

Definition of assessment criteria / Self-assessment

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Summary

This article studies the development of the self-assessment of a group of eleven to thirteen-year-old pupils, through the definition, interpretation and use of assessment criteria in a group work context on the resolution of an inquiry activity on properties of the quadrilaterals. The results obtained evidence that the pupils had exceeded the expectations of the teacher, identifying criteria approaches next to the teacher ones. The appropriation of the assessment criteria in parallel with the development of a critical capacity had contributed to a better performance of the realization of the tasks and of the capacity of communicating mathematically.

Introduction

Throughout several years of teaching maths and others areas of learning developed with pupils, and also as a class tutor I had to face the necessity to clarify or to argue the criteria used in assessment.

The questions of justice of attributed classification, based on the defined assessment criteria at the level of school and subject groups, the understanding of the criteria on the part of the pupils, the meaning of these criteria to each pupil, the intervention of the teacher in order to improve the performances of the pupils had been interrogations that I had been stating myself with not always easy-to-find answers.

With the support of the investigation group of Projecto AREA², persuaded that the pupils were capable of their self-assessment, I decided to put under consideration to a group of twenty pupils of a class, the construction and application of criteria approaches that served as auto-regulation and simultaneously allowed a bigger conscience of the teachers task as well as their own in the assessment process. We thus looked forward to understand in what way the pupils worked the criteria approaches. For such purpose we formulated the following questions:

- How do pupils define the criteria approaches associated to a task?
- In what way the criteria of assessment defined by the pupils approach to the teacher's ones?
- In which way do pupils use his or her criteria of assessment?
- Does the use of criteria approaches contribute for self-assessment purposes?

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The definition/appropriation of assessment

Since the ends of years 60, educators became increasingly interested in understanding the attempts of the pupils to control their own efforts of learning and accomplishment. The emphasis in formative assessment as a part of the learning process gained force (Crockcroft, 1982; NCTM, 1991; 1995; 2000), and has come to change the culture of assessment from serving selection and exclusion to improving learning skills.

For Santos (2002) the regulation of the learning is understood as an intentional act that, acting on the learning mechanisms, contributes for progression and/or of learning reorientation. The regulation of the learning will be the result of some processes: formative assessment, co-assessment and self-assessment (Santos, 2002) varying overall onto the role of the pupil and the teacher in the process. To involve the pupils in the assessment, through self-assessment, constitutes a form of helping them to learn and to understand the aspects to improve. *The Norm for the transparency* (NCTM, 1995) relates that the assessment praxis must give the knowledge to all intervening parties of “the rules of the game”, that is, to inform in time how data will be collected, how results will be used, which criteria approaches are used, what the pupils have to know and what is expected from them.

When speaking on assessment it is impossible not to speak of assessment criteria. According to Nunziati (1990), the assessment criteria are the generally implicit rules, to access in what way a pupil carried through a work, acquired certain knowledge or established positive interrelation with the others. Several authors categorize them in *criteria of accomplishment and criteria of success*.

The accomplishment criteria relate to procedures, concrete acts we expect the pupils to perform from what we ask them to do. The success criteria, on their side, are directed to the final results, defining acceptance levels. The success criteria can be changed into accomplishment criteria in case they are used in assessing learning improvement and be used by the learner instead of being used for measure (Bonniol & Vial, 1997).

The assessment criteria are therefore a referent either for teachers or for pupils. However the valued criteria, despite explicit, do not have necessarily the same meaning for all those to whom they are presented (Pinto, 2002; Morgan, 2003). The interpretation and use made for ones and others may be different, in other words, the comparison between what a person gets and what is intended to be got not necessarily match.

The spreading of the criteria by itself, does not lead automatically to a more efficient performance. Its use depends, in part, on the degree of acceptance and internalization of the objectives, standards or individual's criteria (Sá, 2004). In the organization of the self-assessment it exist, therefore, two important phases, one of the appropriation of criteria and other of the organization of self-assessment functioning (Nunziati, 1990).

