



EFFECT OF INTERDISCIPLINARY LEARNING APPROACH ON CRITICAL THINKING OF PRIMARY SCHOOL STUDENTS

Dr. Jagdeep Kaur

Principal, Rayat College of Education, Rail Majra, Panjab University,
Chandigarh.



ABSTRACT :

The present study was performed on primary school students and analysis of their critical thinking was done by imparting interdisciplinary approach based curriculum through flipped classroom. The samples of 100 students of Grade-V were taken. Questionnaire was prepared by the investigator. The data was analysed with the help of mean, standard deviation and t-test. The major findings of the study were in favour of interdisciplinary approach (flipped learning).

KEYWORDS : primary school students and analysis , critical thinking , egalitarian philosophy.

INTRODUCTION

Flipped learning pedagogy stems from the premise of inquiry based and egalitarian philosophy with the growing access to vast information through the internet, the Traditional Model of teacher as the role steward of knowledge has become obsolete (Jenkins et al. 2017). In the 1990s, Harvard Professor Eric Mazur developed a model of 'peer instruction' in which he provided material for students to prepare and reflect on before class and then used class time to encourage deeper cognitive thinking via peer interaction and instructor challenge. He called this "just in time teaching" (Crouch and Mazur 2001). At the International Conference on College Teaching and Learning in 2000 a presentation was delivered on 'The Classroom Flip: Using Web Course Management Tools to Become a Guide by the Side' (Baker 2000). So 'flip' concept was developed and it emphasized the role of Learning Management Systems in delivering materials to students before class. Significantly, the role of the teacher was articulated as facilitator and coach or 'guide on the side'. Subsequent research focused on the notion of 'inverting the classroom' as a means of providing an inclusive learning environment in which personalized coaching and mentoring was the norm (Lage, Platt and Treglia 2000). Fast forward to the present and the dramatic growth of online content creation, collaboration and distribution tools provide practitioners with an accessible toolkit for delivering flipped learning. Video creation (e.g. Screencast and Webinars) and distribution tools (e.g. Youtube) provide the opportunity to create flipped content with ease. Alternatively, there is a wealth of pre-existing media available for reuse (e.g. iTunesU and Open Yale Courses). While technology is not a prerequisite (flipped text based content is just as valuable as video content), there is no doubt that the intersection of web 2.0 technology and learning theory has enabled flipped learning to become a valuable addition to the spectrum of flipped learning.



Sources: <https://digest.bps.org.uk/2017/01/27/a-promising-study-suggests-teachers-can-train-8-year-olds-in-theory-of-mind/>

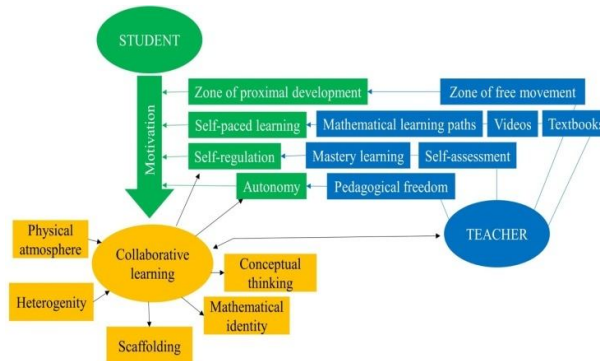
Sources: <https://www.timeshighereducation.com/blog/use-misuse-and-abuse-research-education-white-paper>

INTERDISCIPLINARY CURRICULUM

An interdisciplinary curriculum combines several school subjects into one active project or is organized to cut across subject-matter lines, bringing together various aspects of the curriculum into meaningful association. It focuses on broad areas of study since that is how children encounter subjects in the real world—combined in one activity. In the interdisciplinary curriculum, the planned learning experiences not only provide the learners with a unified view of commonly held knowledge (by learning models, systems, and structures) but also motivate and develop learners’ power to perceive new relationships and thus to create new models, systems, and structures. Interdisciplinary curriculum involves using the knowledge view and curricular approach that consciously applies methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience.

