

The Contributions of the Monitoring: Program to the Education in Geoscience and in the Monitor's Academic Formation

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Abstract

Monitoring in the Caçapava do Sul campus, Federal University of Pampa (UNIPAMPA), intends to provide the development in academical activities and techniques inside the Geoscience field, in subjects offered in the curricula of Geophysics, Geology and Environmental and Sanitary Engineering programs. It is a student activity in which helping the teacher to intensify and assure the cooperation between the students and the monitor into the classroom and also in the basic activities on the University related to Teaching, Research and Extension is the main purpose. Therefore, it is possible to intensify the awareness of group importance in knowledge in general, as well as the familiarity with the differences, with conceptual contents, behaviour and proposed activities that are offered to develop in each student the responsibilities itself and with everybody else, always emphasizing the importance of working in a group. Teaching is inseparably related to learning. The goals are the development of conceptual abilities and classroom and laboratory techniques, as well as in extracurricular activities, in order to arouse in the students their interests about the subjects addressed. The main objective of monitoring work is to learn, not only learning about the subject, but also contents related to some procedures, preparing, experiment and, in the matter of fact, everything that is related to the knowledge about living and discussing in a group. Therefore, it is believed that the student/monitor should live this experience provided by teaching and integrate the practical experiences in his formation, in addition and as an improvement of his program.

Keywords

Monitoring, Learning, Teaching, Knowledge

1. Introduction

This article has the objective of the knowledge: not only learning about the subject, but also contents related to some procedures, preparing, experiments and, in the matter of fact, everything related to the knowledge about discussing in a group, aiming a theoretical study in the matters associated to the subject by the teacher and the monitor; a better planning and execution of the activities inside the classroom; the attendance and the monitor advisory in the activities done by the students in the laboratories; to develop the interest about his own knowledge process and the classmates; to explore the potential of each student, interacting with the different learning to share, analyze, construe and valorize the acquired knowledge in daily activities, learning about how to learn, experimenting, arguing and mainly making decisions; searching information, selecting and understanding the mistakes and with this, building new concepts and behavior models, and surely knowing how to hear and respect the others opinion.

Teaching is inseparably related to learning. The monitoring can enable the integral formation of the students, giving them a large, systemic and interdisciplinary technical view (Kuenzer, 2001). It is an intention of trying to build a culture of cooperation into the classroom, through the attitude changes and awareness of the importance of a group in building knowledge, therefore adjusting the thought to learn with differences, controlling conflicts and increasing the human relationships (Masetto, 2001). The contents conceptual and proposed activities related to attitudes are done in group, so developing in the students their own responsibilities, especially learning how to learn and how to study in group.

The importance of monitoring in the graduation subjects goes beyond the title, because it contributes to improving the human life (Severino, 2007). Its importance goes beyond this. It is the contribution to the students, and especially to the exchange experiences and knowledge between the monitor and the teacher. The monitor tries the joys and the problems of teaching. He lives the pleasure of sharing the knowledge, contributing to the student's intelligence and stimulating the learning, as such a professor. The experiences of monitoring contribute to avoiding wrong choices in the future and to finding new vocations to the monitor.

2. Ease of Use

The monitoring is generated in pedagogical projects in the graduation courses at Federal University of Pampa (UNIPAMPA) as a relevant and useful activity to human and professional formation of the student, besides being a complement to the subjects of each program. The Environmental and Sanitary Engineering program was founded in 2011. The UNIPAMPA's monitoring program is regulated by the 29/11 CONSUNI's resolution and it agrees with the established rules in the Program Pedagogic Project, which provides 120 hours to the Graduation complementary activities (ACG's).

