

FLIPPED SYMPOSIUM: DEVELOPING THE SPIRIT OF THE FUTURE RESEARCHER

Boris Conan¹, Simon Carolan¹

¹Centrale Nantes (FRANCE)

Abstract

The flipped symposium is the organization by second year Masters students of a symposium concerning a chapter of the course that is not handled by the instructor. In this activity, inspired by the flipped classroom, the students are encouraged to build the course themselves from different bibliographical sources. The specificity of the exercise is the performance of the students who take on the role of a confirmed researcher by reproducing the whole of the scientific dissemination process: collaborative writing of an article, editorial management, the reviewing and the organization of the symposium itself. This activity lets them get a first-hand experience close to that of the work of the researcher, a career envisaged by at least a third of the students. This activity works in the perspective of legitimate peripheral participation.

Keywords: flipped learning, higher education, MOODLE

1 INTRODUCTION

The flipped classroom is commonly described as making the learning experience more time efficient and increasing interactivity in the classroom which leads to deeper learning [1, 2, 4, 6]. This pedagogical model is increasingly used in higher educational environments where it encourages learners to develop greater autonomy and to adopt a proactive approach to their learning [1]. It is also undeniable that faced with the increasing number of students enrolled in higher education and the budget constraints of establishments, this methodology leads to more sustainable management of modern universities [1].

Since the emergence of this technique, the methodology has been adapted to a wide variety of contexts and learning designs including the use of case studies [4] and more recently in professional and further education [2]. Initial results from these experiments highlight the positive impact on student participation within these learning activities as well as upon their learning skills in additional courses that they may follow.

At Centrale Nantes, we experimented the use of the flipped classroom in the format of a flipped symposium in order to encourage potential future researchers to adopt part of the roles and of the subsequent responsibilities of research professionals in the dissemination of research. Our methodology is largely built upon the notion of role-play developed within the Mantle of the Expert [3] where students learn through collaborative problem solving as well as works related to situated learning, largely through the use of Legitimate Peripheral Participation [5] where apprentice professionals engage in peripheral actions within a community, working their way towards the centre of that community and a relative degree of expertise.

To our knowledge, this is the first documented experiment of the use of flipped symposium, allowing students in research-based Masters programs to develop specific professional skills in the dissemination of research. This activity will form a major part of their professional duties, whether they pursue careers in the academic field or in industry.

This paper will detail the methodology put into place for the students to prepare and orchestrate the symposium through the authoring of papers, the reviewing of contributions, the editing of the symposium's proceedings and the organization of the symposium itself. The observations of the instructor and the learning designer will be coupled with the results of a comprehensive evaluation of the activity by the students in order to provide detailed feedback on the impact of the experiment on students and the potential avenues for the future development of the activity and its deployment within other learning contexts.

2 METHODOLOGY

The methodology of the flipped symposium revolves around four main activities; writing, reviewing, editing and organizing. Each of these steps is facilitated by the instructor putting the necessary tools at the disposal of the students with a certain number of recommendations. The onus is then on the students to complete the necessary activities whilst demonstrating autonomy and proactiveness.

2.1 Context

The flipped symposium is organized within the framework of the course Introduction to General and Urban Meteorology (MEGU) at Centrale Nantes, a French graduate engineering school. The course is given to students following the research-based Masters program in Sciences and Technologies of Urban Environments (STEU) and is based around the objective of giving both theory based and practical knowledge of meteorology.

The group is composed of 12 international students from 8 countries (mainly Europe, Asia and North Africa). The course is taught in French, which is the mother tongue for only one third of the group. Historically, around a third of these students go on to study in doctoral programs and those that choose a career in industry have a vocation to work in engineering or research and development departments.

The MEGU course (32 hours) is divided into 4 chapters whose content is traditionally taught through a combination of lectures and seminars. The flipped symposium replaces one of the course chapters which concerns secondary aspects of meteorology in order to acquire general knowledge of the subject area. The chapters that are concerned with the fundamental aspects of meteorology are taught in a traditional way using the combination of lectures and seminars. This choice of a partial use of flipped teaching allows the instructor to maintain control over these aspects of the course.

The objective of the flipped symposium is to increase the participation of learners and to make them actors of their learning. Through situated learning in a research environment, the flipped symposium gives them a primary experience of several of the activities of a researcher; collaborative writing of articles, reviewing of articles and the organization of a symposium. The reproduction of the scientific dissemination process affords them increased autonomy and responsibility.