Interdisciplinary curricula provide students the opportunity to work with knowledge drawn from multiple disciplines. Following suit, interdisciplinary learning requires interaction of knowledge from different disciplines; integration of knowledge from different disciplines; and an overarching topic, theme, or problem that shapes the learning experience. Since the university curriculum is commonly structured by academic disciplines, and faculty are socialized to their respective disciplinary norms, interdisciplinary is a complex endeavour for colleges and universities. These endeavours include developing interdisciplinary courses, sustaining interdisciplinary initiatives, and financing interdisciplinary programs.

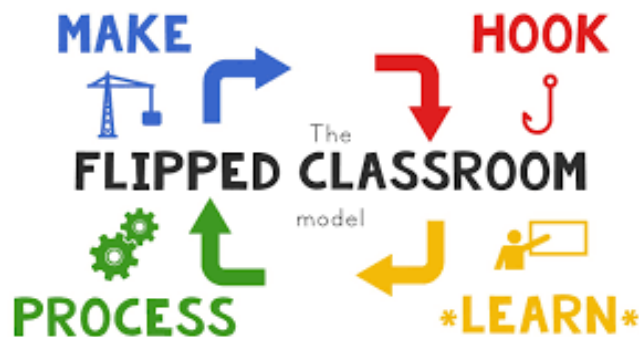
FLIPPED LEARNING STRATEGIES



Sources: <http://www.flippedassessment.com/2018/01/why-flipped-classroom-is-not-enough.html>

CRITICAL THINKING

Critical thinking includes the ability to respond to material by distinguishing between facts and opinions or personal feelings, judgements and inferences, inductive and deductive arguments and the objective and subjective. It also includes the ability to generate questions, construct and recognise the structure of arguments adequately support arguments; define, analyse and devise solutions for problems and issues; sort, organize, classify, correlate and analyse material and data by drawing inferences, arriving at reasonable and informed conclusions, applying understanding and knowledge to new and different problems, developing rationale and reasonable interpretation, suspending beliefs and remaining open to new information, method, cultural systems, values and beliefs and by assimilating information.



Sources: <http://teatherteacherleaderportfolio.blogspot.in/2016/04/the-flipped-classroom-model.html>

PRIMARY SCHOOL STUDENTS

Primary school education is the basic education which provides at the very early stage to the child. It is provided from 6-11 years age of child.

Adeyemi (2014) investigated comparative study of pupils' academic performance between Private and Public Primary Schools. Results showed that pupils in the private primary schools performed better than their counterparts in the public schools and therefore call for improvement in the public schools to enhance the learning opportunity of the vast majority of pupils attending the public schools. Jha (2013) attempted to study the development of the three R skills. It was found that development of reading and writing skills of girls was higher than boys whereas arithmetic skills of girls and boys were equally developed. The three R skills of rural and urban students were equally developed.

REVIEWS

The flipped classroom has generated considerable interest in nursing education in the last few years, especially in higher education in China. However, research to date has been insufficient to confirm the effectiveness of the flipped classroom approach. Since most of the Chinese studies are published in Chinese journals, they may not be easily accessible to international researchers. Therefore, this meta-analysis aimed to review the effectiveness of a flipped classroom in nursing education both in English and Chinese databases. The aim of the present study was to identify the robust available evidence about the effectiveness of flipped classrooms in nursing education through a systematic review and meta-analysis. A systematic search of English databases, including PubMed, EMBASE, Science Director, CINAHL and Google Scholar, and Chinese databases, including Chinese National Knowledge Infrastructure (CNKI), WanFang Data, VIP Information and Chinese Biomedical Literature (CMB), were conducted to identify peer-reviewed studies that met the inclusion criteria. A total of 29 studies were included in systematic review. There was a significant post-intervention improvement in academic performance both in knowledge with a pooled random-effects standardized mean difference of 1.13 and skills with a pooled random-effects standardized