In the System Earth subject, the contents are: Introduction to Geoscience and Geology; The Universe and the Solar System; System Earth; Atmosphere; The Earth's Internal Structure; Tectonic Plates Theory; Minerals and Rocks; Volcanism and Plutonism;

Metamorphism; Earthquakes; Deformation and Geological Structures; External Earth Dynamics; Earth and Sediments; The Hydrological Cycle; Sedimentary Environments; Erosive and Sedimentary continental, costal and sea processes; Sedimentary Rocks; The Geological Time Scale; Dating principals; Stratigraphy; Fossils; Historical Geology: Hadean, Archean, Proterozoic and Phanerozoic Eons; Energetic Resources; Climate and Climate Changes (Kearey et al., 2014; Grotzinger & Jordan, 2013; Pomerol et al., 2013; Teixeira et al., 2015). However, in Environmental Geochemistry subject the students found contents about the interactions of substances arising from the natural processes of the Planet and by the human activity in many environments: atmosphere, the ozone layer, Greenhouse effect and atmosphere pollutants; Lithosphere; Geochemical cycles; earth contamination; Organic and Inorganic pollutants in sediments (Gill, 2015; Rosa et al., 2014; Baird & Cann 2011; Apelo & Postma, 2005).

Monitoring Program is offered voluntary or paid, this last option just if the professor has a Teaching Project in the Monitoring category registered in the Research, Teaching and Extension Projects System of Information (SIPPEE). In this case, it is needed to be contemplated with a paid scholarship as an internal or external notice. This study detailed here is part of the Education Project of Monitoring Programs, named "Monitoring, a practice of knowing" (03.008.15-SIPPEE), coordinated by the first author. The monitor is selected by a process, which includes curriculum Lattes valuation, school records, interview, availability schedules and a test. The choosing prevails in the student that reaches the best grade in the selection.

The monitoring in the evaluate subjects was offered in a twelve hour week project. The monitor has access to the materials available in the subject and needs to be organized in eight hours a week dedicating to the monitoring and four hours to orientation activities with the professor/tutor. The monitoring program has the support of the professor responsible for the subject, to help the student, which is helping another student, each one respecting the other's knowledge. It is available to the students in extra classes times, agreed between the students and the monitor. These times are usually available to the classes and with the knowledge of the professor/tutor. The monitor can never substitute the subject professor in the classes' activities.

Teaching is learned by practicing in the classroom, discussing between classmates and improved in years, depending on the interests of the teacher in your own satisfaction, and mainly, in the students' absorption and knowledge (Abramowicz, 2001). The professor/tutor is responsible for supporting the dialogue in the comprehension of education with the Monitor, to show him all the tools needed to transmit knowledge according to each student level. Education, seen as a social practicing (Sacristan, 1995), supports the construction of bonds between the teacher and the monitor, and supports its intellectual growing. In this way, it is possible to help the monitor in comprehending his world in another way of view, learning how to divide and transform himself (Charlot, 2005). The goals suggested have a reason, a vision, and an objective and it directs the monitor in a relationship with knowledge and with the study objects.

Like organization of the orientation to the monitor, is proposed study meetings twice

a month and to improve the knowledge about the matters of the subject, like the references that was selected before by the professor and the monitor; meeting twice a month to plan the activities to be worked together with the students (classes, tasks in group, extra-classes activities). Therefore, it is possible to exchange ideas in the construction of the satisfaction research (questionnaire) between the monitor and the professor. More than this, it was possible to a theoretical improvement in the discussions realized in the meetings. In this way, the professor responsible participate indirectly advising the monitor and in his elaboration of reports every two months about the influence of the monitoring to the learning.

The Monitoring

The monitoring is a learning activity to the students who frequent the subjects “opus citatum”, which the main objective is subsidize the comprehension of the education contents. In this way, it is possible to fix and improve the knowledge of the curricular components of the Environmental and Sanitary Engineering program. The activities developed during the monitoring helps the monitor’s process of learning and education because of the intelligence development and increment are related.

The education is a social program, which the culture and the social context of the professor and the students are reflected and shared (Sacristan, 1995). A near relation between the monitor and the professor allows a relationship between both. The mutual exchange of knowledge increases the experiences lived by the monitor (Isaia & Bolzan, 2007). At the same time that he interacts with the students trying to help them, he increases and develops his own knowledge about the subject.

The monitor image to the students is seen like a substitute professor, even though the official responsibility is indeed to the professor. Some students, even with all the quantity of subjects, do not show interest in the class. This happens because of the shame of some of them, or when they think they are a step forward or because of thinking that had understood all the matters that the professor taught. However, when they are reviewing the subject, they find many doubts. The monitor normally answers these doubts, because the shyness was a problem to ask the professor. Other students see the monitor like a classmate and they do not have interest to find some help, trying to study alone.

