



# Programming Language Training With the Flipped Classroom Model

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**Abstract** The flipped classroom method, which could be considered as one of the crucial new generation teaching approaches, is a permutation of the educational activities that are carried out inside and outside of the classroom environment. The main purpose of the present study is to determine the impact of the flipped classroom approach on students' academic achievement and their attitudes toward programming and methodology at the higher education level. The current study employed a mixed research method as findings were transcribed on the basis of quantitative and qualitative data sets. Academic achievement tests and attitudes toward programming scales were used to collect quantitative data, whereas a semistructured focus group interview was used to collect the qualitative data set. The findings demonstrated that a statistically significant difference existed among the students in the experimental group and students within the control group regarding their attitudes toward programming and academic achievement. The results of the study reported that the experimental group had more positive attitudes and higher levels of academic achievement when compared with the control group. The advantages of the flipped classroom model include the elevated teacher–student interaction, raised independence in terms of accessing courses regardless of time and place, the opportunity to save time particularly during practicing, student-centered structure and increased motivation. This method also has many disadvantages. These include the need for technological requirements, students not watching videos, poor attendance to the course, and the lowered student–teacher interaction, especially outside the classroom.

## Keywords

blended learning, flipped classroom, learning model, programming languages.

## Introduction

In the evolving and changing world, technology plays a crucial role in human life from now on. This development has also taken place in educational settings and has yielded substantial changes. To be more precise, the introduction of the internet to our lives and the spread of mobile devices have generated opportunities for people to reach all kinds of information regardless of time and location concerns. Taking into account all of these, it can be stressed that learning and teaching processes have evolved and have thus started to take place in different settings outside of the classroom context and usually in the form of online education. Technology and technological advancements have injected new terminologies into the relevant fields. Digital citizens are one of the new terms derived from technology and technological advancements. It is believed that the new generation might experience challenges when developing high-level skills such as critical thinking, coding, digital literacy, commitment, and problem-solving and they will fail to generate new ideas through listening, reading, and following teachers' presentation, which is considered as the components of the traditional education method. Furthermore, it may be articulated that these developments have

led to the introduction of new methods that are student-centered and efforts are being made to develop their technological experience. In this context, the “flipped learning classroom method” is considered as the one of the popular.

## Literature Review

Related Studies It is believed that the flipped classroom model, which has recently been applied around the world, can solve the deficiencies and disruptions encountered in modern education systems. p. According to the findings of the study, it was determined that there is a significant difference between the pre- and posteducation entrance success. points of the students in the experimental group who teach the course according to the flipped classroom model. In addition, as a result of the research, it was observed that there was a significant difference in favor of the experimental group between the achievement scores of the students in the experimental group and the success scores of the control group. According to the qualitative data collected, it was concluded that students were mostly satisfied with the flipped classroom model, gave them autonomy in their learning, cooperated better with teachers and classmates, but were a little skeptical and afraid at the beginning of the course Many studies have been conducted on the use of the flipped classroom model in educational environments. The effects of the flipped classroom model were investigated in different courses. Most of the studies show that the flipped classroom model increases academic achievement, affects student motivation and attitude positively, and students have positive opinions..

### a. Social presence

One of the most important factors in online learning is social presence. Social presence can be defined as the degree of salience between two communicators using a communication medium due to the differing perceptions of medium of its online learning Social presence also can be interpreted as the degree to which a person is perceived as “real” in mediated communication, which contribute to the social climate in the classroom experience As Gunawardena argued, social presence is necessary to increase the communication both in traditional and technologybased classrooms. Instructor must be able to create and maintain the educational arrangements, while students enjoy that arrangement. If the social presence is low, it means the interaction in learning is also very low.