To make that the assessment criteria were known and appropriated by the pupils is not, nevertheless, an easy task. The regulating action promoted by the teacher must contemplate the explicit /negotiation of assessment criteria. It is intended that the pupil goes interpreting progressively and understanding every time better the one that the teacher waits from him, and, in this sense, the criterion is temporary and evolutive, once being associated straightly to the apprenticeship and acting on it, it changes for each phase of pupil's development. By the way the pupil should go having the perception of the differences that exist between one he did and one he was expected to do and from there to act intentionally in the sense of to remove or to reduce those differences. It is in the continued work with those criteria that the understanding on them is going loping.

Methodology

In accordance with the purposes of the study a methodology of qualitative and interpretative nature was proceeded (Bogdan & Biklen, 1982; Erickson, 1989). The investigation activity elapsed with a mixed class of twenty pupils, from a public school in a city localized in the centre of Portugal. Its ages rounded eleven or twelve years old and they were on the 6th grade, during the 2005/2006 school year.

The pupils, twelve boys and eight girls, had good school results and work habits, they were motivated and interested and they revealed easiness of accomplishment of group works and of research but relationship difficulties existed, of acceptance of the differences, vanity and excessive competition.

From January, the pupils were informed of the study that they would accomplish and it was chosen the task to propose to them (Annexe 1). Negotiated the constitution of the work groups, the pupils defined the assessment criteria relatively to three categories “Behaviours and attitudes”, “ Knowledge of the matter ” and “ Presentation of the work” and for each category they made a listing of indicators, setting them out in way to correspond to the scales of classification that were already woken. With base of the works of the five groups and for the three defined categories some of the criteria were re-negotiated and adjusted and in the end it was made the synthesis of his proposals, which turned in the grill of classification (Annexe 2).

Although foreseeing the difficulty of pointing out determined items, I opted for not influencing the choice done by my pupils because it was my intention to know what they valued in the different aspects that involve the accomplishment of a task and in the respective assessment.

In April, the works of the groups were picked up together with the grill of self-assessment properly filled out. At this time I verified that the filling out of the grill lifted some problems to the pupils, namely when some of the elements of the group has been highlighted, for positive, or for negative reasons. The form that I found to surpass this difficulty was to make them rethink, through my written comments, the way of improving the works in accordance with the criteria for them own told for “Is satisfactory well” in each one of the categories. Thus, after the correction of the written resolutions of the task I returned them together with the grills of assessment, with information, comments and suggestions for the improvement. Per times by their request, there was need of, in conversation with the elements of each group, to explain better some aspects of my written feedback mainly in the questions that linked with the mathematical contents, which I intended that were well understood and quite hard-applied.

In May the groups presented its works using the supports and the way that understood convenient. Each group had the charge to observe another one and in the end to do the appreciation of descriptive way about the *quality of the presentation* and of *the materials* and to propose a classification. After that, each group must discuss and write a final self assessment and propose their one classification.

Collecting the data had for support the observation of the classes and the analysis of the pupils’ registers written in several moments, namely the filling out of the grills of assessment, the resolution of the mathematical activity and the final self-assessment of the groups.

The analysis of the data was made along the whole process. The whole material was organized and classified, trying to settle down followed relationships among the different categories.

Presentation and discuss of the results

In March of 2006, I made a first rising of the ideas that the pupils had about the assessment of a work in any discipline. Leaving of a brainstorming it was elaborated with them a listing of aspects to observe and later on assembled in three categories: "*Behaviours and attitudes*", "*Knowledge of the Matter*" and "*Others – Presentation of the work*".

For each category they made a listing of indicators, setting them out in way to correspond it to classification scales that were awake after great discussion in "*Not satisfactory*", "*Satisfactory*" and "*It Satisfies Well*" or something equivalent.