3. Methodological Resources

During the first semester of 2015, a research about collecting data was done with the Environmental and Sanitary Engineering students of UNIPAMPA (Federal University of Pampa). The goal of the research is to identify how the monitoring contributes with the apprenticeship of the contents of Geoscience, taught in the subjects. Two classes participated to verify the potency of the monitoring and the points to develop in the monitoring at the same subject in the next semesters.

The sample had 62 (sixty-two) students, which 13 (thirteen) were registered in Environmental Geochemistry subject and 49 (forty-nine) had studied the System Earth sub-

ject. However, had participated voluntarily and anonymously 28 (twenty-eight) students.

In the analysis of the data, it was possible identify that just 11 (eleven) Environmental Geochemistry students and 17 (seventeen) System Earth students answered the research. It is important to say that two of Environmental Geochemistry students gave up before the end of the semester. So, 100% of the Environmental Geochemistry students participated in the research and 34% System Earth students answered the research (**Figure 1**).

In the research, the dates were got from the use of a questionnaire with 12 (twelve) questions distributed in “yes or no” questions, quantitative or qualitative to show the opinion of the students about the participation in the monitoring (see **Appendix**).

Another important aspect is that from the 100% of the students that answered, no one searched the monitoring in the semester that was done the research. To these students it was produced a different questionnaire of the one that was asked to the students that frequented the monitoring. This is to try to understand the causes of the non-frequency.

3.1. Environmental Geochemistry

The reason why the Environmental Geochemistry students do not participate (100% of the students) in the monitoring is variable: 06 (six) students said that the time of the monitoring is not compatible with the subject’s time that they were studying in that semester (**Table 1**). This is because the sixth semester students were not in the subjects that were supposed to be in their semester. In this way, it was offered extra time to do the recuperation exam. Another students did not frequent the monitoring because imagined that it was not necessary when it is questioned the questions during the class (two students). They comprehend the professor explanation (two students); they prefer to study alone (three students); and they prefer to ask the doubts to their classmates (one student) or they did not have questions (one student) or they did not have reasons (one student) and, they say again that the time was incompatible (one student).

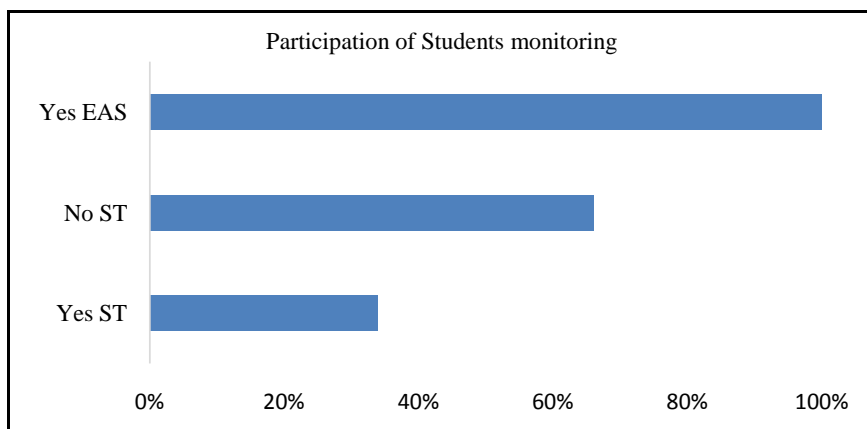


Figure 1. Graphic illustration showing the participation of the students in the monitoring. ST: System Earth, EAS: Environmental and Sanitary Engineering, Environmental Geochemistry. Source: research questionnaire 1st semester of 2015.

In the question “How do you evaluate the subject relevance to your formation?”, 08 (eight) students answered that it is important and the subject is important to other specific subjects, 02 (two) students said that the subject has no importance and 01 (one) student said that did not participated (Figure 2). In this last case, the answer is not comprehensible because the student was legally in the list of students of the class and participated of the classes. This shows the low level of interest of the student.

The students showed their opinion about the aspects of the offer condition of the monitoring even who did not frequent (Table 2). The distance monitoring was an option to 04 (four) students; 03 (three) students said that the aspects were completely positive. 01 (one) students suggested an increase in the number of monitors, bigger rooms and better spaces; and 01 (one) student said again about the incompatible time between the subjects and the monitoring.