2.2 Procedure

The flipped symposium is the organization by the students of a scientific symposium dealing with a chapter of the course. The idea is to get them to write, in groups of co-authors and in the format of an article, a chosen chapter from the course (in the form of the flipped classroom). The pooling of knowledge is done in an original fashion by reproducing the scientific research dissemination process through the organization of a symposium. The productions are integrated into the course and are an integral part of the evaluation.

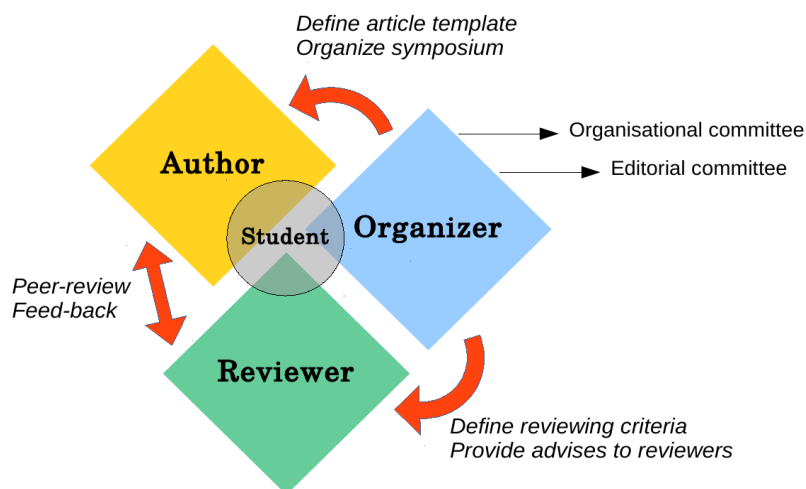


Figure 1: Diagram of the organization of the flipped symposium.

One of the specificities of the flipped symposium is the management of the entire process by the students themselves; editorial management, reviewing of the articles and organization of the symposium. In this way, each student is given several roles (Fig. 1); that of a co-author of a scientific production (Sec.2.2.1), that of a reviewer (Sec. 2.2.2) and that of an organizer in the editorial team (Sec. 2.2.3) or in the organization team of the symposium (Sec. 2.2.4). A great deal of autonomy is purposefully afforded to the students so that they adopt the activity and participate actively in it.

At the beginning of the activity, the instructor explains the learning design, the different roles, gives the important dates (Fig. 2), the outline of the chapter to be dealt with and validates the subjects. Then, he adopts the role of facilitator by giving the students the technical means to carry out the different activities and lets the students organize everything leading up to the symposium where he participates in the sharing of knowledge between groups.

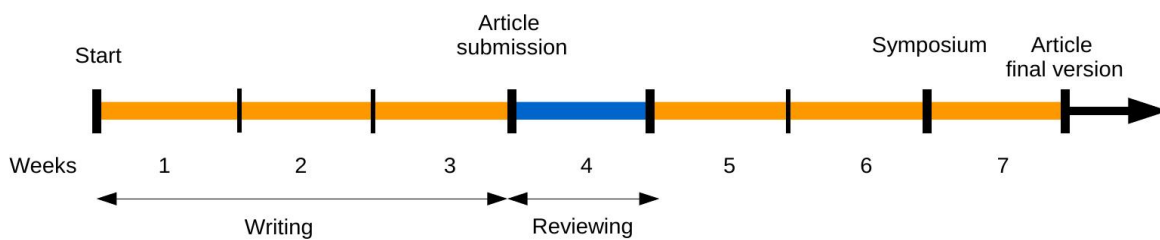


Figure 2: Timeline of the activity.

2.2.1 Writing process

In this collaborative writing stage, the students have the objective of producing an article that is several pages long and that deals with part of the course. The idea is not to propose an original piece of research work but to deal with the subject in a 'state of the art' article based on a literature review. In groups of 2 or 3 students, they choose the theme which, as mentioned above, is validated by the instructor.

A period of three weeks (Fig. 2) is allotted to the authoring groups in order to propose an article whose format matches the criteria defined by the editorial team (see Sec. 2.2.3). After the reviewing of the article (Sec. 2.2.3), the authors receive feedback from the reviewers in the form of a grade out of 100 and comments. A feedback process allows the authors to give an appreciation of the quality of the reviews.