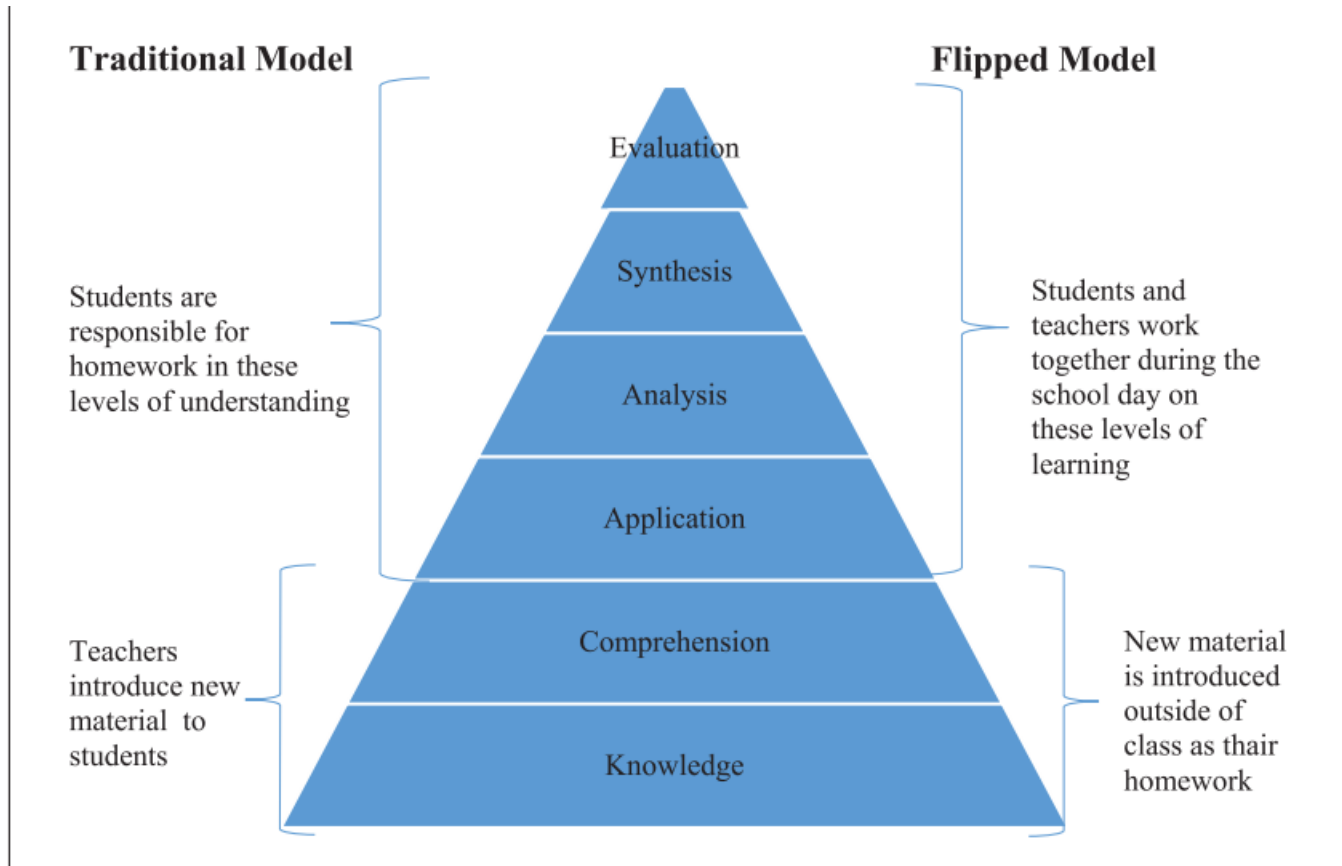
### b. Social Interaction

Interaction is one of the most important components of teaching and learning experiences. Interaction is the most important thing when it comes to face-to-face learning or even in online learning . Inevitably, interaction that uses the social aspect must be apply in learning in order to improve student learning by enhancing student knowledge. According to Tu , social interaction is fundamental to the explanation of the relationship between social presence and the social learning theory. When social interaction becomes part of the classroom dynamics, therefore classrooms become active places . Also, social interaction of learning which is very essential for the successful learning provides and support productive and meaningful learning. Besides, social interaction also promotes learning engagement which has been identified as positively affecting achievement of learning outcomes .