Table 1. Reasons to not frequent the monitoring.

	Yes	No
Is the time of monitoring compatible with the time of your subjects?	5	6
How many times have you been in the monitoring during the semester?	None	
		11
Do you ask your questions during the class?		2
Did you understand the explanation of the teacher?		2
Do you prefer studying alone?		3
I do not have reasons		1
Do you prefer ask your questions to your classmates?		1
I did not have questions		1
The monitoring time was incompatible		1

Source: research questionnaire 1st semester of 2015.

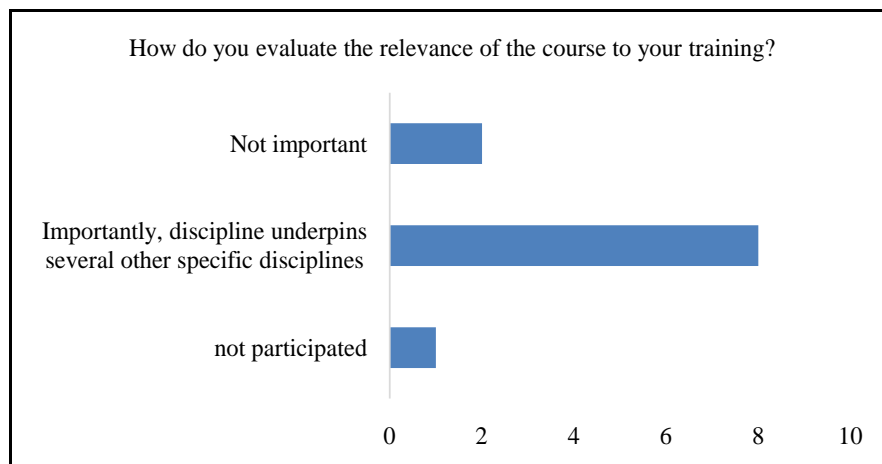


Figure 2. Graphic illustration of the subject relevance in the student formation. Source: research questionnaire 1st semester of 2015.

3.2. System Earth

To the System Earth students, It was proposed a questionnaire to evaluate the participation (or not) to the monitoring, like the monitor attending (**Table 3**).

Although many students were with free time, only 35.30%, 06 (six) students went to the monitoring from one to five times in the semester. The majority of the students, more or less 64.70% (11 students) did not go in the monitoring at extra time at all. Just one student had classes at the same time of the monitoring and it was not possible to frequent to the monitoring.

About the student's achievement of the goals going to the monitoring, 11 (eleven) students did not answered; 03 (three) students achieved all their goals and 03 (three) students achieved partially their goals (**Figure 3**).

In the question "How do you evaluate the subject relevance to your formation?". 16 (sixteen) students, being 94.12% of the students that answered, said that it is important because the subject is the base to many other specific subjects, and only one student

Table 2. Aspects about offering conditions of monitoring.

Distance monitoring	4
Just positive aspects	3
Increase the number of monitors, bigger rooms and better spaces.	1
Incompatible time	3

Table 3. Frequency in the monitoring.

How many times have you been in the monitoring during the semester?	1 a 5	zero
	6	11
Is the monitoring time compatible with your subject's time?	Yes	No
	16	1

Source: research questionnaire 1st semester of 2015.

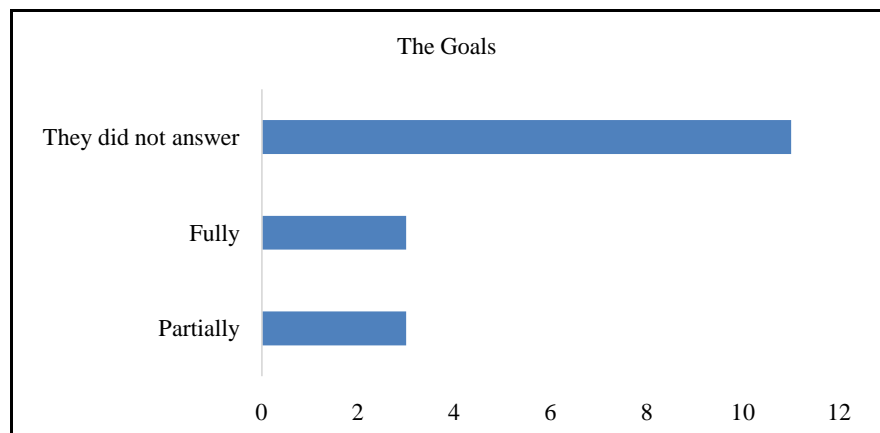


Figure 3. Graphic illustration of the achievement of the goals of the students that frequented the monitoring. Source: research questionnaire 1st semester of 2015.