<p>• <i>Comprometimento e Atitude</i></p> <p>1 → Participação ← <i>Um Nativo que se quando ... sat. e quando ... s. Bem quando ...</i></p> <p>2 → Funcionamento</p> <p>3 → comportamento</p> <p>4 → Interesse</p> <p>5 → responsabilidade</p> <p>* <i>Atenção à apresentação</i></p> <p>* <i>Enriquecimento da Matéria</i></p>	<p>1. Não Sat. - quando o aluno não participa.</p> <p>Sat. - <i>qual quando o aluno faz alguma participa um pouco mais também não tanto!</i></p> <p>S. Bem - quando o aluno participa em todos trabalhos.</p> <p>2 - Não Sat - quando o aluno não funciona correctamente.</p> <p>Sat. - quando o aluno funciona correctamente mas não tão bem para marcar S. Bem.</p> <p>S. Bem - quando o aluno funciona excelente.</p>
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As one can see in the Annexe 2, in the category "*Behaviours and Attitudes*", the pupils defined six indicators, being the first five more related with the phase of accomplishment of the works for the groups and the last to be applied in the final phase of presentation to the group. This indicator and the two of the category "*Presentation of the work*" were incomplete in this phase of construction of the grill because the pupils referred they be not capable to foresee what would be important to observe then. In the category "*Knowledge of the Matter*" the pupils proposed five indicators – *It dominates the contents; Correction of the Information; Quality of the text; Understanding of the task and Resolve the task* – revealing that for them were important either the capacity of dealing with the mathematical concepts, or the clarity of the mathematical communication.

In April, the works of the groups were picked up together with the grill of self-assessment properly filled out by the respective groups. The filling out of the grill lifted some problems to the pupils, namely when some of the elements has been standing out, for the positive, or for the negative reasons. I gave indications in the sense they could make reference to those situations if they found important. For example, one of the groups marks the item "It was satisfactory well" in the Participation but there is a note that refers "*Everybody had worked, standing out André who worked more*".

According to the established with the pupils, the works and the grills of assessment were for me picked up, appreciated and commented. The filling out of the grill for the pupils reflects two important aspects: in what it refers to the "*Behaviours and Attitudes*", the pupils were capable of, with some easiness and justice, self evaluated, being his appreciation very close to mine, as one can read in my comments by the time "*Regarding the functioning of the group I agree with your assessment*". In what it refers to the "*Knowledge of the Matter*", the difficulties I perceived during the preparation of the grill (definition of the indicators) turned up now mirrored in the appreciations of the pupils. All they found, in a first moment that had solved the task correctly.

In the following picture the synthesis of the self-assessment of five groups (A, B, C, D and E) can be seen. Just the Group B is always self evaluated in "Satisfactory". The remaining groups have more levels "It satisfies well".

Knowledge of the matter	Not satisfactory	Satisfactory	Satisfies Well
<i>It dominates the contents</i>		A – B – E	C – D
<i>Correction of the Information</i>		B	A – C – D – E
<i>Quality of the text</i>		A – B – D	C – E
<i>Understanding of the task</i>		B – C – E	A – D
<i>Solve the task</i>		B	A – C – D – E

This first application of the grill by the pupils was quite discussed in a class. I intended the pupils perceive themselves that, at that time, their appreciations stood back of mine and that there were aspects of the mathematical contents and quality of the mathematical communication that they could not of being improved and that I knew that they were capable to do.

After the correction of the written resolutions I returned to all the groups the grills of assessment and the works, with information, comments and suggestions for the improvement of the works. I wrote in all the grills sentences of the type "Regarding the knowledge of the matter you must try to improve in accordance with my indications" and in the corresponding math works I wrote "You must be careful with the orthographic mistakes", "You must use or complete with the mathematical appropriate terms" or, "You must use terms such as the diagonal, the same length, different lengths, middle point, ..." or "You can still reach also conclusions for the figures in its set". Referring one of the points that we woke to talk in this Project AREA, it seems to me that in this case the teacher's feedback (written or oral) has performed like one more motivator element of the regulation of the pupils' learning. A group wrote in the final appreciation "The grill helped us, but it helped us more what *stora* said in the original work".