mean difference (SMD) of 1.68. Students' self-learning abilities were also improved with a pooled random-effects SMD of 1.51 compared with traditional lecture. In the subgroup analysis, we found that the effect sizes had high fidelity in terms of nursing degrees and research settings. There was a high rating of flipped classroom pedagogy from teaching evaluations, study satisfaction, study attitude and improvement in critical thinking and problem-solving skills. These results indicated that a flipped classroom might help nursing students improve in knowledge, skills, attitudes, self-learning, study satisfaction, critical thinking and problem-solving skills. We recommend adopting this approach for nursing education reform. There is a call for robust empirical research and unification of appraisal standards for further support of the effectiveness of the flipped classroom. Furthermore, a meta-regression analysis is also recommended to explore the sources of heterogeneity in included studies.

RATIONALE OF THE STUDY

The researcher selected schools of Chandigarh district for the purpose of teaching of Interdisciplinary curriculum through learning strategies and traditional methodology to the primary school students of fifth grade. It has been experienced that the students are very creative who can apply their critical thinking if they are exposed in different situations. The researcher used questionnaire to know the impact on the critical thinking of the children if they are taught interdisciplinary curriculum through flipped learning strategies.

OBJECTIVES OF THE STUDY

1. To study and compare the effect of imparting interdisciplinary curriculum through flipped learning strategies and traditional Learning Strategies on the Critical Thinking of boys.
2. To study and compare the imparting interdisciplinary curriculum through flipped learning strategies and traditional Learning strategies on the Critical Thinking of girls.
3. To study and compare the effect of imparting interdisciplinary curriculum through flipped learning strategies and traditional learning strategies on the critical thinking of total boys and girls.

HYPOTHESES OF THE STUDY

1. The two instructional treatments will yield equal mean gain scores on Critical Thinking of the boys.
2. There is no significant difference in mean gain score of Critical thinking of the girls when taught by two instructional treatments.
3. Equal mean gain on Critical Thinking scores will be yielded by the total boys and girls when taught by two instructional treatments.

Sample

The research study was carried out on 100 students of V grade randomly selected from two schools affiliated to C.B.S.E.

Tool Used

1. Twenty five lesson plans based on interdisciplinary curriculum and blended learning strategies.
2. Questionnaire prepared by investigator for the purpose of research.

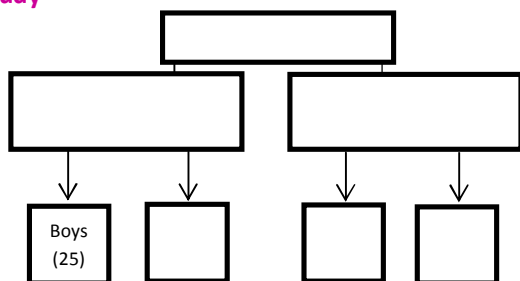
The study was limited to

- The experiment was delimited to class V students of two schools of Chandigarh.
- Twenty five lesson plans based on interdisciplinary curriculum from science and social science subjects were framed.
- Only five flipped learning strategies were used for experimental group.

Statistical techniques

Statistical techniques used in research work were Mean,S.D.and t-test.

Design of the study



Method and procedure

Twenty lesson plans were prepared on the basis of interdisciplinary curriculum which was framed from science and social science subjects.

| | |
|-------------------|--|
| Domain I | Environment,pollution,waste,threeR’s(reduce,Reuse and Recycle),go green and natural disasters. |
| Domain II | Nature resources,air,water,rocks and minerals reproduction of plants and agriculture. |
| Domain III | Natural calamities different life styles, safety and first aid, food and health and simple machines. |

As it was already decided that two groups i.e. students of control group were taught through traditional methodology and students of experimental group were taught through flipped learning strategies. On both the groups pre-test was administered before the instructional treatment and post-test was applied after the instructional treatment.

RESULT AND DISCUSSION

Hypothesis 1. As per the hypothesis taken all the students were again divided into two groups.i.e experimental group and control group.In each group there were 25 students.Both the groups were taught 25 interdisciplinary approach based lessons on science and social science.After evaluation it is found that the mean gain score of experimental group was 14.56 and control group 10.64.The standard error of difference was 1.22.It is given in the table 1.1.

