Je-LKS
SPECIAL ISSUE
EMEMITALIA CONFERENCE 2015
Vol. 12, n.3, 2016
ISSN: 1826-6223 | eISSN: 1971-8829
Journal of e-Learning and Knowledge Society
The Italian e-Learning Association Journal

FLIPPED CLASSROOM: THE POINT OF VIEW OF THE STUDENTS

Stefania Della Sciucca
Valentina Fochi

I.T.E.T "A. Mantegna"- Mantova (Italy)
E-mail: stefania.dellasciucca@istruzione.it

Keywords: Flipped classroom, Experience, Questionnaire, Results.

The Flipped Classroom (FC) was tested in three parallel classes of a technical secondary school for two years. At the end of the project, an anonymous questionnaire was given to the students to have a feedback regarding the effectiveness of the new teaching methodology. The students' responses have been analyzed in terms of attitude to the FC, their opinion about the first and second inversion, the teacher time class management and the impact of the model on school performance.

for citations:
Della Sciucca S., Fochi V. (2016), *Flipped Classroom: the point of view of the students,* Journal of e-Learning and Knowledge Society, v.12, n.3, 9-17. ISSN: 1826-6223, e-ISSN:1971-8829

1 Introduction

The aim of this work is to show the results of a project carried out for two years in a technical secondary school. The project concerns the application of the Flipped Classroom (FC) methodology in three parallel classes of the first two years teaching Combined Sciences - Chemistry. The FC methodology consists in the inversion of the classical teaching activity moments: the lectures and the self-study. The transmission of the contents is sent home through online classes (first inversion), while homework, study and revision, exercises and problems are done at school (second inversion) under the supervision of the teacher (King, 1993; Tucker, 2012). The class time without the lectures is organized by the teacher to implement a variety of teaching strategies related to the active learning such as the cooperative learning (Foot & Howe, 1998), the peer tutoring (Topping & Ehly, 1998), the inquiry based learning (Edelson, Gording & Pea, 1999) or the problem solving (Hmelo-Silver, 2004). These strategies require the activation of the student and encourage the development of active cognitive processes through analysis, evaluation and application of knowledge.

At international level, learning experiences inspired to the FC model are grown rapidly both in school and academic practice. Bishop and Verleger (2013) provide a comprehensive survey of the research of the FC and the results show that most studies conducted up to 2013 explored student perceptions and used single-group study design. Reposts of student perceptions of the FC are generally positive, they tend to prefer in-person lectures to video lessons, but prefer interactive classroom activities over lectures. Some evidences suggest that student learning is improved for the flipped compared to traditional classroom (Bergmann & Sams, 2009) however there is very little work investigating student learning outcomes objectively. In a recent paper Gilboy and colleagues (Gilboy, Heinerichs & Pazzaglia, 2015) demonstrate that this instructional approach improves the student-teacher interactions, the opportunities for real-time feedback and the increase in student engagement within two undergraduate nutrition courses. Also in this case the results focus only on students' satisfaction regarding their experience with the FC, however it is valuable to understand students' perception because these findings are promising for future studies. The authors suggest future research can examine grades on assessments from a traditional course compared to grades on assessment from FC.

In Italy learning experiences inspired to FC are grown rapidly too. It is not surprising that one of the last issues of the online informative journal Bricks[1] is dedicated to the FC experimentation from elementary to secondary education.

[1] www.rivistabricks.it

However there is very little scientific work in literature. The paper of Cecchinato (Cecchinato, Aimi & Papa, 2014) and the Pavarani's thesis in mathematics at University of Bologna (Pavarani, 2014) are two examples. The Cecchinato's work is an analysis of the teaching method experimentation in a high school, the "Liceo Paciolo D'Annunzio" (Fidenza), after a year project. He focused his attention on the teachers: their motivations and formation processes, the main difficulties encountered during the application of the FC and the perceived attitude of the students during the class. On the contrary, the relevant part of the Pavarani's thesis is the experimentation of the FC as external teacher in two classes at "I.T.I.S. Leonardo da Vinci" (Parma). She focused on the students' opinion about the new methodology and on the final test results which were both strongly affected by just a month of experimentation.