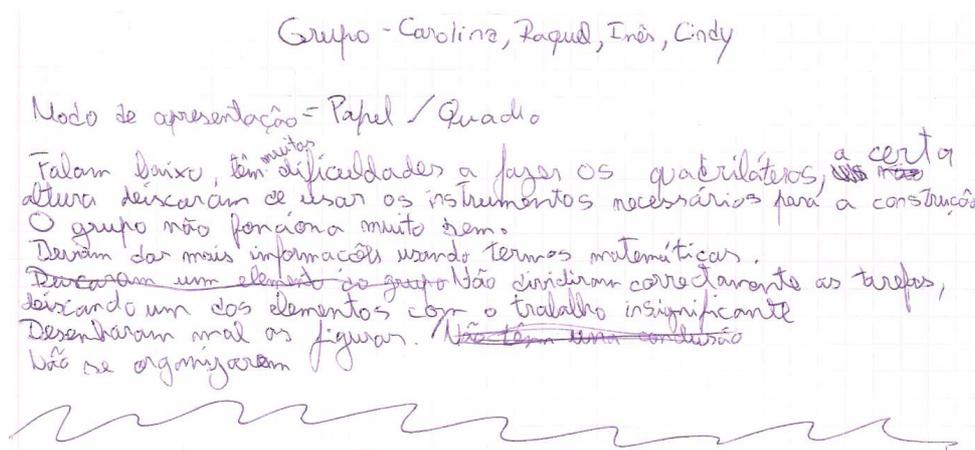
When the grills and the productions were returned, the pupils had eight days for, out of the classroom, improve and prepare the presentation. All the groups showed zeal in re-formulating its works, trying to improve them. Here I should remember that it was a very competitive class and even those groups, which in the departure already have a good level in the accomplishment of the task, knowing that I was giving a improvement hypothesis to all, they didn't stop taking advantage of that opportunity. Just one of the boys' groups went leaving the subject to crawl and later they alleged not to have time for meet each others. This fact was questioned animatedly by other groups that found the time and the way adapted.

The presentation of the work produced elapsed in two classrooms of 45 minutes. The pupils, in group, would do the presentation of his works using the supports and the way they understood convenient. In all the groups all the pupils intervened. Of noticing that the boys' group that I referred previously was that who worst organized the presentation denoting clearly the lack of previous preparation

Each group had the charge to observe another group and in the end to do the appreciation about the quality of the presentation, of the materials and to propose a classification ("Not satisfactory", "Satisfactory" and "It satisfies Well").

Remember that this item “*Presentation of the work – Organization*” was not filled initially by the pupils in the elaboration of the classification grill. According to them, at that time, they had difficulty in foreseeing what could choose as indicators.

Thus, in the presentation day, it was awake that the appreciation would be made in the descriptive way. This appreciation was susceptible of being complemented by any other element of the group and the authors of the works had entitled defense. It can be read in some groups the following:



Group - Carolina, Raquel, Inês, Cindy
Way of presentation = Paper/ blackboard
They speak low, have many difficulties in making the quadrilaterals, at certain time had left to use the necessary instruments for the construction.
The group does not function very well. They had to give to more information using the mathematical terms

In the final self-assessment of some groups one can read:

“We work well, distribute the tasks, we got organized and made our best to improve the work”.

“We learn more on quadrilateral and realize still better the diagonals”.

The final classification was proposed by the groups incorporating the self-assessment and the assessment done by the pairs. These proposals were discussed in the class and later on ratified by me. Two groups obtained the classification of “Satisfactory“ and three groups obtained “It Satisfies Well”.

Conclusion

The persistence the pupils demonstrated along whole process revealed that this was a significant work for them who wrapped up since the first moment and took in a serious way the possibility to intervene straightly in the construction and application of an assessment instrument.

This experience surprised me for several reasons. It was positive to notice that when confronted with the reality of the assessment, the pupils understood better than I expected what teachers value; also quite positive aspects were the wealth and diversity of the defined criteria, the care in the accomplishment of the task, the involvement in all the stages of the work, and the great sense of responsibility for having been given to them the possibility to create the elements of their own assessment.