Table 1.1:Mean,SD and t-value of gain critical thinking scores of experimental and control group boys

| Variables | Experimental Group | | | Control Group | | | SED | t-value |
|--------------------------------------|--------------------|-------|------|---------------|-------|------|------|----------|
| | N | Mean | SD | N | Mean | SD | | |
| Gain Critical Thinking Scores | 25 | 14.56 | 5.54 | 25 | 10.64 | 2.84 | 1.22 | 3.2081** |

**Significance at 0.01 level

The t-ratio of this difference was 3.2081 at 24 df level.It again clearly shows that the test applied on the boys students shows significant at 0.05 level of confidence and also at 0.01 level of confidence.It further

indicates that flipped learning strategies should be adopted at teaching level and especially at primary level of the students.

Hypothesis 2. The table 1.2 shows that the mean gain score of experimental group was 14.60 and the control group 9.96. The standard error of difference was 1.189. The t-ratio of this score was 3.9035 at 24 df level which is quite significant at 0.05 and 0.01 level of confidence. It clearly indicates that there is no significance difference in the mean gain score which shows that the hypothesis was rejected. So, the investigator concluded that the teachers must use flipped learning strategies as a method of teaching.

Table 1.2: Mean,SD and t-value of gain critical Thinking scores of experimental and control group girls

| Variables | Experimental Group | | | Control Group | | | SED | t-value |
|-------------------------------|--------------------|-----------|----|---------------|------|------|-------|----------|
| | N | Mean | SD | N | Mean | SD | | |
| Gain Critical Thinking Scores | 25 | 14.606.58 | | 25 | 9.96 | 2.28 | 1.189 | 3.9035** |

****Significance at 0.01 level**

Hypothesis 3. The investigator for the purpose of verifying the hypothesis took all the boys and girls of both the schools. In this way the students of one school i.e experimental was taught through flipped learning strategies and the students of control group was taught through traditional methodology of teaching. After making an evaluation some statistical information are collected, in this case the mean gain score of experimental group was 14.58 and control group was 10.30. It is shown in the table 1.3.

Table 1.3: Mean,SD and t-value of gain critical Thinking scores of experimental group total boys and girls

| Variables | Experimental Group | | | Control Group | | | SED | t-value |
|-------------------------------|--------------------|-------|------|---------------|-------|------|-------|----------|
| | N | Mean | SD | N | Mean | SD | | |
| Gain Critical Thinking Scores | 50 | 14.58 | 6.02 | 50 | 10.30 | 2.57 | 0.845 | 5.0640** |

****Significance at 0.01 level**

The standard error of difference was 0.845 and the t-ratio of this difference was 5.0640. This value is significant at 0.05 level of significance and also at 0.01 level of significance. The significant level of significance clearly shows that the hypothesis was rejected as there was much difference between the two mean gain scores.

EDUCATIONAL IMPLICATIONS

The students of experimental group taught through interdisciplinary curriculum by learning strategy exhibited better results as compared to students taught by traditional methodology. It shows that teachers should use flipped learning strategy to teach curriculum especially to the primary classes, as it is the crucial age when they develop habits, values and attitudes. And interdisciplinary curriculum should be used.

REFERENCES:

1. Beekes, W. (2006). The "millionaire" method for encouraging participation. *Active Learning in Higher Education*, 7(1), 25–36.CrossRefGoogle Scholar
2. Betihavas, V., Bridgman, H., Kornhaber, R., & Cross, M. (2015). The evidence for 'flipping out': A systematic review of the flipped classroom in nursing education. *Nurse Education Today*, 6, 15–21.Google Scholar
3. Bishop, J. L., &Verleger, M. A. (2013). The flipped classroom: a survey of the research. In *ASEE National Conference Proceedings, Atlanta, GA*.Google Scholar
4. Bonwell, C. C. (1996). Enhancing the lecture: revitalizing a traditional format. *New Directions for Teaching and Learning*, 1996(67), 31–44.CrossRefGoogle Scholar
5. Butt, A. (2014). Student views on the use of a flipped classroom approach: evidence from Australia. *Business Education & Accreditation*, 6(1), 33–43.MathSciNetGoogle Scholar
6. Cashin, W. E. (1985). *Improving lectures. Idea paper no. 14*. Manhattan: Kansas State University, Center for Faculty Evaluation and Development.Google Scholar
7. Davies, R. S., Dean, D. L., & Ball, N. (2013). Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. *Educational Technology Research and Development*, 61(4), 563–580.CrossRefGoogle Scholar
8. Findlay-Thompson, S., &Mombourquette, P. (2014). Evaluation of a flipped classroom in an undergraduate business course. *Business Education & Accreditation*, 6(1), 63–71.Google Scholar
9. Gilboy, M. B., Heinerichs, S., &Pazzaglia, G. (2015). Enhancing student engagement using the flipped classroom. *Journal of nutrition education and behavior*, 47(1), 109–114.CrossRefGoogle Scholar
10. Hung, H. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, 28(1), 81–96.CrossRefGoogle Scholar
11. Huxham, M. (2005). Learning in lectures Do 'interactive windows' help? *Active learning in higher education*, 6(1), 17–31.CrossRefGoogle Scholar
12. Kachka R. (2012) Understanding the flipped classroom.
13. Karabuleet, A. ,Jahren C. (2017) <http://doi.org/10.1111/bjet.12548>, published on feb.20,2017.
14. King, A. (1993). From sage on the stage to guide on the side. *College teaching*, 41(1), 30–35.CrossRefGoogle Scholar
15. Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: an overview. *Theory into practice*, 41(4), 212–218.CrossRefGoogle Scholar
16. Larson, S., & Yamamoto, J. (2013). Flipping the college spreadsheet skills classroom: initial empirical results. *Journal of Emerging Trends in Computing and Information Sciences*, 4(10), 751–758.Google Scholar
17. Love, B., Hodge, A., Grandgenett, N., & Swift, A. (2014). Student learning and perceptions in a flipped linear algebra course. *International Journal of Mathematical Education in Science and Technology*, 45(3), 317–324.CrossRefGoogle Scholar
18. McLaughlin, J. E., Griffin, L. M., Esserman, D. A., Davidson, C. A., Glatt, D. M., Roth, M. T., ...Mumper, R. J. (2013). Pharmacy student engagement, performance, and perception in a flipped satellite classroom. *American Journal of Pharmaceutical Education*, 77(9), 196.Google Scholar

19. McLaughlin, J. E., Roth, M. T., Glatt, D. M., Gharkholonarehe, N., Davidson, C. A., Griffin, L. M., ...Mumper, R. J. (2014). The flipped classroom: a course redesign to foster learning and engagement in a health professions school. *Academic Medicine*, 89(2), 236–243. Google Scholar
20. Roach, T. (2014). Student perceptions toward flipped learning: new methods to increase interaction and active learning in economics. *International Review of Economics Education*, 17, 74–84. CrossRef Google Scholar
21. Roehl, A., Reddy, S. L., & Shannon, G. J. (2013). The flipped classroom: an opportunity to engage millennial students through active learning strategies. *Journal of Family & Consumer Sciences*, 105(2), 44–49. CrossRef Google Scholar
22. Rosie, A. (2000). “Deep learning”: a dialectical approach drawing on tutor-led web resources. *Active Learning in Higher Education*, 1(1), 45–59. CrossRef Google Scholar
23. Uzunboylu, H., & Karagozlu, D. (2015). Flipped classroom: a review of recent literature. *World Journal on Educational Technology*, 7(2), 142–147. CrossRef Google Scholar
24. Windschitl, M. (1999). Using small-group discussions in science lectures. *College Teaching*, 47(1), 23–7. CrossRef Google Scholar
25. Young, M. S., Robinson, S., & Alberts, P. (2009). Students pay attention! Combating the vigilance decrement to improve learning during lectures. *Active Learning in Higher Education*, 10(1), 41–55. CrossRef Google Scholar



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