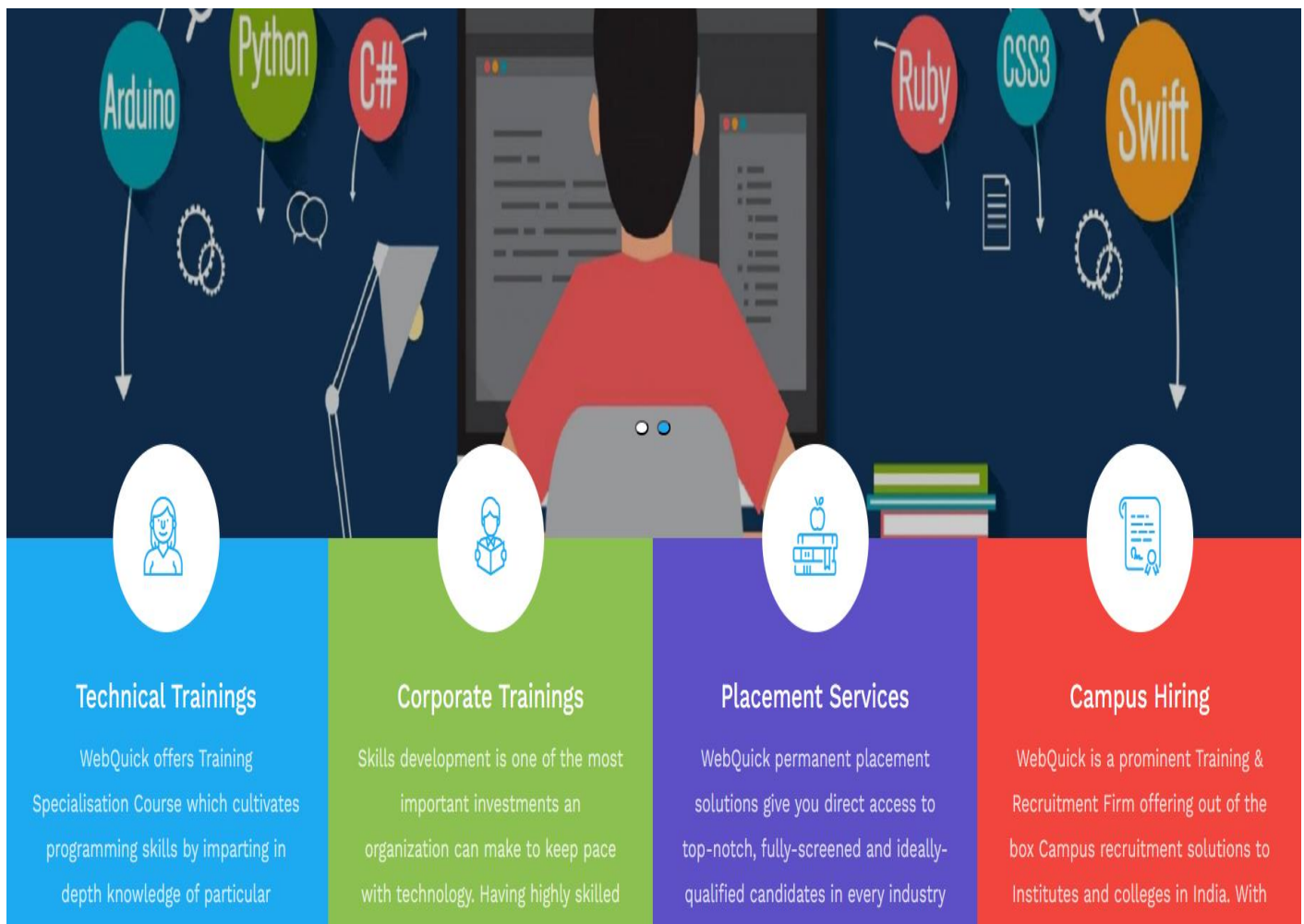
### c. Satisfaction

Similar to social presence and social interaction, satisfaction in courses is an important thing in learning. When comparing satisfaction with online and face-to-face courses, many researcher argued that learners tend to be more satisfied with face-to-face interaction]. In regard to that, Gunawardena and Zittle also argued interactions between learner and instructor also contribute to satisfaction. According to satisfaction deals with three parts, namely satisfaction with instructor’s directions and support, satisfaction with own commitment to learning, and satisfaction with course policies as well. There are several studies have been conducted to measure the level of student satisfaction in traditional and online environments. However, this study solely focused on social presence, social