The advantages of the FC have been widely discussed (Bishop, 2013; Roehl *et al.*, 2013; Mclaughlin *et al.*, 2014; Heinerichs *et al.*, 2016) but, being a methodology that overturns the habits of the students, it must be carried out over a long period, not just for few months or some teaching modules. As Bergmann (Bergmann & Sams 2012) pointed out, it takes a while for students to get accustomed to a new system of learning.

The purpose of this article is to evaluate how students perceive the FC and perform in after two years of experimentation. The impact of this innovative approach to classroom education is discussed in terms of attitude to the FC, the opinion about the first and second inversion, the teacher time class management and the students' school performance.

2 Methodology

The FC was experimented in three first classes of a technical secondary school teaching Combined Science - Chemistry. The experimentation lasted two years and involved eighty students. Activities outside the classroom were handled through the Moodle platform and a YouTube[2] channel. The video lessons were posted unlisted because students could access them only by their virtual classroom. The time class was organized using the inquiry based science learning strategy (Edelson, Gording & Pea, 1999). In the American chemistry education community, POGIL (Process Oriented Guided Inquiry Learning)[3] has become a powerful tool to create conceptual understanding without direct instructions.

[2] https://www.youtube.com/user/stefaniadellasciucca

[3] https://pogil.org

Table 1
QUESTIONNAIRE SUBMITTED TO STUDENTS

Module	Number of posts
attitude toward the FC	1. Did you respect the delivery of watching videos at home? 2. How closely did you look at the video lessons? 3. Did you take notes while you looked at the video lessons? 4. How much did you participate in the activities during the class?
the first inversion	5. Did you appreciate to follow explanations watching videos at home? 6. Did you appreciate being able to review/playback the video lessons? 7. Did you consider self-study at home useful? 8. Was it easy to take notes while watching at the videos?
the second inversion	9. Did you appreciate the help of the teacher during the classwork? 10. Did you consider the teaching activity during the lesson useful? 11. Did you like the way we used the time class?
the teacher time class management	12. Do you think the video lessons proposed by the teacher were clearly explained? 13. Do you think the material proposed by the teacher was quantitatively adequate? 14. Do you think the teacher responded adequately to the questions of the students? 15. Do you think the class activities were appropriate considering the material available?
the impact of FC on school	16. Do you think the FC has eased your learning process? 17. Do you think the FC has improved your school performance? 18. Do you consider your experience with the FC positive?

The FC is ideally set up for this type of learning, so many POGIL activities have been used during the class. At the end of the second year of experimentation a feedback was asked. According to most of the recent international studies (Gilboy *et al.*, 2015; McLaughlin *et al.*, 2014) and on the basis of the Pavarani's work (master's degree thesis, 2014), an anonymous questionnaire was submitted to students. As shown in Table 1, five areas of investigation have been considered: the FC attitude, the first and second inversion, the teacher time class management and the impact of the FC on school performance.

3 Results and discussion

Table 2 reports the average scores weighed over the students of each classroom and over the total. Considering the scale of the answers, 1 nothing, 2 little, 3 fairly, 4 very, 5 very much, each key area has been examined.

Table 2
QUESTIONNAIRE RESULTS IN TERMS OF WEIGHTED AVERAGE SCORE ON THE NUMBER OF STUDENTS IN EACH CLASS AND IN TOTAL; SCALE FOR THE ANSWERS: 1 NOTHING, 2 LITTLE, 3 FAIRLY, 4 VERY, 5 VERY MUCH

KEY AREAS	Question	Classe A (25 students)	Classe B (25 students)	Classe C (27 students)	Total
attitude toward the FC	1.	3.2	4.1	3.6	3.6
	2.	3.1	3.8	3.3	3.4
	3.	3.5	4.5	4.0	4.0
	4.	3.4	3.8	3.3	3.4
the first inversion	5.	2.4	3.5	2.8	2.8
	6.	3.3	4.0	3.0	3.4
	7.	2.7	3.7	2.8	3.0
	8.	3.3	3.6	2.9	3.2
the second inversion	9.	3.3	4.3	3.3	3.6
	10.	3.4	4.1	3.7	3.7
	11.	3.2	3.8	3.2	3.4
the teacher time class management	12.	3.0	3.8	2.9	3.2
	13.	3.4	3.9	3.1	3.4
	14.	3.1	3.6	3.3	3.3
	15.	3.3	3.7	3.5	3.5
the impact of the FC on school performance	16.	2.1	3.3	2.8	2.7
	17.	2.3	3.2	2.5	2.6
	18.	2.5	3.7	2.6	2.9