said that: “To our formation we need the monitoring, because in the laboratory class or in another time they are always ready to help us, always receptive and they can help us, with the professor, in all our doubts.”

In the question about the reasons to go to the monitoring, many different opinions were seen (Table 4). The majority of the students (eleven—64.7%) did not answer the question; 03 (three) students said that is a preparation to the tests that they have during the semester; 02 (two) students answered that it is to improve the knowledge, while 01 (one) student, who frequents the monitoring, suggests that it is because of the absence of teaching comprehension. Another student said that it is important because it complements the class apprenticeship.

Based on the answer of “Which matters were studied in the monitoring?” the students said rocks and definitions (03 students) and 01 student said the Earth emergence. The 13 other students did not give their opinion.

3.3. The Monitor

The students were questioned about the attending offered by the monitor (Table 5), his content mastery in the subject and his availability when he was broached. To this questions, 09 (nine) students confirmed that the attendance by the monitor was good and 08 (eight) answered that it was very good.

The students measured the monitor’s mastery related to the matters discussed in the Monitoring in a unanimous way. All the students responded that the monitor shows mastery and explains the contents clearly and satisfyingly.

Related to the disposal in helping the students with their doubts and difficulties in the contents related to the subject, 16 (sixteen) claimed that the monitor shows disposal when requested.

Table 4. Frequency in the monitoring.

Do not comprehend the professor explanation	1
It is important because is a complement to learn of the class.	1
To be prepared to the tests.	3
To amplify the knowledge	2
Do not answered	11

Source: research questionnaire 1st semester of 2015.

Table 5. The monitor.

	Good	Very Good
How does the monitor offer the attending to the students?	9	8
Does the monitor know all about the subjects that were discussed?	Yes 17	Not Zero
Is the monitor willing when the students need?	Yes 16	Not 1

Source: research questionnaire 1st semester of 2015.

4. The Experience of Being Monitor

Being in the University changes significantly the life of any person. The scientific knowledge is seen over the high school, normally in an isolated way and then, they are quickly integrated in the graduation. One of the main difficulties to the students is exactly how to integrate this knowledge, and transform them in tools to investigate and explanation, applying these techniques in their everyday. Usually it is in this journey that the student needs some help and proper orientation to win the obstacles.

It is necessary to the monitor the knowledge and the fluency in the subjects contents, besides the versatility and creativity in the daily activities. The thematic may need different strategies to achieve the expected results, which are always summarized in being a better comprehension and learning experience to the student. Doing an analogy, it is possible to transfer a dense and complicated knowledge to the students' universe. The use of images, graphics and visual resources, like animations it is crucial to represent processes or situations that are not possible to visualize in the natural time and space.

Teaching in the classroom is treated in a general way in the matter of the necessity of each student. Each thematic is discussed to attend the general objectives in a subject or program. Sometimes, this generates some doubts that are not remedied. They stay without studying and the student only realizes this when comes a test, or when he needs the knowledge to do an exercise. Many times the students look for the monitoring to solve another specific theme. The frequent attendance is to prevent that this cases happen, or minimize them. In this way, the Monitoring has a specific character, where there is a search by the students for a complement to what they discuss in the classroom. In this moment, we need to be sensible, because it is possible to identify some situation that occurs in the same class, and it is the monitor and the professor responsibility to do an adjustment or a change in the teaching strategies to better attend the students.

There are some situations in that the student searches for the monitoring because of great difficulties in a certain content. In these moments, it is crucial to identify what are the reasons that led him to not follow the subject in a satisfactory way, and help him in the improving of his knowledge and performance. One of the most common reasons is the spaces between the contents studied by the student and this is essential to develop the subject. These facts are frequently occurring in several classes, possibly because the students were not properly helped. During the research semester, two situations were founded at UNIPAMPA, on the Environmental and Sanitary Engineering program. At first, in a first semester class of System Earth and second, in a sixth semester of Environmental Geochemistry subject.