interaction, and satisfaction dimension, because these three dimension were suitable and amenable to conduct with participants' background.



supports problem-based, collaborative, inquiry-based, and active learning theories. It removes the limitations of the learning environment to a certain extent, as in mobile learning theory. Besides, it is seen that the flipped learning model is based on a social constructivist approach. Social constructivism states that the structuring of knowledge is achieved through social and culturally regulate experiences.

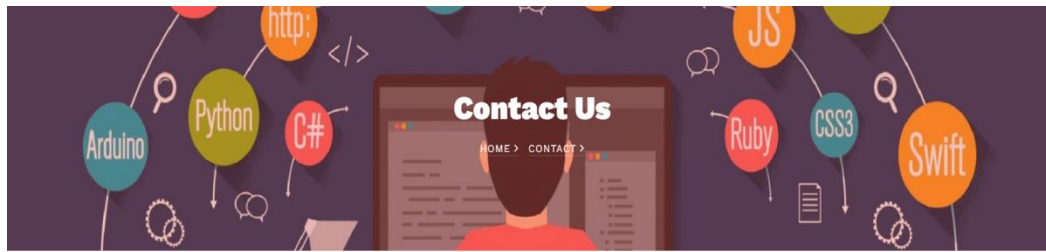


## Method

Interactivity, collaboration, and online learning community Many researchers have defined what a learning community looks like in an online environment and have stressed its importance from different perspectives. Yuan and Kim (2014) stated that a learning community was the creation of a sense of belonging by a group of learners, where learners trusted one another, constructed knowledge, shared useful information, established connections by getting to know one another, set up common objectives for learning, and believed that their needs would be fulfilled.

- The effort to build a learning community should start at the beginning of a course and continue throughout the term.
- Both students and instructors should be involved in building the learning community
- Asynchronous and synchronous technologies should be both used to create a shared space in which students and instructor interact.
- Various strategies should be employed to stimulate discussions.
- Both task-oriented discussions and social interactions should be encouraged.
- Students should be assigned tasks that require collaboration.

View of website



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**Table 1 lists**

some popular online education initiatives. Although these initiatives are booming exponentially, the debate remains about whether corporate-based online-education initiatives have the credentials to grant credits and degrees to individual learners

who have completed their online courses.

**Table 1 -- Some Popular Online Education Initiatives**

Name	Sponsor	Year founded	Fees
<b>Coursera</b>	Joint efforts by Princeton University, Stanford University, University of California Berkeley, University of Michigan-Ann Arbor, & University of Pennsylvania	2011	Private
<b>edX</b>	Harvard University & MIT	2012	Non-profit
<b>iTunes U</b>	Apple Corporation	2012	For-profit
<b>Khan Academy</b>	Salman Khan (Hedge Fund manager)	2007	Non-profit
<b>Minerva</b>	Minerva project and Keck Graduate Institute (KIG). (Larry Summers, former Harvard University President & United States Secretary of the Treasury, chaired its first advisory board)	2012	Private
<b>MITx</b>	Joint efforts by Harvard University and edX	2001	Non-profit
<b>Peer 2 Peer University (P2PU)</b>	Funding from the Hewlett Foundation & the Shuttleworth Foundation,	2009	Non-profit
<b>Saylor</b>	Michael J. Saylor (Chairman, CEO, & President of the business intelligence company MicroStrategy)	2008	Non-profit
<b>TED-Ed</b>	Sapling Foundation	1984	Private Non-profit
<b>Udacity</b>	Sebastian Thrun	2012	For-profit
<b>Udemy</b>	Eren Bali	About 2010	Some are free; some are for a tuition fee

## What Has Been Proved Effective in Online Teaching?

### Cognitive and teaching presence:

An online learning community provides a potential environment that enables students to learn effectively through the growth of teaching, cognitive, and social presence. (Social presence is briefly defined as students' participation.