3.1 Attitude toward the FC

The majority of the students reply that they respected the homework assignment of watching the videos and taking notes given 4 as average score. Otherwise for the attention in watching videos and the participation in the class activities the average scores go down to 3.4. The picture that emerges is that students do what they are asked to do, but they are not fully responsible yet. By analyzing the scores of each class we can see that Class B differs positively and Class A negative compared to the total average values.

3.2 Feedback on the first inversion

In agreement to what has been highlighted at international level (Bishop, Verleger, 2013), the first inversion did not impress the majority of the students who have assigned 3 to this key area, on average. Stands out a score of 3.4 given to the opportunity of review the video lectures.

Looking at each class, the Class B has appreciated a lot following the

lectures watching videos at home, as well as the opportunity to stop and rewind them. It is also positive their opinion about the effectiveness of the self-study and taking notes. It is the only class remained consistent with the statements in the previous key area. The other two groups in fact show a lack of domestic work by assigning less than 3 to the study efficacy and just 3 to the easiness of taking notes.

3.3 Feedback on the second inversion

For this key area the average total scores settle between 3.4 and 3.7. The highest have been assigned to the effectiveness of the activities inside the classroom and the help that the teacher focused on the student needs.

This highlights that among the two inversions students have preferred the second, according to what has been pointed out at international level (Bishop & Verleger, 2013).

The data are confirmed by the insistent request of many of them to have the lectures during the class, as well as the active learning activities, and confirm the poor habit and attitude to do homework. Even for this investigation area Class B has assigned the highest scores, all around 4.

3.4 Feedback on the teacher time class management

This key area is difficult to comment because it is an evaluation of the teacher's work. The lowest score, 3.2, has been assigned to the clarity of the video lessons: this result is not surprising because during the two years of experimentation students had highlighted problems about the sound quality, rather than the speed in the voice narration or the number of contents in each video.

A confirmation of this interpretation comes from the 3.5 assigned to the adequacy and amount of the proposed materials. Moreover, even when the teacher explains in the classroom not everyone understands immediately: the second task for each video lesson has been to take notes of what was not clear and the incoming class activities had been started discussing those unclear points, as suggested by Brgmann and Sams (2012).

The score that the majority of the students had assigned to the teacher's exhaustive answers is slightly higher than 3. This result is not surprising because the teacher has tried to avoid as much as possible direct answers, urging reasoning and discussion between equals. At first there was confusion in the classroom and not everyone immediately understood the meaning and purpose of the teacher's answers.

3.5 Impact of the FC on scholastic performance

This is the area of study in which students have been stricter with the scores, all below 3 for each question. The scores assigned to the improvement of learning and scholastic performance, respectively 2.7 and 2.6, show a perception not really positive of the effects of the new methodology.

These results are quite complex to motivate because different factors must be taken into consideration.

Above of all the lack of domestic work, as previously discussed, makes the methodology weak because the first inversion is missing; also working in team, respecting each other, focusing on, speaking in an appropriate tone of voice are necessary attitudes for the second inversion, but they must not be taken for granted. In fact many students have had the problem of shyness or they shamed to ask the teacher for help, some of them have learned to get help from friends while others have continued to make noise and do not work until the end of each lesson.

Overall the experience of the FC was rated as fairly positive, with a score of 2.9. Also for this key area Class B has assigned the highest scores, all higher than 3.

The results for the last question of the questionnaire "Would you like to continue with the FC also in the next three-years?" confirm the trends already highlighted: in Class B 70% of the students would like to continue working with this methodology, in Class C 52% of the students are in favor of the FC while in Class A only 39%.