The selection of open tasks with an investigative nature seems to me to be adjusted to the objective of involving pupils in a process of appreciation of the resolution quality, not restricting to aspects of right vs. wrong and for propitiating the accomplishment in group work, a friendlier ambient for the self assessment of the pupils.

Another aspect that surprised me was the fact that pupils were too ambitious, because they hope the grill was good enough for every purpose. The dilemma of the negotiation got up then - commitment between one that I found more appropriate and the one they wanted that was included in the assessment criteria.

The appropriation of the assessment criteria in parallel with the development of a critical capacity had contributed to a better performance of the realization of the tasks (Black *et al.*, 2002; Santos & Gomes, 2007), and of the capacity of communicating mathematically. During the period of this experience there was always on behalf of the pupils the notion of justice in the assessment of others and the recognition that to evaluate is not a task simple at all. They became more pondered in the criticism they made each other or regarding the classifications of works that they received from any discipline.

In the end of this experience I was convinced that the simple spread of the criteria of assessment is not enough so that the pupils automatically try to improve their performances. In a first phase, they have to be internalized and in a second phase they have to be put in functioning by each pupil so that there is a true "self-regulation", in an continued experience in the time. The construction of the assessment criteria should be negotiated with the pupils and being extremely important the teacher' role (Perrenoud, 1998).

The teacher should be motivated and to believe that it is worthwhile, noticing that there are advantages for the pupils once it helps to understand them better what is proposed to do (Nunziati, 1990) and consequently they improve their performance.

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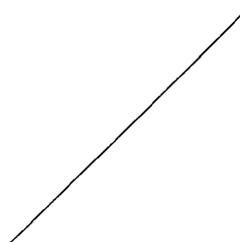
Annexe 1

Adapted from Projecto “Explorar e Investigar para Aprender Matemática” (1999) *Investigações Matemáticas na sala de aula, propostas de trabalho, Geometria*, Lisboa; Matemática para todos e APM.

In search of quadrilaterals

In the figure a line is represented:

Figure 1



If we trace a new line segment that crosses the first one and unite the extremities of these two line segments, we obtain a quadrilateral, as you can see in figure 2:

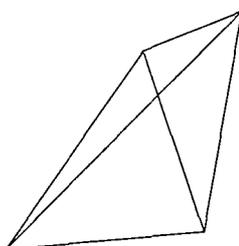
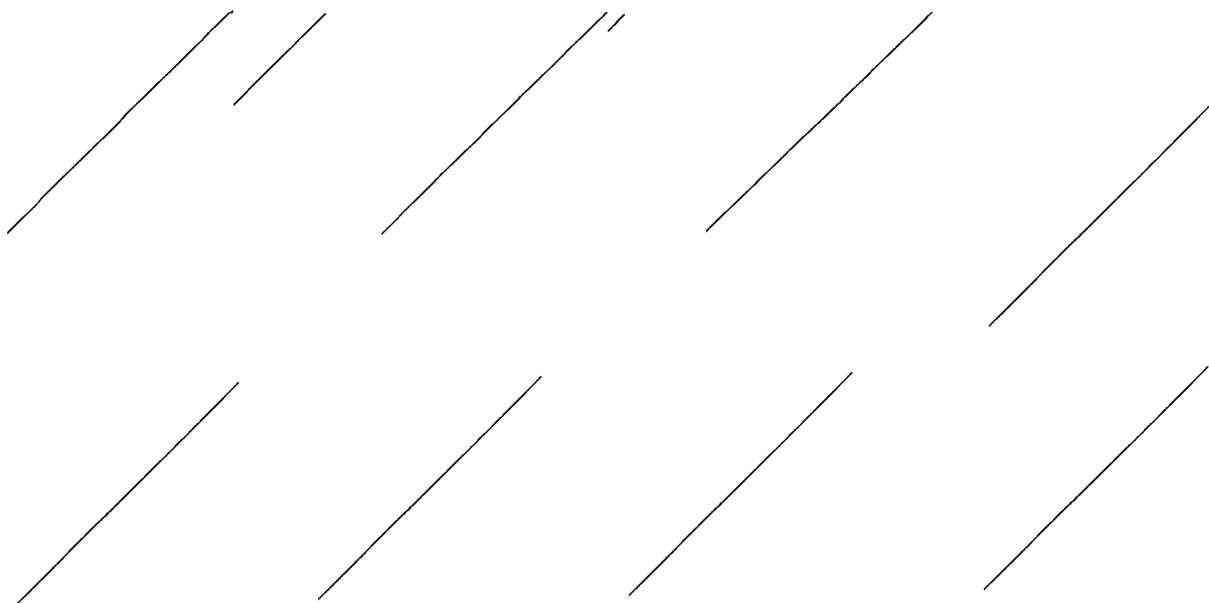