In addition to the article, each group of authors should provide a series of 4 multiple choice questions and a short-answer question with the corrections. These questions form part of the course and at least one question from each group is integrated into the final assessment. This exercise allows them to distance themselves from the course matter and define acquired knowledge.

For the writing step, the instructor puts articles from different journals to initiate their bibliographical research and a collaborative platform for the writing of contributions (Wiki in MOODLE) and for the posting of contributions (Workshop in MOODLE) at the disposal of students. At every step, the authoring activities on the platform are visible by other members of the cohort. The instructor selects the groups that would work together to make sure that there was at least one French speaking member in each author group.

In this phase of the activity, the students acquire technical skills in the subject that they are dealing with in addition to transversal skills; analyzing scientific articles, producing a bibliography and writing a scientific article. They also acquire organizational skills including working in groups, sharing of responsibility and communicating in multicultural environments.

2.2.2 Reviewing process

In this activity, the articles produced by the different groups are evaluated by their peers. Upon completing the writing phase (Sec. 2.2.1), each contribution is evaluated by at least two anonymous reviewers in line with the reviewing guidelines established by the editorial team of the symposium (Sec. 2.2.3). A period of a week is allocated to this activity (Fig. 2). The reviews are then communicated solely to the authors who then have 3 weeks to improve their production by following

the advice of the reviewers. The pertinence of the reviews is evaluated through feedback from the authors to the reviewers in the form of a grade out of 10 with justification for the grade.

Before the activity, the instructor put into place a reviewing tool. In this case, it was MOODLE Workshop, which handles the submitting of articles, the automatic sharing of contributions between reviewers and the anonymous evaluation of the contributions by the reviewers.

This phase of the activity, completed individually, allows the student to put himself in the shoes of a content specialist who evaluates the work of his peers. The review, a crucial step in the mechanism of scientific dissemination, gives the student responsibility for the quality of the work to be reviewed. It also allows him to distance himself from the student's work, providing a constructively critical overview of both his peers work and his own contribution. The reviewing process then allows him to initiate the phase of the pooling of the different parts of the course chapter.

2.2.3 Editorial process

The editorial committee is the body that oversees the writing and the reviewing of articles. Composed of half of the students, the organization is freely chosen by the students with only a certain number of tasks being defined by the instructor.

First of all, it is in charge of defining the layout and the format of the article in order to ensure the homogeneity of contributions. In this case, it provides a template to authoring groups at least one week before the submitting of articles. Secondly, it defines the framework for the reviewing of articles. To this end, it defines 10 reviewing criteria that are to be used to evaluate the contributions. These criteria should be relatively precise in terms of the different elements of the article; quality of the writing, quality of the literature review, the presence of references, links with the course. Last of all, the committee writes a short reviewing charter, defining the critical and proactive role of the reviewer.

The free organization of the students within the organizing committee requires strong organization and communication skills. The choice of the reviewing criteria is also a specific skill set as it requires the definition of the required qualities for a sound scientific article.

2.2.4 Organisational process

The organization committee is composed of the other half of students and has the task of organizing the symposium over a 3 hour class period. The instructor is only responsible for the technical means such as booking the room and the necessary material. The rest of the organization is the sole responsibility of the students.

Before the symposium, based on the list of articles submitted for review, the committee decides upon a program and defines the running of the event (presentation time, sequence, presentation format) and communicates it to the authors so that they can prepare their intervention. During the symposium, the committee handles the running and the timing and chairmen present the speakers and animate the question sessions.

As with the editorial committee, great freedom is afforded to students in the organization of the tasks attributed to the group which allows them to develop their organizational skills and their sense of responsibility. The presenting of the symposium is also an enriching experience for the organizers allowing them to develop their public speaking skills.

2.3 360° Assessment

The assessment of the activity is carried out on several levels; by peers, by the instructor and by the students themselves. It contains both individual and collective assessments.

2.3.1 Peer assessment

The writing of the article is assessed by the peers via the reviewing process, with each member of the authoring group receiving the mean of the reviewers' grades (collective assessment). Each reviewer receives a feedback grade from the authors on the pertinence of the review (individual assessment).