Conclusion

The students' evaluations of each class fully agree with what has been experienced in the classroom. For Class A, after a fairly positive first year, there was a decline: during the second year, in fact, students have begun to skip the domestic work, as clearly emerges from the questionnaire. This has made the work during the class much more tiring and unproductive. In Class C, the group of students willing to come into play was a minority and has remained silent and has never managed to become a driving force for the entire first year of experimentation; the situation has improved during the second year. This class has taken longer to become familiar with the methodology and to trust the teacher. The most active and full of enthusiasm were of course the students of Class B for which both inversions have worked. Seeing the active learning in progress has been the best result so that the students themselves have organized study groups also outside school hours. There is no doubt that in this case the FC has won and the effect on the outcomes has been observed.

At the end of the first year of experimentation, the insufficient students were 30% in all classes while at the end of the second, they were 16% in Class B and still 30% in the other two classes.

As highlighted by Bregmann and Sams (2012), it takes time for students to get accustomed to the new system of learning and each class goes with its own pace. For the two classes less likely to change and for which FC had not work, as with any class and methodology, adaptation and adjustments are required.

On the basis of the experiences and the feedback analyzed strategies that could enhance students' learning and their motivation could be the involvement of a larger number of teachers of the class, the improvement of communication presenting information in a smarter and faster way with the use of new technology tools such as PowToon[4], to create animated videos, the diversification of the active learning activities including for example the application of information in a project-based scenario.

REFERENCES

Bergmann, J., Sams, A. (2012), *Flip your Classroom: Reach Every Student in Every Class Every Day*. Washington, DC: ISTE and Alexandria, VA: ASCD.

Bishop, J.L. (2013), *A Controlled Study of the Flipped Classroom with Numerical Methods for Engineers*. www.digitalcommons.usu.edu Utah State University.

Bishop, J.L., Verleger, M.A. (2013), *The flipped classroom: a survey of the research*. ASEE National Conference Proceedings, Atlanta, GA: American Society for Engineering Education.

Cecchinato, G., Aimi, B., Papa, R. (2014), *"Flipped Classroom": intervento in un liceo della provincia di Parma*. QWERTY, 9(2), 15-29.

Edelson D.C., Gordin D.N. and Pea R.D. (1999), *Addressing the challenges of inquiry-based learning through technology and curriculum design*, Journal of Learning Science 8 (3-4), 45-62.

Foot H., However C. (1998), *The psychoeducational basis of peer-assisted learning*. In Topping K.J., Ehly S.W. editor, Peer-assisted Learning, pages 27-43. Lawrence Erlbaum Associate, 1998.

Gilboy MB., Heinerichs S., Pazzaglia G. (2015), *Enhancing student engagement using the Flipped Classroom*, Journal of Nutrition Education and Behavior, 47 (1), 109-114.

Heinerichs S., Pazzaglia G., Gilboy MB. (2016), *Using Flipped Classroom Components in Blended Courses to Maximize Student Learning*. Athletic Training Education Journal, 11 (2), 55-57.

Hmelo-Silver C.E. (2004), *Problem-based learning: what and how do students learn?*, Educational Psychology Review, 16 (3), 235-266.

[4] https://www.powtoon.com

King, A., (1993), *From sage on the stage to guide on the side*. College Teaching, 41, 30-35.

Maclaughlin J., Roth M., Glatt D., Gharkholonarehe N., et al. (2014), *The flipped classroom: a course redesign to foster learning and engagement in a health profession school*, Acad. Med. 89, 236-243.

Pavarani, A. (2014), *Flipped Classroom: illustrazione del modello di insegnamento e resoconto di un'esperienza didattica*. Tesi di laurea magistrale in matematica, Università di Bologna, amslaurea.unibo.it/7066.

Roehl, A., Reddy, S.L., Shannon, G.J. (2013), *The Flipped Classroom: An Opportunity to Engage Millennial Students Through Active Learning Strategies*, 105 (2), 44-49.

Topping K.J., Ehly S.W. (1998), Peer-assisted learning, Lawrence Erlbaum Associate ISBN 97808058250224.

Tucker, B., (2012), *The flipped classroom*, Education Next, 12 (1), 82-83.