Figure 2

Activity 1

Trace line segments that cross the ones that are already drawn and try to obtain other different quadrilaterals.

Por baixo de cada quadrilátero que conheceres escreve o seu nome.
Underneath each quadrilateral you know, write its name.



Activity 2

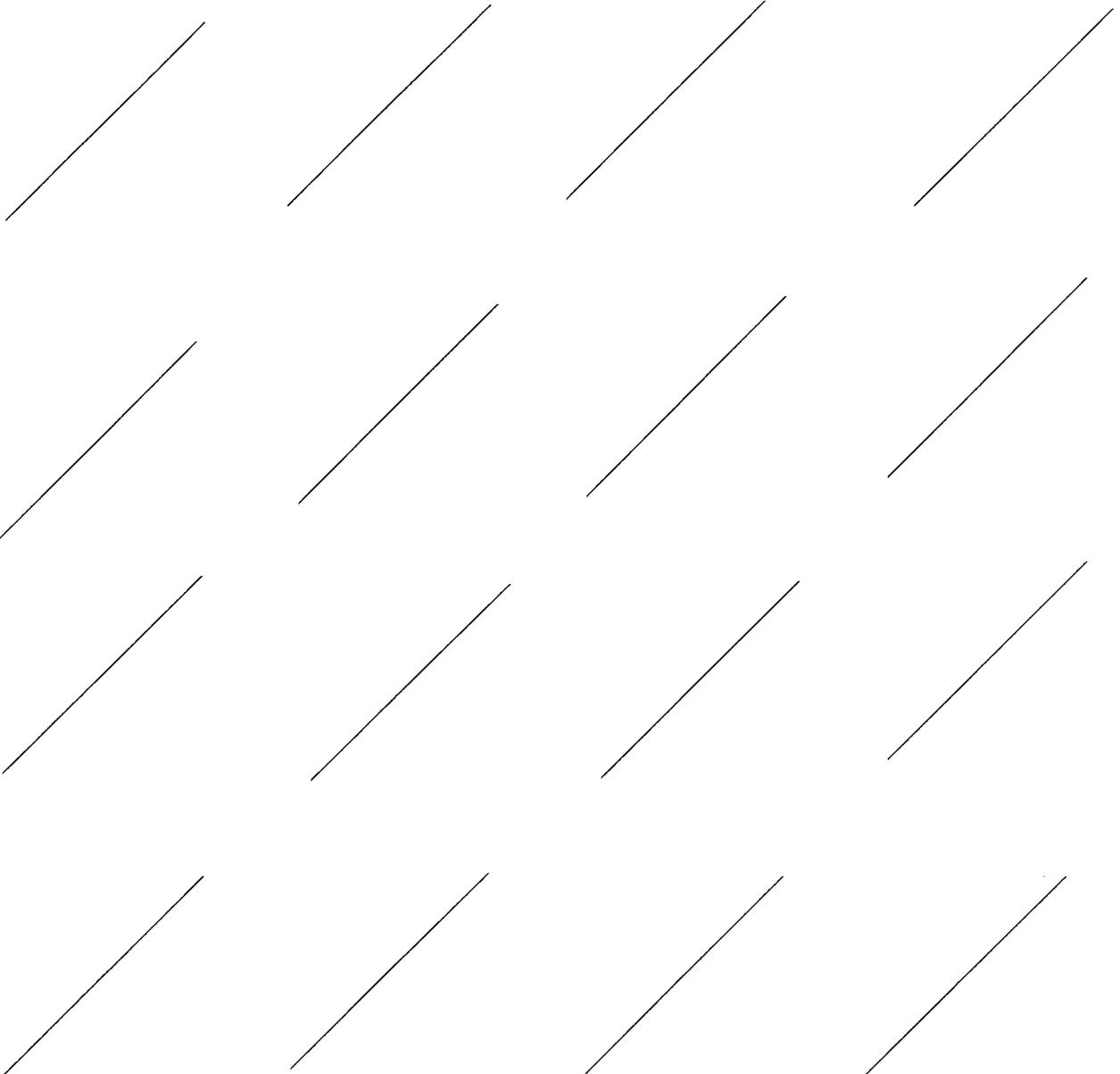
In figure 2, you can note that the two line segments don't have the same length. You can also verify that none of them is crossed to the middle by the another.

