classroom approach would make students feel more comfortable while learning programming language than traditional approach.It will be helpful for the students to develop application with great learning enthusiasm and practical knowledge. Based on teaching JAVA & JEE course content, teaching situation of this course will greatly emphasis on Flipped teaching approach for this type of courses.By adopting flipped classroom approach for teaching programming courses, level 6 of bloom's taxonomy can be attained, where the students apply their creativity and develop a project. That is, student's cognitive skills are enhanced and evaluated. Therefore it is a good practice to adopt Flipped classroom approach and is greatly recommended and appreciated to adopt this kind of approach for any programming language course like JAVA&JEE.

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