2.3.2 Instructor assessment

The final versions of the articles are assessed by the instructor based on the criteria defined by the editorial committee (collective assessment). This is incorporated with the grade from the reviewers. During the symposium, the presenters are assessed based on their clarity, their capacity to share

knowledge and to respond to questions (collective assessment). A bonus is included in order to individually reward the most active members of the symposium (individual assessment). The committees are assessed on their professionalism and the quality of their work (collective assessment). Last of all, during the exam at the end of the course, several of the questions amongst those prepared by the co-authors (Sec. 2.2.1) are included and assessed (individual assessment). The assessment of the students' work at several stages, allows for a more representative coverage of the activity as a whole.

2.3.3 *Self assessment*

A survey is provided at the end of the activity to assess the pertinence of the activity and its organization but also to allow students to reflect upon the skills that they have developed through this exercise. The questions cover four major points; general appreciation, organization, knowledge and skills and overview and perspectives.

3 RESULTS

The results are presented in 3 formats; a comparison between the assessments in relation to the previous year, the results of the student survey and the instructor's observations.

3.1 Comparison from one year to another

The results of the assessments vary slightly in relation to the previous year. The cohort's mean is practically the same (-2.5% in comparison with the previous year) but the grades are more homogenous. No students had a grade below 40% whereas two students were below this level in the previous year. This could be an indication of a greater interest or of greater investment from the students. At the top end of the ranking, only two students had a grade that was 80% or higher in comparison with four students the previous year. This could be related to the difference in the style of activities between classical exercises and the flipped symposium. Students who did well in traditional exercises can be easily phased by the nature of these interactive activities. In addition, the predominance of collective assessments had the effect of making the student grades more uniform.

However, it is necessary to be cautious when making such statements as the assessment methods are radically different in comparison with the previous year and it will be necessary to reconduct the experiment to have more decisive results. It is also important to emphasize that the assessment design (Sec. 2.3) may not include a great enough emphasis on the transversal skills developed through the flipped symposium; group work, organization, public speaking. This is a possible avenue for improvement.

3.2 Key results from the student survey

A survey built upon 18 questions split into four sections (general appreciation, organization, knowledge and skills and overview and perspectives) was submitted to students following the activity.

All of the students appreciated the activity. The most frequently evoked reasons were the experience of the research process (8/12), group work (4/12) and peer learning mechanisms (4/12).

For 11 out of 12 students, the instructions provided were sufficiently clear and the tools were adapted to the activity. 4 students found the workload fair, 6 of them considered it high and 2 of them found it very high. This exercise obviously requires a greater investment than for a traditional class. Considering the sharing of workload, 7 out of 12 students considered that it was evenly shared going down to 6 out of 12 for the editorial and organization groups. An avenue for improvement could be the nomination of committee chairs.

For the question of scientific skills developed through the activity, all of the students spontaneously responded that they had acquired scientific knowledge with 3 students adding aspects relating to knowledge of the universe of scientific research. In terms of transversal skills, amongst the skills suggested by the students, the most cited include the ability to present work orally (5 out of 12) and in writing (5 out of 12), ability to produce a state of the art (4 out of 12), the ability to have a critical overview (2 out of 10) and the ability to organize an event (2 out of 12). One student claimed not to have developed any of these skills as he had already participated in a flipped classroom experiment. For the majority of students (10 out of 12), these skills would be useful in other courses.

In the overview and perspectives section of the survey, the majority of students (10 out of 12) found it motivating to have responsibilities, showing that the importance of allowing students to develop autonomy in their learning and to prepare them for the professional duties that await them.

For 5 students, organizing work with other group members is not particularly difficult. On the other hand, for 3 students, this is difficult. A possible improvement of this point could be to promote create cohesion within the groups by allowing time for exchanges between the members to discuss the different tasks and to elect a representative.

Some students (3 out of 12) found the instructor's feedback too limited. This observation is shared by the instructor and improvements could be brought to the activity by organizing a meeting between the author groups and the teachers upon the submission of the draft article. A clearer visibility of the assessment steps at the beginning of the course would also be beneficial.

Even though the exercise was appreciated by all of the students, one of them did not particularly like the methodology and 3 students found the lack of formalized guidelines for each step of the activity to be disorientating. This second point is not necessarily to be considered as a negative point as it can foster the learning of certain transversal skills such as problem solving. However, it is important that this disorientation does not last throughout the activity. A more detailed introduction of the working methods and of the different steps could be envisaged to improve the understanding of the process by the students.