How should you draw the second line segment if you want to get a parrot?

And if you want to get a rectangle? and a rhombus? and a square? and a parallelogram?

Makes the attempts you want to and write your answers.

You should explain well the way you thought and you should use the terms that you learned on quadrilaterals.



Annexe 2

Behavior and attitude		
<i>Participation</i>		
Not satisfactory	He(she) one doesn't participate, doesn't give ideas	
Satisfactory	He(she) participates not very much, is rarely attentive	
It satisfies well	He(she) participates, gives ideas, is attentive	
<i>Operation</i>		
Not satisfactory	we are always to arguing	
Satisfactory	we understood more or less each other	
It satisfies well	we understood well each other	
<i>Behavior</i>		
Not satisfactory	He (she) is always playing	
Satisfactory	once in a while he/she amuses and he/she speaks	
It satisfies well	He(she) is always attentive and to work	
<i>Interest</i>		
Not satisfactory	He(she) doesn't have any interest for the work	
Satisfactory	He(she) has some interest in the work	
It satisfies well	He(she) doesn't give up and is interested to the maximum in the work	
<i>Responsibility</i>		
Not satisfactory	He(she) doesn't accomplish the tasks that are attributed	
Satisfactory	He(she) accomplishes some tasks that are attributed	
It satisfies well	He(she) accomplishes all the tasks that are it attributed	
<i>Attention to the presentation (*)</i>		
Not satisfactory	He(she) speaks when a group is presenting the work	
Satisfactory		
It satisfies well	He(she) shows interest in the work of the other ones	
Knowledge of the matter		
<i>Dominates the contents</i>		
Not satisfactory	He(she) doesn't notice, doesn't try to know	
Satisfactory	He(she) makes a little effort to know	
It satisfies well	He(she) notices the matter without difficulty	
<i>Correction of the information</i>		
Not satisfactory	He(she) doesn't know, doesn't correct the information	
Satisfactory	He(she) tries to correct even with difficulty	
It satisfies well	He(she) corrects what is wrong	
<i>Quality of the text</i>		
Not satisfactory	It is badly and with very little information	
Satisfactory	It has little information but it is reasonable	
It satisfies well	When the text has correct information and good quality	
<i>Understanding of the task</i>		
Not satisfactory	He(she) doesn't understand the task	

Satisfactory	He(she) understands some of the tasks	
It satisfies well	He(she) understands well the tasks	
<i>Solves the task</i>		
Not satisfactory	He(she) doesn't solve the tasks	
Satisfactory	He(she) solves some tasks	
It satisfies well	He(she) solves well the tasks	
Presentation of the work		
<i>Graphic presentation</i>		
Not satisfactory	the work is terribly presented	
Satisfactory	the work is reasonably presented	
It satisfies well	the work is very well presented (with everything in order)	
<i>Organization (**)</i>		
Not satisfactory		
Satisfactory		
It satisfies well		

(*) in the phase of works' presentation

(**) there was not any proposal in this phase.