Comparison between Classes

1) The freshmen

The introduction of a student for the first time in the graduation program deserves a special attention by the teachers and the University. In several cases, this introduction is based on changes, mainly in the manner of teaching. In regular high school, the student

instruction depends a lot on the school. However, in the graduation the student build his knowledge in an independent way.

Changing is also a present factor in the beginning of the student in the university, in responsibilities and at the new home. The majority of the UNIPAMPA's students come of another states, far from here, and they need to guarantee their own responsibilities. This big change is very important to the adult life, because normally is the first time that they are being responsible for themselves.

It is very common that in the first year of the course the student feels a lack of knowledge to identify what he or she most like about the subjects. The responsibility to approach the theory and the practical activity together is divided between the teacher and the monitor, with complementary activities when the student sees how the daily work is done.

As a result of the new selection system to apply in the University it is notable the difference between the knowledge levels in the first semester students. This difference has a direct influence in the students' performance, mainly in the beginning of the course indeed, because the preparation to understand and solve the many situations vary between that very well prepared until the ones that doesn't have resources to face this situations.

The cultural diversity is a peculiar fact in Caçapava do Sul campus. The Environmental and Sanitary Engineering program, like the others, has many professors of other Brazilian states, like São Paulo, Minas Gerais, Rio de Janeiro, Bahia and others. This diversity turns the Monitoring an enriching experience, and at the same time, challenging. These are the reflections of a country with continental dimensions. The adaptations to too many unique realities drive the monitor to search for a proper language to each group of student. In addition to the political division between the states, there is also the past of each student. There are students from big urban centers, students that used to live in medium-sized cities, students that were born and raised in small towns and even in rural areas. Another important factor is the difference between the ages founded in the course. There are really young students, with eighteen years old, and students with more than forty years as well.

2) The veterans

Besides all the difficulties found by the beginners, the sixth semester students have problems to relate the subject to the professional future. The necessary subjects to learning well were given in a theoretical way, with practical field activities and laboratory classes. This way, approaches the professional difficulties that will be lived for each one, as working in a company as working in the university. However, this work is passing about a awareness time, because in some cases the low motivation of the student has a big participation to the bad scores or the bad apprenticeships. These facts change the situation to a challenge to achieve good results and knowledge.

The absence of knowledge in some matters that were already studied in other subjects is present in the students. This knowledge is important to the next subjects. To avoid this problem, some extra references were indicated and it is done in a specially

attention to this matters and students.

5. Conclusion

This experience of monitoring gave to the student activities which help the teacher to increase and make sure of cooperation between the monitor and the responsible professor in the basic activities in the university about education, research and extension. Therefore, the awareness of the importance of groups as a unique group together in the knowledge construction was increased, and also the importance of living with the differences was increased too. Some conceptual subjects, activities and procedures were experienced to develop the student responsibility to himself and to the others, especially learning to work in group.

About the research, the results show the efficiency of the monitoring. To the assiduous students in the monitoring, the subjects studied and the monitor knowledge contributed to the student's learning. Though the monitoring available time, many students did not frequent the monitoring because of the incompatible subjects and monitoring time.

Anyway, the monitoring is a continuous learning and an exchange of knowledge that includes the students, the monitors and the responsible professor.

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Appendix

Sample Questionnaire for Monitoring of Environmental Geochemistry and System Earth

- 1) How many times have you been in the monitoring during the semester?
- 2) How do you evaluate the subject relevance to your formation?
- 3) What are the reasons to frequent the Monitoring?
- 4) Reasons to not frequent the Monitoring
- 5) Is the monitoring time compatible with your subject's time?
- 6) How does the monitor offer the attending to the students?
- 7) Does the monitor know all about the subjects that were discussed?
- 8) Is the monitor willing when the students need?
- 9) Aspects about offering conditions of Monitoring
- 10) Which matters were studied in the monitoring?
- 11) About the methodology used in the monitoring, opine.
- 12) Leave your opinion on practices that could improve monitoring.

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