In terms of the general comments made by the students, the time-consuming aspect of the activity is relatively prevalent (4 out of 12 students). The positive and negative aspects of group work are also subject to comments from students (3 out of 12). Developing this activity within a wider class on research methodology is cited as a possible avenue for improvement.

To conclude this sub-section and the survey, the vast majority of students are ready to renew this experience with another course (10 out of 12 students).

3.3 Observations of the instructor

The instructor considered that the activity went well as the students were actively involved and the schedule was respected. The students demonstrated a wide range of key skills over the period of the activity.

The editorial team initially faced some organizational problems and the defining of the reviewing criteria therefore required the intervention of the instructor in order not to slow down the editorial process. The nomination of committee leaders could alleviate these issues. Apart from this issue, the students completely defined the rules and organized the activity as planned. The overall quality of the articles was good and they covered a great deal of the course chapter. Some plagiarism and citation issues were observed in certain articles, which highlight the lack of student experience in this type of activity and the necessity to cover article writing through activities like this. The groups of authors rarely used the collaborative writing tool (Sec. 2.2.1), probably because of a lack of knowledge of the tools. A greater introduction to these elements and a description of the importance of collaborative writing is to be envisaged.

The symposium was the highlight of the activity. Thanks to the preparatory work of the organization group, there were rich interactions at the end of each presentation (15 minute presentation followed by 15 minute exchange). All of the participants were actively involved. The instructor, who adopted the role of a participant in the symposium, could intervene to orient questions towards the subjects that were covered in a simple manner during the presentation and if necessary ask for further explanations. This moment of knowledge exchange was a key point of the activity and allowed the cohort to begin assimilating the content of the course. This is the pivotal point of the activity where students collaboratively learn from each other's courses. Giving each student several crossover roles is another pivotal part of the learning design as the students work together to define the rules in different group structures emphasizing the cross-cultural structure of this course.

4 CONCLUSION

The initial objective of the flipped symposium to increase the participation of students and to help make them the actors of their education has been attained. The results from for this initial experiment presented in section 3 show that students adhere to the project and demonstrates a high level of participation and motivation from the students. The strong points of this approach are numerous;

greater student participation, greater student motivation and development of subject-based, transversal and research-based skills.

This is a result of the transfer of responsibility from the instructor to the students and an appropriation of the course material by them. Giving students a hand in their education and helping them become more responsible, appears to be the pivotal point of this learning approach. The students want greater responsibility and it is this responsibility that can motivate them to work on the subject. This notion could clearly be applied to other contexts and for other activities.

In addition to the increased responsibility of students, alternating between group and individual work is one of the advantages of this activity. In addition, the creation of overlapping groups allows each student to have several co-dependent roles that are vital for the success of the process as a whole.

The different points for improvement mainly concern the organizational aspects of the instructor's work; clearer indications at the beginning of the activity to underline the stakes of each role, better explanation of the advantage of using the suggested tools and more precise indications of the assessment methods early in the process.

Faced with the success of this initial experiment, the activity will be used with subsequent cohorts, incorporating the suggested improvements. This will effectively allow us to obtain more detailed and sustainable feedback on the impact of the activity in line with the pluri-annual approach that is highlighted in the literature [1] to confirm the interest in using this learning design to impact the learning process. The accuracy of results will grow in coming years as other instructors from the educational institution have shown a keen interest in adopting this approach for their students in the coming academic year in light of this successful experiment.

REFERENCES

- [1] J. L. Bishop, & M. A. Verleger, (2013). The flipped classroom: A survey of the research. In ASEE National Conference Proceedings, Atlanta, GA (Vol. 30, No. 9, pp. 1-18).
- [2] J. De Stercke, (2015). Une classe renversée à l'École du Feu: récit d'une expérience pédagogique en formation professionnelle. *Formation et profession*, 23(2), 83-86.
- [3] D. Heathcote & G. Bolton, (1994). Drama for Learning: Dorothy Heathcote's Mantle of the Expert Approach to Education. Dimensions of Drama Series. Heinemann, 361 Hanover St., Portsmouth, NH 03801-3912.
- [4] C.F. Herreid & N. A. Schiller, (2013). Case studies and the flipped classroom. *Journal of College Science Teaching*, 42(5), 62-66.
- [5] J. Lave & E. Wenger, (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.
- [6] J. F. Strayer, (2012). How learning in an inverted classroom influences cooperation, innovation and task orientation. *Learning Environments Research*, 15(2), 171-193.