Each presence has a distinctive role to play, but they are intertwined and interchangeable. Qualitative and quantitative findings indicated that teaching presence plays the central role and "that teaching presence should be the catalyst that initiates the community development process" (p.818). However, he raised his concerns on the online discussion for adult learners with regard to cognitive presence, arguing that online discussion injected ambiguity in the reinforcement of cognitive presence and should be evaluated further using multiple data resources and methodologies. To online learners, cognitive presence and epistemic engagement can occur only when teaching and social presence are well developed, and the development of social presence is dependent on how well the teaching presence has been established.

### Pedagogical practice for effective online teaching:

These online instructors also identified the need to engage their students, which can be accomplished by utilizing emails and online discussion boards, responding promptly to discussion questions, encouraging students to share their backgrounds and work experiences, and conducting meaningful small group projects. To achieve these objectives, they suggested online instructors be good organizers. In a well-organized course they described, students should be given all course materials at the beginning of the class, be provided with direct links to the necessary websites and resources, and be clearly informed about how to navigate the university website to successfully complete the course.

### **Online course design, instructions, and supports :**

The course design process has five phases: (1) designing content; (2) developing content; 3) implementing content; 4) evaluating the course; 5) revising content . Examining the features and principles of Universal Instructional Design (UID) and Universal Design for Learning (UDL), Rao and Tanners (2011) advised instructors designing courses to consider not only the course objectives, but also how to adapt strategies and technologies for achieving the objectives. They highlighted several strategies that students appreciated most in their online learning. Uppermost among the students' preferences were the wide range of options and choices the online course provided. They found, for instance, that if the instructor's course design presented materials in various formats – using videos, audios, other technologies or software – that can make required text-based materials more interesting and can also allow students to respond in multiple formats as well.

### **Recommendations.**

Finally, online course instructors deserve more researchers' attention to explore their teaching journeys and professional development needs. As reported, a large number of the faculty in higher education were reluctant to teach online courses (Crawford-Ferre & Weist, 2012), and those who have taught online courses reported that it took much more time teaching online classes than face-to-face mode. Instructors should encourage students to relate their discussions, assignments and group work to their own experiences, to the viewpoints of others, to subject matters, and to their own learning and work. Current, online education is mostly the model of one-size-fits-all standardized curriculum that ignores the needs of students , and a focus should be more on exploring how online offering could meet individual learners' needs and provide differentiated online instructions through the course design. Also, more is needed to know about student online experiences and what motivates students to participate in online education. In the end, online education is about students – their learning, their academic outcomes, and much more. More knowledge about the online process and the people involved will enable online instructors and institutions to better design their courses, serve students' needs, and position themselves in a competitive global market

### **Future Research.**

There can be little doubt that online education is destined to continue to grow, possibly at everfast speed. That being the likely case, more research should be conducted to investigate the effectiveness, efficacy, and improvement of online teaching and learning. At present time, however, there is a great gap and perhaps future research should be focused more on in-depth analysis of online instruction practices, step-by-step implementation, and the most effective practices for onlinecourse design and instruction. This article has reviewed aspects of how to teach effectively and successfully in an online learning environment. However, there is no empirical evidence in the reviewed studies and research to demonstrate whether online education has actually improved students' academic outcomes. Future research, therefore, may connect online education with students' academic achievements. Online education is a growing trend, and more and more institutions may eventually be offering more and more online courses to an increasing number of students. Therefore, future studies should be designed to obtain students' perspectives, especially those who are new to computerbased learning. In addition, the study may also focus on this regard by levels of students in online education such as undergraduate and graduate level and by subjects and disciplines.

### **Conclusion**

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